| | |
|---|---|
| **BEARINGS, ALUMINUM-Sn STEEL BACKED** | **WSD-M8A18-A1** |
| **BEARINGS, ALUMINUM-Sn-Si STEEL BACKED** | **WSD-M8A18-A2** |
| **BEARINGS, ALUMINUM-Sn-Si STEEL BACKED** | **WSD-M8A18-A3** |
| **BEARINGS, ALUMINUM-Sn-Si STEEL BACKED** | **WSD-M8A18-A4** |
| **BEARINGS, ALUMINUM-Sn-Si STEEL BACKED** | **WSD-M8A18-A5** |
| **BEARINGS, ALUMINUM-Sn STEEL BACKED** | **WSD-M8A18-A6** |

## 1. SCOPE

The materials defined by these specifications are Aluminum-Tin (A1 and A6) and Aluminum-Tin-Silicon (A2, A3, A4 and A5) bearing alloys bonded to a low carbon steel backing.

## 2. APPLICATION

These specifications were released originally for material used in the manufacture of bearings and bushings for automotive applications. Uses include main and connecting rod bearings of medium load.

## 3. REQUIREMENTS

### 3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

### 3.2 CONSTRUCTION

The functional layer shall be cast then processed into a wrought strip and roll-bonded onto a steel back.

Bonding layers up to the following maximum thicknesses are allowed; nickel - 30 micrometers and/or aluminum - 75 micrometers thick on bearings up to 3 mm final wall thickness, and 125 micrometers for bearings greater than 3 mm. Functional Layer and backing thickness refer to the finished part and shall be stated on relevant Engineering Drawing. The functional layer shall include the bonding layer.

### 3.3 CHEMICAL COMPOSITION (weight %)

3.3.1 Steel Backing

Low carbon steel (0.03 - 0.25% carbon).

| Date | Action | Revisions |
|---|---|---|
| 2003 10 10 | Revised | Para 3.0 inserted; para 3.1, 3.8 and 4 deleted |
| 1995 01 31 | C10460360 | Rev 3.2, 3.3.2, 3.3.3 Added A6 R. Cooper, P. Lee |
| 1991 03 26 | C10128525 | Released N. Riley EAO, P. Lee NAAC |

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3.3.2 Functional Layer

| | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|
| Tin | 17.5 – 22.5 | 8.0 – 12.0 | 10.0 – 14.0 | 5.5 – 7.0 | 10.0 – 14.0 | 7.0 – 13.0 |
| Copper | 0.7 – 1.3 | 0.7 – 1.3 | 0.7 – 2.3 | 0.7 – 1.3 | 0.9 – 1.3 | 0.2 – 1.6 |
| Iron | 0.7 max | 0.7 max | 0.7 max | 0.7 max | 0.7 max | 0.7 max |
| Silicon | 0.7 max | 3.0 – 5.0 | 3.0 – 5.0 | 1.0 – 2.0 | 3.0 – 5.0 | |
| Manganese | 0.7 max | | | | | 0.4 – 1.6 |
| Total Others | 0.5 max. | 0.7 max | 0.7 max | 0.7 max | 0.7 max | 0.7 max |
| Aluminum | Balance | Balance | Balance | Balance | Balance | Balance |
| Nickel | | | | 0.7 – 1.3* | | 0.9 – 3.1 |
| Silicon | | | | 0.7 max* | | |

* = Optional range

The specific composition shall be selected from within one of the above ranges in order to meet component performance requirements and will form part of the approved Control Plan for each geometry and application.

3.3.3 Overlay/Surface Coating

A tin flash with a maximum thickness of 3 micrometers can be applied for function to WSD-M8A18-A1 to A6 if required and shown on the drawing.

**3.4 ADHESION**

The bond between the bearing layer and the steel backing must withstand the following test:

A sharp chisel with a cutting width of 10 mm minimum and a cutting angle of 40 - 50° will be forced at an angle of 30 - 60° degrees between the bearing layer and the steel backing. The cutting motion of the chisel is in a direction which tends to pull the bearing layer away from the backing. The bearing layer must not flake or spall.

**3.5 HARDNESS (The average of 5 determinations minimum on the functional surface)**
(ASTM E 92/ASTM E 10)

| | A1 | A2 | A3 | A4 | A5 | A6 |
|---|---|---|---|---|---|---|
| HV min | 32 | 35 | 55 | 35 | 35 | 40 |
| or | | | | | | |
| HB min | 30 | 33 | 50 | 33 | 33 | 37 |

Note: Maximum hardness values will be part of the Control Plan and shall be stated on Engineering Drawing following sample manufacture.

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