BEARING AND BUSHING ALLOY

GM3874M GM3889M GM4031M GM4111M GM4167M GM4168M GM4195M GM6158M GM6159M

1 SCOPE. This standard covers lead, tin and aluminum alloys used primarily as overlays and overplates in bearing composites. (Coverage for composites are published elsewhere in the GM Standards.)

1.1 GM3874M, GM4167M, GM4168M, and GM4195M are Lead Base. GM4031M and GM4111M are Tin Base. GM3889M, GM6158M, and GM6159M are Aluminum Base.

1.2 RESTRICTED AND REPORTABLE CHEMICALS (GM1000M). All materials supplied to this specification must comply with the requirements listed in GM1000M, **Restricted and Reportable Chemicals.**

2 REFERENCED STANDARDS.

GM1000M

3 CHEMICAL AND PHYSICAL PROPERTIES. Materials shall conform to the limits shown in Tables 1 through 3 for the applicable GM numbers.

3.1 Bearing materials shall be free of all defects detrimental to the performance of the material in processing or service.

4 INITIAL SOURCE APPROVAL. No shipment shall be made by any supplier until representative initial production samples have been approved by engineering as meeting the requirements of this specification.

4.1 Completed copies of the Material Safety Data Sheet meeting GM information requirements must be submitted with any new submissions or whenever a composition change has occurred.

5 INSPECTION AND REJECTION. All shipments of material or parts under contract or purchase order manufactured to this specification shall be equivalent in every respect to the initial samples approved by engineering. There shall be no changes in either formulation or manufacturing processes permitted without prior notification and approval by engineering. Lack of notification by the supplier constitutes grounds for rejection of any shipment. While samples may be taken from incoming shipments and checked for conformance to this specification, the supplier shall accept the responsibility for incoming shipments meeting this specification without dependence upon purchaser's inspection.

6 APPROVED SOURCES. Engineering qualification of an approved source is required for this specification. Only sources listed in the GM Corporate Materials File under this specification number have been qualified by engineering as meeting the requirements of this specification. Sources are available through the on-line MATSPC System.

7 GENERAL INFORMATION. This standard was issued in July 1934. The latest revisions include:

Rev	Date	Description
B	4/89	Editorial
C	11/97	Editorial; aka's added

TABLE 1 – LEAD BASE BEARING ALLOYS (NOTE)

GM Specification Numbers	Similar SAE J460	Pb %	SN %	Cu %	Sb %	As %	S %	Bi %	Fe %	Ni %	Al %	Zn %	Others Each %	Others Total %
3874M	19	Balance	8.0 – 12.0	1.25 – 3.00	–	–	–	–	0.10	–	0.005	0.005	0.05	0.50
4167M	16	Balance	4.20 – 4.70 3.5 – 4.70	0.02 – 0.05 0.10	3.25 – 3.75 3.0 – 4.0	0.05	0.0015 – 0.005	0.10	0.10	0.01 0.03	0.005	0.005	0.03	0.20
4168M	13	Balance	5.0 – 7.0	0.70	9.0– 11.0	0.10	0.005	0.10	0.01	0.01	0.005	0.005	0.30	0.50
4195M	14	Balance	9.0 – 11.0	0.50	14.0– 16.0	0.30 – 0.6	0.0015– 0.005	0.10	0.01	0.01	0.005	0.005	0.03	0.20

NOTE: Upper range of limits is for material before bearing fabrication; lower figures apply to finished bearing. All values not given as ranges are maximum.

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BEARING AND BUSHING ALLOY

GM3874M GM3889M GM4031M GM4111M GM4167M GM4168M GM4195M GM6158M GM6159M

PHYSICAL AND MECHANICAL PROPERTIES (FOR REFERENCE – NOT PART OF SPECIFICATION)

GM Specification No.	GM3874M	GM4167M	GM4168M	GM4195M
Melting Point	–	472°F (244°C)	466°F (241°C)	466°F (241°C)
Compressive Yield at 0.125% Deformation	4500 psi (31.0 MPa) approximate	2100 psi (14.4 MPa) approximate	4400 psi (30.3 MPa) approximate	4500 psi (31.0 MPa) approximate
Hardness (HB)				
At 68°F (20°C)	–	10.5	17.3	22.5
At 210°F (99°C)	–	7.9	10.8	10.5
Typical Safe Loading	12000 psi for thickness < 0.001 in. (82.7 MPa for thickness < 0.03 mm)	4000 psi for thickness < 0.003 in. (27.6 MPa for thickness < 0.08 mm)	2000 psi for thickness < 0.005 in. (13.8 MPa for thickness < 0.13 mm)	2000 psi for thickness < 0.008 in. (13.8 MPa for thickness < .20 mm)

TABLE 2 – TIN BASE BEARING ALLOY (NOTE)

GM Spec No.	Similar SAE J460	Sn %	Cu %	Sb %	Pb %	Bi %	As %	S %	Al %	Zn %	Fe %	Other Each	Other Total
GM4031M	12	88.0 min	3.0 – 4.0	7.0 – 8.0	0.25	0.05	0.10	–	0.005	0.005	0.10	0.03	0.50
GM4111M	–	Balance	–	0.10	0.25	–	–	–	0.005	0.005	–	0.05	0.50

NOTE: All values not given as ranges are maximum.

PHYSICAL AND MECHANICAL PROPERTIES (FOR REFERENCE – NOT PART OF SPECIFICATION)

GM Specification No.	GM4031M	GM4111M
Melting Point	466°F (241°C)	450°F (232°C)
Compressive Yield at 0.125% Deformation	6100 psi (42.1 MPa) approximate	–
Hardness (HB): @ 68°F (20°C)	24.5	–
At 210°F (99°C)	12.0	–
Typical Safe Loading	2000 psi thickness < 0.005 in. (13.8 MPa for thickness < 0.13 mm)	–

TABLE 3 – ALUMINUM BASE BEARING ALLOYS (NOTE 1)

GM Specification Number	Similar SAE 3460	Al %	Cu %	Pb %	Cd %	Si %	Mg %	Mn %	Sn %	Ti %	Fe %	Zn %	Ni %	Other Each	Other Total
GM3889M	781	Balance	0.05 – 0.15	–	0.8 – 1.4	3.5 – 4.5	0.05 – 0.15	–	–	0.02	0.35	0.15	–	0.05	0.50
GM6158M	787	Balance	0.05 – 0.15	4.0 – 9.0	0.7 – 1.6	3.5 – 4.5	0.05 – 0.15	0.20 – 0.35	0.30 – 0.6	0.02	0.25	0.15	–	0.05	0.35
GM6159M	783	Balance	0.7 – 1.30	–	–	0.50	–	0.10	17.5 – 22.5	0.10	0.35	–	0.10	–	0.15

NOTE 1: At bearing running surface 0.001 inch or (0.03 mm) maximum depth. All values not given as ranges are maximum.

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