

**INCH-POUND**MIL-B-17931E  
AMENDMENT 2  
22 May 1995

## MILITARY SPECIFICATION

## BEARINGS, BALL, ANNULAR, FOR QUIET OPERATION

This amendment forms a part of MIL-B-17931E, dated 27 July 1987, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 4

\* 2.2 Add under AFBMA:

"Society of Automotive Engineers (SAE)  
AMS 6444 - Steel Bars, Forgings, and Tubing 1.45Cr  
(0.98-1.10) (SAE 52100) Premium Aircraft-  
Quality, Consumable Electrode Vacuum  
Melted."

PAGE 4

\* 3.2.1: Delete and substitute:

"3.2.1. Inner and outer ring material. Material for inner and outer rings shall be chromium-alloy steel (type 52100) produced by vacuum induction melt, vacuum arc remelt (VIM VAR) in accordance with AMS 6444. Calcium alloy additions shall not be used for deoxidation or inclusion shape control. The ring billet material shall be in accordance with the nonmetallic inclusion rating requirements of ASTM A 295. The steel microstructure shall be uniform and spheroidized and shall meet the carbide microstructure requirements of ASTM A 295 (see Table VI)."

PAGE 5

\* 3.2.2, Sentence 2, Delete and substitute:

"The ball billet material shall be in accordance with the non-metallic inclusion rating requirements of ASTM A 295."

Insert before sentence 4:

"The steel microstructure shall be uniform and spheroidized and shall meet the carbide microstructure requirements of ASTM A 295 (see Table VI)."

AMSC N\A

1 of 4

FSC 3110 -

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MIL-B-17931E  
AMENDMENT 2

3.3.2, Sentence 3: Delete and substitute:

"The mean hardness of the balls shall be at least two Rockwell C points greater than the mean hardness of the rings."

3.3.3, Line 2: Delete "300°F" and substitute "a minimum of 250°F".

PAGE 11

\* TABLE I, Radial internal clearance min/max column for standard part number M17931-G087: Delete "0.0020/0.0026" and substitute "0.00124/0.0030".

TABLE I, OD max/min column for standard part number M17931-G088: Delete "11.4173/11.4173" and substitute "11.4173/11.1470".

TABLE I, Add footnote "2" reference to width max column for standard part number M17931-G087.

TABLE I, Add footnote 2:

"2/ Under 15-pound axial gage load, the unloaded side face of the inner ring shall stick out .0110 -.0115 inches beyond the outer ring side face for both loading directions. Inner ring width variance to satisfy the stickout requirement is permitted."

PAGE 14

\* TABLE 111, Width max column for standard part numbers M17931-A004, M17931-A006 and M17931-A007: Delete "1.3260" and substitute "1.3386".

PAGE 19

\* 3.4.5: Insert new sentence 4, "The installed cage shall not impede relubrication of a bearing that requires relubrication. Snap-in type cages shall be installed with the open side of the cage facing the marked side of the bearing."

PAGE 21

\* 3.7: Insert before sentence 1, "Die-stamps shall not be used for marking."

MIL-B-17931E  
AMENDMENT 2

PAGE 23

\* TABLE VI, category, minor, add:

"211 Ring material inclusions and microstructure do not meet requirements (see 3.2.1)."

"212 Ball material inclusions and microstructure do not meet requirements (see 3.2.2)."

PAGE 29\30

Add new paragraph 6.4.6:

"6.4.6. Mean hardness. Mean hardness is the arithmetic mean of hardness values found in the required standardizing test of each lot reported to the nearest tenth:

Mean hardness:  $R = (R_1 + R_2 + \dots + R_n) / n$

Where  $R_1, \dots, R_n$  are the hardness values of  $n$  samples in the lot. "

PAGE 32

30.1, Delete and substitute:

'30.1 Fatigue life. Bearing fatigue life for single bearings shall be calculated in accordance with ANSI/AFBMA Standard 9. Bearing fatigue life for bearings in duplex arrangements shall be calculated in accordance with ANSI\AFBMA Standard 9 with the following exceptions:

- (a) Treat the duplex bearing as two individual single row bearings.
- (b) Account for axial and radial forces from all external and internal loads, including centrifugal force, preload, shaft-to-bearing interference fit, and differential thermal expansion of the races and balls as the bearing heats up to operating temperature.
- (c) Use the Palmgren combined life expectancy formula to account for the reduced reliability of a two-bearing arrangement:

MIL-B-17931E  
AMENDMENT 2

$$\frac{1}{L} = \frac{1}{L_1} + \frac{1}{L_2}$$

Where L1 and L2 are the calculated lives of the individual bearings.

Bearing life adjustment factors shall not be used in the calculation, unless specifically permitted by the equipment specification."

30.4, Last sentence, delete "tongs" and substitute "tangs"

PAGE 36

TABLE XI, Housing bore diameter (inches) max column: Delete "5.5135" and substitute "5.5128".

PAGE 39

TABLE XII, Add item: Standard part number "M17931-G056", Navy code "212Z".

NOTE : The margins of this amendment are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Preparing activity:  
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