

## Delphi K-Alloy/A304

Delphi's K-Alloy/A304 is a patented casting alloy engineered to protect today's most critical components from harsh operating environments. K-Alloy/A304 is designed for die casting. Millions of parts have been produced using Delphi's K-Alloy/A304 since its introduction in 2003, eliminating the need for expensive pre and post processing such as anodizing, chromating and paint.

### ► Benefits

- Excellent corrosion resistance offers unique engineering solutions
- Superior finishing quality for high polish applications
- Better thermal conductivity for improved cooling (15% over A380)
- Eliminates pre and post processing needs such as anodizing and paint
- Cost effective processing characteristics
  - Same castability and flow properties as standard die cast alloys
  - Same existing molds to achieve existing product dimensions
  - Same mechanical and flow properties as standard die cast alloys
  - No special tooling or process parameters required

### ► Typical Applications

Delphi's aluminum casting alloys are suitable for many diverse applications:

- Electronic component housings exposed to harsh environments
- Indoor and outdoor lighting, such as stadium lighting
- Recreational equipment, such as boats and fishing equipment
- Defense applications, such as drones, military radios, and antennas
- Automotive, transportation, and harsh under hood environments

### ► U.S. Patent Number

6,733,726 — High Corrosion Resistance Aluminum Alloy

### ► Classification

Engineered Materials: Coating, Corrosion Resistant Alternative



**Delphi's K-Alloys are suitable for a wide variety of applications.**

► **Delphi K-Alloy/A304 Comparison with Industry Standard (A360)**

**30 Day Salt Spray Results**

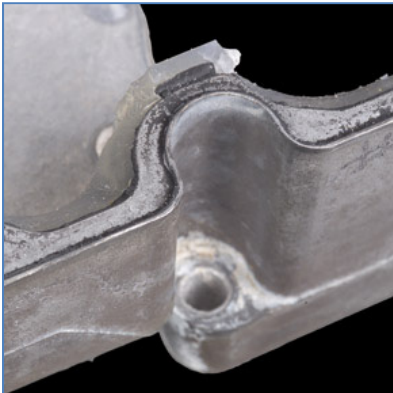


**K-Alloy:**

Housing does not show signs of corrosion however the fasteners/screws show deterioration evident from white ring around the contact point with the housing.

**A360 Alloy:**

Housing shows signs of surface chemical reaction resulting in significant corrosion on the housing's top cover.



**K-Alloy:**

The same housing shows the top cover removed. The sealed surface remains intact and shows no signs of water intrusion nor surface corrosion.

**A360 Alloy:**

Housing shows signs of water intrusion. Corrosion to the edge of the housing is pronounced. The raised area on the perimeter shows signs of aggressive corrosion and severe surface pitting is evident.



**K-Alloy:**

After light blasting with glass beads to remove dispensed adhesive and salt residue from the sealing surface, the housing shows no visual corrosion, nor metal loss due to chemical reaction.

**A360 Alloy:**

After light blasting with glass beads to remove dispensed adhesive and salt residue from the sealing surface, the housing shows material loss, pitting, and raised perimeter completely missing.



► **Property Comparison**

|  | K-Alloy     | 360         | 380         | 383         | 413         | 356 T6 Permanent | K-Alloy SP Sand | 356 T6 Sand |
|--|-------------|-------------|-------------|-------------|-------------|------------------|-----------------|-------------|
| Tensile Strength (PSI)   | 43,000      | 46,000      | 47,000      | 49,000      | 42,000      | 38,000           | 40,000          | 33,000      |
| Yield Strength (PSI)   | 25,000      | 25,000      | 23,000      | 23,000      | 19,000      | 27,000           | 32,000          | 27,000      |
| Elongation (%)   | 5.0         | 3.5         | 4.0         | 3.5         | 3.5         | 5.0              | 4.0             | 5.0         |
| Electrical Conductivity [% of ACIS (International Annealed Copper Standard)] | 32          | 27          | 25          | 28          | 31          | 39               | 36              | 39          |
| Thermal Conductivity (W/m.K @ 77°F)  | 113         | 113         | 96          | 96          | 121         | 159              | 151             | 151         |
| Density (gms cm <sup>-3</sup> )  | 2.63        | 2.63        | 2.71        | 2.74        | 2.66        | 2.68             | 2.65            | 2.68        |
| COTE (In./In. x 10 <sup>-6</sup> ) 68-212°F                                  | 11.5        | 11.6        | 11.7        | 12.5        | 11.3        | 11.9             | 11.9            | 12.0        |
| Casting Temperature (°F)   | 1180 - 1285 | 1175 - 1285 | 1150 - 1285 | 1150 - 1285 | 1175 - 1285 | 1030 - 1140      | 1030 - 1140     | 1030 - 1140 |
| Brinell Hardness (500 Kg/10 mm Ball)   | 80          | 80          | 80          | 75          | 80          | 80               | 70              | 70          |
| Corrosion Resistance (10 = best, 1 = worst)                                  | 10          | 7           | 3           | 3           | 6           | 8                | 10              | 8           |

► **Delphi Contact Information**

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