ALUMINIZED TYPE 1 TUBING is manufactured from hot dip aluminized sheet steel with either a T1-13, T1-25 or T1-40 coating weight.

AK Tube’s Aluminized Tubing is manufactured in accordance with ASTM A787. Our innovative manufacturing process provides a highly formable, cost-saving solution for bending, flaring, beading and other severe forming applications.

Due to its strong resistance to moisture and salt corrosion, Aluminized Tubing is an excellent choice for Exposed Truck, Auto and other applications. These include Automotive Parts, Structural Members, Exhaust Systems, Burner Tubing, Radiant Heating, Pneumatic Carriers, Radiator Returns and Playground Equipment. Aluminized is also an excellent substrate for painted applications. Aluminized tubing can be bent, beaded, pierced, notched, flared, swedged, expanded and painted.
ALUMINIZED TYPE 1 TUBING

Product Description

PRODUCT FEATURES

CORROSION RESISTANCE
Aluminized steel Type 1 has superior performance compared to zinc coated materials for resistance to atmospheric and salt spray corrosion.

FORMABILITY
Aluminized steel Type 1 can be used to produce parts containing simple bends to parts with complex forming requirements.

HEAT REFLECTIVITY
Aluminized steel Type 1 has excellent heat reflectivity during exposures to temperatures below 800 °F (427 °C), reflecting up to 80% of the radiant heat that impinges upon it.

HIGH TEMPERATURE PROPERTIES
Aluminized steel Type 1 is an excellent heat resistant material effective up to 1250 °F (677 °C). For applications above 800 °F (427 °C) where alloying of the coating is a concern, AK Steel’s DQHT grade has been specially formulated to resist alloying at temperatures up to 1000 °F (538 °C). ALUMI- THERM® Steel is a product designed to provide enhanced high temperature strength at temperatures approaching 1400 °F (760 °C).

COATING CHARACTERISTICS
Aluminized Type 1 coating contains approximately 91% aluminum (Al) and 9% silicon (Si) that is metallurgically bonded to the steel substrate. The hot dip coating process assures a tightly adherent, uniform coating on both sides of the product. A schematic of the coating cross-section is shown in Figure 1.

Aluminized steel Type 1 is supplied in coating weights ranging from T1-13 (0.13 oz./ft.²) to T1-60 (0.60 oz./ft.²) as shown in Table 1. Most common are T1-25 and T1-40. Lighter coating weights (T1-13 or T1-25) are recommended for severe forming applications. For coating weights not listed, contact your AK Steel sales representative.

HIGH TEMPERATURE PROPERTIES
At temperatures above 800 °F, the diffused aluminum coating provides high emissivity for radiant heating tubes and continues to provide corrosion protection to the steel substrate.

Creep and fatigue strength are equal to the steel substrate.

CORROSION RESISTANCE
The hot dip aluminum-silicon coating (See Figure 3) forms a tightly adherent aluminum oxide surface film, which is highly resistant to moisture and chloride (e.g., marine or road salt). Although aluminum will provide galvanic protection in a strong chloride atmosphere, it is generally considered a barrier coating due to the oxide film. Table 1 shows the benefits of this type of coating in both.

*ASTM B117 Salt Fog results comparing Aluminized T1-25 (Fig. 3 on left) coated carbon steel to a continuously galvanized tube (Fig. 3 on right). The galvanized coating weight was equivalent to a G90 and the inside diameter was painted prior to test start. The first sign of red rust on the aluminized tube appeared after 312 hours as compared to 192 hours for the continuously galvanized tube.
Product Description

### TABLE 1 – ATMOSPHERIC CORROSION 10 YEAR WEIGHT LOSS

<table>
<thead>
<tr>
<th>Coating Type and Designation</th>
<th>Minimum Coating Weight, g/m²</th>
<th>Weight Loss, g/m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild Industrial</td>
<td>Marine Coastal</td>
</tr>
<tr>
<td>G90 Galvanized</td>
<td>275</td>
<td>174</td>
</tr>
<tr>
<td>T1-40 Aluminized</td>
<td>122</td>
<td>10</td>
</tr>
</tbody>
</table>

### TABLE 2 – SALT FOG TESTING (ASTM B117)*

<table>
<thead>
<tr>
<th>Coating Type and Designation</th>
<th>Hours to First Red Rust</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Flat Coupon (Avg.)</td>
</tr>
<tr>
<td>G90 Galvanized</td>
<td>200</td>
</tr>
<tr>
<td>T1-25 Aluminized</td>
<td>300</td>
</tr>
<tr>
<td>T1-40 Aluminized</td>
<td>500</td>
</tr>
</tbody>
</table>

*Because uncoated areas are subject to cosmetic red rust in a moist, non-salt environment, external seam welds on tubing are remetallized after weld scarfing. Likewise, cut edges can exhibit red rust in a moist environment, but the rust is not progressive and does not undercut the coating. Cut edges are therefore typically covered or hidden by design. Results can vary by diameter to thickness ratio of the tubing. First sign of red rust, appeared at the remetallized weld seam on the aluminized samples.

**Typical salt spray results may vary and it is best to run test many times to obtain a broad average.

### TABLE 3 – COATING WEIGHT

<table>
<thead>
<tr>
<th>Coating Designation</th>
<th>Min. Coating Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>oz./ft²</td>
</tr>
<tr>
<td>T1-13</td>
<td>0.13</td>
</tr>
<tr>
<td>T1-25</td>
<td>0.25</td>
</tr>
<tr>
<td>T1-26</td>
<td>0.26</td>
</tr>
<tr>
<td>T1-40</td>
<td>0.40</td>
</tr>
<tr>
<td>T1-50</td>
<td>0.50</td>
</tr>
<tr>
<td>T1-60</td>
<td>0.60</td>
</tr>
</tbody>
</table>

Coating Weight is the total of both sides and is determined according to ASTM A463. 1 oz./ft² = 0.000398 in. coating thickness total both sides.

### DIAMETER CAPABILITIES

Aluminized Type 1 Tubing is available in outside diameters of 0.750 – 6.625 in. and wall thickness of 0.035 – 0.120 in.

### STEEL GRADES AVAILABLE

- CS – Commercial Steel
- FS – Forming Steel
- DDS – Deep Drawing Steel
- EDDS – Extra Deep Drawing Steel
- HSLAS – High Strength Low Alloy Steels

### TECHNICAL ASSISTANCE INFORMATION

For additional information or to obtain samples of this product, contact our Technical Service Department, at 800.955.8031 or at sales@aktube.com.
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AK Tube LLC is a wholly owned subsidiary of AK Steel.

AK Steel is a leading producer of flat-rolled carbon, stainless and electrical steel products, primarily for the automotive, infrastructure and manufacturing, electrical power generation and distribution markets. Through its subsidiaries, the company also provides customer solutions through carbon and stainless steel tubing products, die design and tooling, and hot and cold stamping. Headquartered in West Chester, Ohio (Greater Cincinnati), the company employs approximately 9,200 men and women at manufacturing operations across seven states (Alabama, Indiana, Kentucky, Michigan, Ohio, Pennsylvania and West Virginia), as well as Canada and Mexico. Additional information about AK Steel is available at www.aksteel.com.

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Data referring to material properties are the result of tests performed on specimens obtained from specific locations of the products in accordance with prescribed sampling procedures; any warranty thereof is limited to the values obtained at such locations and by such procedures. There is no warranty with respect to values of the materials at other locations.