

## Delphi K-Alloy and K-Alloy SP

Delphi's K-Alloy and K-Alloy SP are patented casting alloys engineered to help protect today's most critical components from harsh operating environments. K-Alloy is for die casting and K-Alloy SP is for sand casting and permanent mold applications. Millions of parts have been produced using Delphi's K-Alloy 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



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

### ► 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 K-Alloy Comparison with Industry's Best (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	K-Alloy SP Permanent	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	38,000	40,000	33,000
Yield Strength (PSI)	25,000	25,000	23,000	23,000	19,000	32,000	27,000	32,000	27,000
Elongation (%)	5.0	3.5	4.0	3.5	3.5	4.0	5.0	4.0	5.0
Electrical Conductivity [% of ACIS (International Annealed Copper Standard)]	32	27	25	28	31	36	39	36	39
Thermal Conductivity (W/m.K @ 77°F)	113	113	96	96	121	155	159	151	151
Density (gms cm <sup>-3</sup> )	2.63	2.63	2.71	2.74	2.66	2.65	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	11.9	12.0
Casting Temperature (°F)	1180 - 1285	1175 - 1285	1150 - 1285	1150 - 1285	1175 - 1285	1030 - 1140	1030 - 1140	1030 - 1140	1030 - 1140
Brinell Hardness (500 Kg/10 mm Ball)	80	80	80	75	80	80	80	70	70
Corrosion Resistance (10 = best, 1 = worst)	10	7	3	3	6	10	8	10	8

▶ **Delphi Contact Information**

Nasser Lukmani  
 [1] 248.813.8073  
 nasser.lukmani@delphi.com

Tim Forbes  
 [1] 248.813.8065  
 timothy.forbes@delphi.com