ALCHEMY CASTINGS & EXTRUSIONS

From Ounces to Tons
No job too big or too small

390 Millen Road, Rear Unit, Stoney Creek, Ontario, L8E 2P7

Toll free 866-979-7911 Phone 905 297 7911 Fax 905 385 2614

Email: info@alchemyextrusions.com

White Metal Bearing Alloys (Babbitt Metal) - Lead and Tin Based

			
Bar Shape	**Ingot**	**Margash**	**Pig**
Dimensions	**10-3/4" x 2" x 1-1/4"** (L x W x H)	**26" x 2" x 1-1/2"** (L x W x H)	**17-1/2" x 4" x 3-1/2"** (L x W x H)
Pure Lead	10 LB	25 LB	55 LB
Pure Tin	6-1/2 LB	16 LB	35 LB

Tin Based Alloys

Marine 11D	SNSB5CU4
No. 1 (ASTM #1)	SNSB4.5CU4.5
Marine 11R	SNSB7.75CU2.75
Nickel Genuine (ASTM #2)	SNSB7.5CU3.5
Marine 11	SNSB5.75CU5.25
Diesel Special	SNSB6.75CU5.5
No. 11 (ASTM #11)	SNSB6.75CU5.75
SAE 11	SNSB7.5CU6.5
Imperial Genuine	SNSB7CU7
Turbine	SNSB7CU8
Royal Amature	SNSB8.25CU8
Super Tough (ASTM #3)	SNSB8CU8

Lead Based Alloys

No. 13 (ASTM #13)	PBSN6SB10
Mill Anchor	PBSN5SB12
Durite (ASTM #15)	PBSN1SB16
Star	PBN5.25SB14
Silvertone	PBSN2SB18
Royal (ASTM #8)	PBSN5SB15
Heavy Pressure (ASTM #7)	PBSN10SB15
Special Sawguide	PBSN10SB19

Tin Based Alloys - Chemical Composition (%) Chart

INDUSTRY NAME	ASTM B23	Sn (Tin)	Sb (Antimony)	Cu (Copper)	Pb (Lead)
Marine 11 D	-	90.0 - 92.0	4.5 - 5.5	3.5 - 4.5	0.35 (Max)
No. 1	Grade 1	90.0 - 92.0	4.0 - 5.0	4.0 - 5.0	0.35 (Max)
Marine 11R	-	89.0 - 89.5	7.5 - 8.5	2.5 - 3.0	0.35 (Max)
Nickel Genuine	Grade 2	88.0 - 90.0	7.0 - 8.0	3.0 - 4.0	0.35 (Max)
Marine 11	-	88.0 - 90.0	5.5 - 6.0	5.0 - 5.5	0.35 (Max)
4X Royal Nickel Genuine	-	87.5 - 89.5	7.25 - 7.75	3.25 - 3.75	0.35 (Max)
Diesel Special	-	87.5 - 88.0	6.5 - 7.0	5.0 - 6.0	0.35 (Max)
No. 11	Grade 11	86.0 - 89.0	6.0 - 7.5	5.0 - 6.5	0.35 (Max)
SAE 11	-	85.0 - 87.0	7.0 - 8.0	6.0 - 7.0	0.35 (Max)
Imperial Genuine	-	85.0 - 87.0	6.5 - 7.5	6.5 - 7.5	0.35 (Max)
Turbine	-	84.0 - 86.0	6.5 - 7.5	7.5 - 8.5	0.35 (Max)
Royal Armature	-	83.5 - 84.0	8.0 - 8.5	7.5 - 8.5	0.35 (Max)
Super Tough	Grade 3	83.0 - 85.0	7.5 - 8.5	7.5 - 8.5	0.35 (Max)
Maximum Allowable Impurities: Fe=0.08, As=0.10, Bi=0.08, Zn=0.005, Al=0.005, Cd=0.05					

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Lead Based Alloys - Chemical Composition (%) Chart

INDUSTRY NAME	ASTM B23	Sn (Tin)	Sb (Antimony)	Pb (Lead)	As (Arsenic)
No. 13	Grade 13	5.5 - 6.5	9.5 - 10.5	Balance	0.25 (Max)
Mill Anchor	-	4.0 - 6.0	11.5 - 12.5	Balance	0.25 (Max)
Durite	Grade 15	0.8 - 1.2	14.5 - 17.5	Balance	0.8 - 1.4
Star	-	5.0 - 5.5	13.5 - 14.5	Balance	0.30 - 0.60
Silverstone	-	1.0 - 3.0	17.5 - 18.5	Balance	0.25 (Max)
Royal	Grade 8	4.5 - 5.5	14.0 - 16.0	Balance	0.30 - 0.60
Heavy Pressure	Grade 7	9.3 - 10.7	14.0 - 16.0	Balance	0.30 - 0.60
Special Sawguide	-	9.0 - 11.0	18.5 - 19.5	Balance	0.25 (Max)
Maximum Allowable Impurities: Cu=0.50, Fe=0.10, Bi=0.10, Zn=0.005, Al=0.005, Cd=0.05					

In selecting the proper type of Babbitt for a particular job there are a number of factors to take into consideration, the most import of which are as follows:

1. Surface speed of the SHAFT
2. Load bearing is required to carry

Secondly, but no less important, the following points must also be taken into account:

A. Continuity of service
B. Bonding possibilities
C. Cooling facilities
D. Lubrication
E. Cleanliness
F. Attention given to the bearings in question

There is no doubt that if a bearing be highly loaded in relation to its size, a high tin alloy is desirable; whereas for much slower speed work and less heavily loaded bearings, a lead-base one may be employed, and is far more economical.

1. Surface speed of the shaft: (The number of feet traveled per minute by the shaft circumferentially.)

Formula: $\frac{Pi \times D \times RPM}{12} = S$

Pi = 3.1416
D = Diameter of Shaft
RPM = Revolutions Per Minute
S = Surface speed of the Shaft

Example: **Determine the surface of a 2 inch diameter shaft going 1,400 RPM**

$\frac{Pi \times D \times RPM}{12} = \frac{3.1416 \times 2 \times 1{,}400}{12} = 733.04$ Ft/min

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2. Load Bearing is required to carry: (The weight which is being exerted through the combined weights of the shaft and any other direct weights on the shaft and measured in pounds per square inch.)

Formula:

$$\frac{W}{I.D \times L.O.B.} = L$$

W = Total weight carried by bearing
I.D = Inside diameter of bearing
L = Load bearing required to carry
L.O.B = Length of Bearing

Example: **Determine the load on a bearing of a 2 inch I.D bearing, 5 inches long and carrying a weight of 3,100 lbs**

$$\frac{W}{I.D \times L.O.B.} = \frac{3,100}{2 \times 5} = 310 \text{ Lbs/sq.in}$$

There are many formulas for standard grade babbitts but they fall into two main classifications:

Babbitt Classification	LIMITS			
	Surface Speeds (# of Ft/min)		LOAD (Lbs/sq.in.)	
	MIN.	MAX.	MIN.	MAX.
Tin-Based Babbitts	1,000	2,400	100	2,000
Lead Based Babbitts	100	1,000	100	500