# AIM's Babbitt Bearing Alloys

Solder plus Support

## Babbitt Description

Babbitt is a white metal alloy that was patented by Isaac Babbitt in 1839. Over time, the term Babbitt has been applied to other similar white metals comprised of tin, copper and antimony. Lead can sometimes be added in place of the tin.


Babbitt alloys offer corrosion resistance, excellent wetting, low wear and friction resistance and are known for their hard/soft composition. While the tin and lead are soft, the copper and antimony form hard crystals throughout the structure. The wearing of the softer metal allows for better absorption of the lubricant as well as any foreign particles.

## Babbitt Uses

Babbitt is used as a lining for bearing shells of cast iron, steel and bronze. The Babbitt lining prevents friction and wear that is common when a lubricant is not able to prevent the bearing's moving parts from welding together. The Babbitt therefore extends the life of the bearing.

## ASTM B-23

| Chemical Composition (%) | Tin Base | | | |
|---|---|---|---|---|
| | Alloy Number (GRADE) | | | |
| | 1 | 2 | 3 | 11 |
| Tin | 90.0 - 92.0 | 88.0 - 90.0 | 83.0 - 85.0 | 86.0 - 89.0 |
| Antimony | 4.0 - 5.0 | 7.0 - 8.0 | 7.5 - 8.5 | 6.0 - 7.5 |
| Lead | 0.35 | 0.35 | 0.35 | 0.50 |
| Copper | 4.0 - 5.0 | 3.0- 4.0 | 7.5 - 8.5 | 5.0 - 6.5 |
| Iron | 0.08 | 0.08 | 0.08 | 0.08 |
| Arsenic | 0.10 | 0.10 | 0.10 | 0.10 |
| Bismuth | 0.08 | 0.08 | 0.08 | 0.08 |
| Zinc | 0.005 | 0.005 | 0.005 | 0.005 |
| Aluminum | 0.005 | 0.005 | 0.005 | 0.005 |
| Cadmium | 0.05 | 0.05 | 0.05 | 0.05 |
| Total Named Elements, Min. | 99.80 | 99.80 | 99.80 | 99.80 |

| Chemical Composition (%) | Lead Base | | | |
|---|---|---|---|---|
| | Alloy Number (GRADE) | | | |
| | 7 | 8 | 13 | 15 |
| Tin | 9.3 – 10.7 | 4.5 – 5.5 | 5.5 – 6.5 | 0.8 – 1.2 |
| Antimony | 14.0 – 16.0 | 14.0 – 16.0 | 9.5 – 10.5 | 14.5 – 17.5 |
| Lead | remainder | remainder | remainder | remainder |
| Copper | 0.50 | 0.50 | 0.50 | 0.50 |
| Iron | 0.10 | 0.10 | 0.10 | 0.10 |
| Arsenic | 0.30 – 0.60 | 0.30 – 0.60 | 0.25 | 0.8 – 1.4 |
| Bismuth | 0.10 | 0.10 | 0.10 | 0.10 |
| Zinc | 0.005 | 0.005 | 0.005 | 0.005 |
| Aluminum | 0.005 | 0.005 | 0.005 | 0.005 |
| Cadmium | 0.05 | 0.05 | 0.05 | 0.05 |
| Total Named Elements, Min. | | | | |

**Babbitt # 2**
AIM's Babbitt # 2 is composed of tin, antimony and copper. This is equivalent to ASTM B-23 #2. This alloy has a melting temperature of 240-355° C (466-669° F). Babbitt # 2 is a high tin Babbitt, which is typically used for high operating temperatures and high unit load. These materials display very good corrosion resistance, easy bonding and fewer tendencies for segregation and welding. They are preferred for use under steady load conditions in steam and gas turbines, electric motors, blowers and pumps.

**Babbitt # 7**
AIM's Babbitt # 7 is composed of lead, antimony, tin and arsenic. This is equivalent to ASTM B-23 # 7. This alloy has a melting temperature of 240-268° C (466-514° F). Babbitt # 7 is typically used for sleeve bearings operating at moderate loads and speeds such as bearings for blowers, pumps, electric motors and machine tools.

**AIM-Co Babbitt**
AIM's AIM-Co Babbitt is a patent pending alloy similar to ASTM B-23 # 3, however cobalt has been added. This alloy has a melting temperature of 240-422° C (464-792° F) and a hardness of 27-30 HV100. AIM-Co Babbitt is typically used for very high loads that have multiple axes for stress strain. It offers more than twice the tension-compression axial fatigue compared to Babbitt #2.

**Packaging**
Babbitt # 2, Babbitt # 7 and AIM-Co Babbitt are available in 20 lb and 25 lb handy ingots and 7 lb notch bar. Babbitt # 2 and AIM-Co Babbitt are also available in .062, .078 and .125 diameter wire packaged on 25 lb spools or in 250 lb POPs or 25 lb hex cartons.

For assistance choosing the right Babbitt bearing alloy for your application, please contact AIM.