FEDERAL SUPPLY CLASS
3110

RATIONALE

CORRECT THE OUT-OF-ROUND TOLERANCES LISTED UNDER TABLE 1.

NOTICE

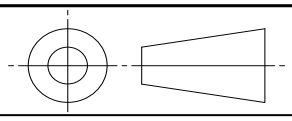
THE INITIAL SAE PUBLICATION OF THIS DOCUMENT WAS TAKEN DIRECTLY FROM U.S. MILITARY STANDARD MS27648E. THIS SAE STANDARD MAY RETAIN THE SAME PART NUMBERS ESTABLISHED BY THE ORIGINAL MILITARY DOCUMENT.

ANY REQUIREMENTS ASSOCIATED WITH QUALIFIED PRODUCTS LISTS (QPL) MAY CONTINUE TO BE MANDATORY FOR DOD CONTRACTS. REQUIREMENTS RELATING TO QPLS HAVE NOT BEEN ADOPTED BY THE SAE FOR THIS STANDARD AND ARE NOT PART OF THIS SAE DOCUMENT.



ISSUED 1998-04 REVISED 2014-04

THIRD ANGLE PROJECTION



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**http://www.sae.org/technical/standards/AS27648D**

CUSTODIAN: AIRFRAME CONTROL BEARINGS GROUP

PROCUREMENT SPECIFICATION: AS7949

SAE INTERNATIONAL

# AEROSPACE STANDARD

BEARING, BALL, AIRFRAME,
ANTI-FRICTION, EXTERNAL SELF ALIGNING,
EXTRA LIGHT DUTY





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THE COMPLETE REQUIREMENTS FOR PROCURING THE PRODUCT DESCRIBED HEREIN SHALL CONSIST OF THIS DOCUMENT AND THE LATEST ISSUE OF AS7949.

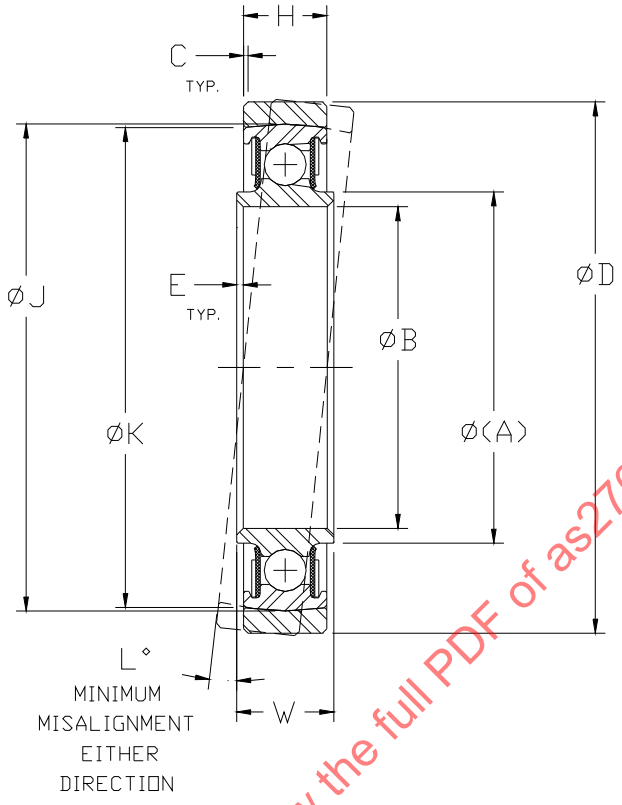


FIGURE 1 - PART CONFIGURATION

## TABLE 1 - DIMENSIONS

| MS DASH NO. | ØB BORE 2/ | BORE TOLERANCE | ØD OUTSIDE DIAMETER +.0000 -.0010 1/ 2/ | W WIDTH INNER RING +.000 -.005 1/ | H WIDTH OUTER RING +.000 -.005 1/ | (ØA) SHOULDER DIAMETER INNER RING (APPROX) | E 4/ CORNER CHAMFER X 45° INNER RING BORE +.015 -.000 | C 3/ CORNER CHAMFER X 45° OUTER RING OD +.015 -.000 | ØK TO SHARP CORNER (REF) | ØJ BRG. SPHERE OUTSIDE DIAMETER | L° MISALIGNMENT ANGLE EITHER DIRECTION 5/ | WEIGHT POUNDS (APPROX) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| -16 | 1.0000 | +.0000 -.0005 | 1.9375 | .437 | .375 | 1.141 | .024 | .024 | 1.709 | 1.740 | 7° 25' | .18 |
| -21 | 1.3125 | +.0005 -.0005 | 2.2500 | | | 1.454 | | | 2.028 | 2.052 | 6° 30' | .20 |
| -23 | 1.4375 | | 2.3750 | | | 1.575 | | | 2.155 | 2.178 | 6° | .22 |
| -25 | 1.5625 | | 2.5000 | | | 1.693 | | | 2.282 | 2.302 | 5° 45' | .25 |
| -29 | 1.8125 | | 2.7500 | | | 1.931 | | | 2.535 | 2.552 | 5° | .27 |
| -33 | 2.0625 | | 3.0000 | | | 2.231 | | | 2.787 | 2.802 | 5° | .30 |
| -37 | 2.3125 | | 3.2500 | | | 2.468 | | | 3.039 | 3.052 | 4° 30' | .33 |
| -47 | 2.9375 | | 4.1250 | .531 | .469 | 3.093 | .039 | .039 | 3.846 | 3.865 | 4° 30' | .64 |
| -48 | 3.0000 | | 4.2500 | | | 3.222 | | | 3.972 | 3.990 | 4° | .69 |
| -49 | 3.0625 | | 4.2500 | | | 3.222 | | | 3.972 | 3.990 | 4° | .69 |

1/ ALL DIMENSIONS TO BE MET AFTER PLATING.

2/ OUT-OF-ROUND TOLERANCES: BORE: -16 +.0003,-.0008
-21 THROUGH -49 +.0008, -.0008
OUTER DIA: +.0010, -.0020

3/ A RADIUS GIVING APPROXIMATELY THE SAME GRIP FOR STAKING THE BEARING IN THE HOUSING WILL BE ACCEPTABLE.

4/ A RADIUS GIVING APPROXIMATELY THE SAME FILLET CLEARANCE WILL BE ACCEPTABLE.

5/ MISALIGNMENT ANGLE IS NOT TO EXCEED MINIMUM REQUIREMENT IN DESIGN OR APPLICATION.

## TABLE 2 - LOADS AND STARTING TORQUE

| MS DASH NO. | RADIAL LIMIT LOAD RATING LB | THRUST LIMIT LOAD RATING LB | 6/ 7/ RADIAL LOAD RATING (LB) FOR AVERAGE LIFE OF 10 000 COMPLETE 90° CYCLES CASE I | CASE II | 8/ MAXIMUM STARTING TORQUE (in-oz) |
|---|---|---|---|---|---|
| -16 | 8085 | 1600 | 4260 | 3960 | 5.0 |
| -21 | 9840 | 2000 | 4590 | 4290 | 7.0 |
| -23 | 10 500 | 2200 | 4650 | 4360 | 9.0 |
| -25 | 11 300 | 2300 | 4680 | 4420 | 9.0 |
| -29 | 12 700 | 2600 | 4760 | 4530 | 14.0 |
| -33 | 14 400 | 2900 | 4820 | 4630 | 14.0 |
| -37 | 15 800 | 3200 | 4880 | 4690 | 20.0 |
| -47 | 24 700 | 5000 | 6600 | 6390 | 30.0 |
| -48 | 27 500 | 5500 | 8150 | 7840 | 30.0 |
| -49 | 27 500 | 5500 | 8150 | 7840 | 32.0 |

6/ CASE I - LOAD FIXED WITH RESPECT TO OUTER RING.
CASE II - LOAD FIXED WITH RESPECT TO INNER RING.

7/ THESE RATINGS ARE FOR OPERATION UP TO 250 °F. FOR OPERATION UP TO 350 °F, THE RATINGS SHALL BE REDUCED BY 20%.

8/ SPECIFIED LIMITS ARE FOR BEARINGS LUBRICATED WITH MIL-PRF-81322 GREASE. FOR BEARINGS LUBRICATED WITH MIL-PRF-23827 TYPE I GREASE, THE TORQUE LIMIT SHALL BE THE SPECIFIED VALUE IN THE TABLE MULTIPLIED BY 1.2.

REQUIREMENTS:

1. MATERIAL: RINGS AND BALLS: 52100 STEEL PER AMS6440 OR AMS6444

   SEALS: POLYTETRAFLUOROETHYLENE (PTFE) PER AMS3652

   SEAL RETAINERS: ANY CORROSION RESISTANT STEEL

2. LUBRICANT: MIL-PRF-81322 OR MIL-PRF-23827 TYPE I. ALL BEARINGS SHALL BE PACKED WITH AN 80% MINIMUM GREASE FILL CONFORMING TO MIL-PRF-81322 UNLESS OTHERWISE SPECIFIED. IF MIL-PRF-23827 TYPE I IS REQUIRED, ADD THE LETTER "G" AFTER THE MS27648 DASH NUMBER. MIL-PRF-23827 TYPE I SHALL NOT BE USED FOR OPERATION WHERE TEMPERATURES EXCEED 250 °F.

3. HARDNESS: HEAT TREAT RINGS AND BALLS TO 60-66 HRC AND STABILIZE FOR OPERATION AT 250 °F

4. SURFACE ROUGHNESS: RACEWAYS AND BALL SHALL HAVE A MAXIMUM SURFACE ROUGHNESS OF 8 MICROINCHES Ra PER ANSI/ASME B46.1

5. PLATING: ALL EXTERNAL SURFACES EXCEPT BORE, SEALS AND SEAL RETAINERS SHALL BE PLATED .0003 TO .0006 THICK WITH:

   (NO DESIGNATOR) CADMIUM IN ACCORDANCE WITH AMS-QQ-P-416, TYPE I, CLASS 2

   DESIGNATOR “E” ZINC-NICKEL IN ACCORDANCE WITH AMS2417, TYPE 2, GRADE B

6. RADIAL INTERNAL CLEARANCE: .0003 TO .0010, DOES NOT INCLUDE RADIAL LOOSENESS BETWEEN THE BEARING OUTER RING AND SELF-ALIGNING RING

7. RADIAL ECCENTRICITY: INNER RING, .0010 MAX, OUTER RING, .0016 MAX.

8. LATERAL ECCENTRICITY: INNER RING, .0010 MAX, OUTER RING, .0016 MAX.

9. PART NUMBER: THE PART NUMBER SHALL BE SEQUENCED LEFT TO RIGHT WITH DESIGNATIONS IN THE FOLLOWING SEQUENCE:

   EXAMPLE OF PART NUMBER:

MS27648 -16GE = BEARING, BALL, AIRFRAME, ANTIFRICTION, EXTERNAL SELF-ALIGNING, EXTRA LIGHT DUTY 1.0000 INCH +.0000, -.0005 BORE, .0003 TO .0010 INCH RADIAL INTERNAL CLEARANCE, FILLED 80% MINIMUM WITH MIL-PRF-23827 TYPE I LUBRICANT, 250 °F MAX. WITH ZINC-NICKEL PLATING

- G — ZINC-NICKEL PLATING (SEE PLATING DESIGNATOR)
- E — LUBRICANT (SEE LUBRICANT DESIGNATOR)
- 16 — DASH NUMBER (SEE TABLE 1)
- MS27648 — BASIC PART NUMBER