



BEARINGS, ALUMINUM SILICON STEEL BACKED

WSS-M8A19-A4

1. SCOPE

The materials defined by this specification are aluminum-silicon bearing alloys bonded to a low carbon steel backing.

2. APPLICATION

This specification was released originally for material used in the manufacture of bearings and bushings for automotive applications. Uses include crank main, connecting rod, balance shaft and thrust washer bearings and bushings of medium load.

3. REQUIREMENTS

Material specification requirements are to be used for initial qualification of materials.

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).

Part producers using this material in their products, must use Ford approved materials and must conform to a process control plan which has been approved by STA and/or the relevant Materials Activity.

3.2 CONSTRUCTION

The functional layer shall be cast or sintered into a wrought strip and roll-bonded onto a prepared steel backing (bonding coatings of nickel or aluminum up to 75 micrometers thickness allowed).

Layer and backing thicknesses as stated on relevant Engineering drawing.

3.3 CHEMICAL COMPOSITION (weight %)

3.3.1 Steel Backing

Cold rolled low carbon steel (0.03 - 0.25% carbon).

Date	Action	Revisions
2006 07 20	Revised	WSD-M8A19-A1/A2 and WSS-M8A19-A3 were inactivated and removed; No replacement named G. Weber
2003 10 10	Revised	Para 3.0 inserted; para 3.1, 3.8 and 4 deleted
1991 03 26	Released	C10128523 N. F. Lee, P. Lee, NAO



3.3.2 Functional Layer

Tin	8.0 - 10.8
Copper	0.7 - 0.9
Iron	0.7 max
Silicon	2.2 - 2.8
Chromium	.15 - .25
Lead	0.2 max
Manganese	---
Total Others	0.50 max
Aluminum	Balance

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° 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 bimetal strip)**
(ASTM E 92/ASTM E 10)

HV	49 minimum
or HB	45 minimum

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

3.6 MICROSTRUCTURE

The functional layer consists of a uniform distribution of silicon particles in an aluminum rich solid solution matrix, and shall be bonded to the steel backing with no bonding or interface defects when viewed at 100 times magnification. No silicon particle shall have any dimension greater than 15 microns. This specification shall have no lead constituents.

3.7 MECHANICAL PROPERTIES

The mechanical properties of the steel backing shall be controlled directly or indirectly (e.g. hardness) as part of the control plan to ensure consistent installation and functional characteristics.