

MIL-B-7949E  
AMENDMENT 1  
2 July 1987

MILITARY SPECIFICATION

BEARINGS, BALL, AIRFRAME, ANTIFRICTION

This amendment forms a part of Military Specification MIL-B-7949 dated 9 April 1981, and is approved for use by all Departments and Agencies of the Department of Defense.

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Delete "3.3.1 Product design change. Any change in product design, description, materials or fabrication procedures will require requalification of the product to an extent determined by the qualifying activity." and substitute:

"3.1.1 Product change. Any change in product design, including raceway geometry or dimensions, rolling element dimensions, rolling element quantity, seals, materials or plant location shall be reported to the qualifying activity and will require requalification of the product to an extent determined by the qualifying activity. Any other specific changes which must be brought to the qualifying activity's attention will be identified in the qualification notification letter.

3.1.2 Product manufacture. The bearing manufacturer shall be capable of performing the preponderance of manufacturing operations in-house, but may subcontract these operations at its option. Component inspection shall be performed at the plant listed on the Qualified Products List. If manufacturing operations are performed in more than one plant, the manufacturer's additional plant(s) shall be reported to the qualifying activity and will be listed accordingly on the QPL. The manufacturer is responsible for meeting all requirements of the specification and for the quality of the end product, whether it is manufactured totally in-house or some of the operations are performed by a subcontractor. Inherent in the responsibility for the end product is the responsibility to verify that the subcontractor's processes meet specification requirements. A change in subcontractor need not be reported to the qualifying activity unless specifically identified in the qualification notification letter. (NOTE: Bearings partly or completely manufactured in foreign countries shall be subject to the laws and procurement regulations pertaining to acquisition of foreign made products.)"

AMSC N/A

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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Add "3.15 Bearing starting torque. The amount of torque required to begin rotation of the bearing shall be measured as specified (see 4.5.12). Starting torque shall be within the allowable values specified in Table I."

TABLE I. Maximum allowable torque values.

MS No.	Ref. No.	Torque Inch-oz
27640-3A	KP3L	1
-3	KP3	1
-4	KP4	1
-5	KP5	1
-6	KP6	2
-8	KP8	3
-10	KP10	3
27641-3	KP3A	1
-4	KP4A	1.5
-5	KP5A	1.5
-6	KP6A	2
-8	KP8A	2.5
-10	KP10A	3
-12	KP12A	3
-16	KP16A	4
-20	KP20A	5
27642-16	KP16B	5
-21	KP21B	7
-23	KP23B	8
-25	KP25B	9
-29	KP29B	12
-33	KP33B	14
-37	KP37B	17
-47	KP47B	24
-49	KP49B	25
-52	KP52B	26
-56	KP56B	28
-60	KP60B	28
-64	KP64B	*
-68	KP68B	*
-72	KP72B	*
-76	KP76B	*
-80	KP80B	*
-84	KP84B	*
-88	KP88B	*
-92	KP92B	*
-96	KP96B	*

MS No.	Ref. No.	Torque Inch-oz
27643-3	DSP3	1
-4	DSP4	1
-5	DSP5	2
-6	DSP6	2
-8	DSP8	2
-10	DSP10	3
27644-3	DPP3	1
-4	DPP4	1
-5	DPP5	1
-6	DPP6	2
-8	DPP8	2
-10	DPP10	3
27645-3A	KSP3L	1
-4A	KSP4A	1
-5A	KSP5A	2
-6A	KSP6A	2
-3	KSP3	1
-4	KSP4	1
-5	KSP5	2
-6	KSP6	3
-8	KSP8	4
-10	KSP10	6
27646-3B	B5380D	2
-39	B5390D	2
-40	B5400D	3
-41	B5410D	4
-42	B5420D	4
-43	B5430D	5
-44	B5440D	5
-45	B5450D	6
-46	B5460D	6

\*Values to be specified  
in purchase orders.

MS No.	Ref. No.	Torque Inch-oz
27647-4A	DW4K2	1
-4	DW4K	1
-5	DW5	1
-6	DW6	2
-8	DW8	2
27648-16	KP16BS	5
-21	KP21BS	7
-23	KP23BS	8
-25	KP25BS	9
-29	KP29BS	12
-33	KP33BS	14
-37	KP37BS	17
-47	KP47BS	24
-48	KP48BS	25
-49	KP49BS	25
27649-3	AW3AK	1
-4	AW4AK	1.5
-5	AW5AK	1.5
-6	AW6AK	2
-8	AW8AK	2.5
-10	AW10AK	3
-12	AW12AK	3
-16	AW16AK	4
-20	AW20AK	5
27649-3B	MB5380D	2
-39	MB5390D	2
-40	MB5400D	3
-41	MB5410D	4
-42	MB5420D	4
-43	MB5430D	5
-44	MB5440D	5
-45	MB5450D	6
-46	MB5460D	6

Paragraph 4.3, delete and substitute the following:

"4.3 Qualification inspection. Initial qualification inspection consists of all requirements of this specification. Qualification inspection shall be performed at a laboratory acceptable to the Government (see 6.3) on sample units produced with equipment and procedures normally used in production.

4.3.1 Inspection samples. Unless otherwise specified by the qualifying activity (see 6.3), each bearing size shall be tested. The number of specimens of each size shall be as indicated in Table II. The sample shall be manufactured with equipment and procedures normally used in production.

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4.3.2 Inspection routine. The qualification tests shall include all of the examinations and tests specified under 4.5. Tests shall be conducted in the order specified in Table II.

4.3.3 Test reports. The manufacturer's test report shall be prepared in accordance with MIL-STD-831 and the qualifying activity authorization letter (see 6.2). The report shall include a dated drawing which shall describe in detail the manufacturer's product by specifying all dimensions and tolerances, materials selected, lubricant, plating, and heat treatment. Any information the manufacturer deems proprietary must be so indicated.

4.3.4 Qualification failure. Failure of any requirement of this specification shall be cause for refusal to grant qualification.

4.3.5 Retention of qualification. To retain qualification, a summary of the inspection for reliability provisions tests results (see 4.4.3) shall be furnished to the qualifying activity (see 6.2) at two year intervals and shall cover the results of inspection for reliability provisions tests performed during that period. The summary shall also include the number and type of any part failures and shall be forwarded via the Government inspector to the activity responsible for qualification (see 6.2). Failure to furnish the summary shall result in loss of qualification for that product. The qualifying activity shall establish the initial starting date and reserve the right to require samples to be submitted with the test data."

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Delete paragraph 4.4.2, substitute "4.4.2 Sample for quality conformance inspection. A random sample of bearings shall be selected in accordance with MIL-STD-105, Inspection Level II, AQL 1.0, except torque shall be inspected in accordance with MIL-STD-105, Inspection Level I, AQL 0.40."

Paragraph 4.4.3 add "f. Bearing starting torque (4.5.12)."

Paragraph 4.5.2 delete the first sentence and substitute "Where specified in the applicable military standard ten bearings shall be checked."

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Delete Table I, substitute:

TABLE II. Qualification inspection samples.

Examination or Test	Sample Number																									Test paragraph
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Examination of product	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4.5.1
Preservation, packaging, packing and marking	X	X	X	X	X	X																				4.6
Radial and lateral eccentricity	X	X	X	X	X	X	X	X	X	X																4.5.2
Out of roundness	X	X	X	X	X	X	X	X	X	X																4.5.2.1
Starting torque (before)											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4.5.12
Radial limit load											X	X	X													4.5.3.1
Radial static fracture load											X	X	X													4.5.3.2
Axial limit load														X	X	X										4.5.4.1
Axial static fracture load														X	X	X										4.5.4.2
Radial play	X	X	X	X	X	X	X	X	X	X																4.5.5.1
Axial play	X	X	X	X	X	X	X	X	X	X																4.5.5.2
Radial dynamic load																	X	X	X	X	X	X	X	X	X	4.5.3.3
Starting torque (after)											X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	4.5.12
Plating	X	X																								4.5.6
Seals			X	X	X																					4.5.7
Hardness	X																									4.5.9
Surface roughness	X	X	X																							4.5.8
Stabilization							X	X	X																	4.5.10
Lubrication	X	X	X																							4.5.11

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Paragraph 4.5.3 add the following sentence: "The starting torque shall be measured before and after these tests (see 3.15)."

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Paragraph 4.5.3.3, second sentence, delete "radial dynamic load..." substitute "load specified as 'radial load rating for average life of 10,000 cycles'...."

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Paragraph 4.5.7.2 lines 2 and 4 delete "...Table II," substitute "...Table III."

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Delete "\*TABLE II. Test torque...," substitute "\*TABLE III. Test torque..."

Add "4.5.12 Bearing starting torque.

4.5.12.1 Bearing mounting. The bearing shall be mounted with the rotation axis of the bearing either horizontal or vertical so that one race may be rotated while the other race is held stationary.

4.5.12.2 Torque measurement. Torque shall be applied either using an electrically driven torque measuring device which starts at a static state and slowly increases torque until rotation occurs or applied manually using a torque watch. The torque indicator shall be calibrated and shall indicate torque in units of inch-ounces. The indicator shall be accurate to sub-divisions of torque not greater than 10 percent of the maximum allowable torque for the bearing being measured. The torque shall be measured in both rotational directions and the higher value of the two shall be recorded."

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Paragraph 6.3 delete and substitute:

"6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List 7949 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Engineering Center, Systems Engineering and Standardization Department, Code 9311, Lakehurst, NJ 08733-5100, however, information pertaining to qualification of products may be obtained from the Naval Avionics Center, 6000 East 21st Street (Attn: Code B/714), Indianapolis, Indiana 46219-2189."

Add after paragraph 6.3 the following paragraphs.

6.3.1.2 Qualification of a bearing distributor. Department of Defense standardization regulations have specific requirements covering qualification approval of a distributor. Details of these requirements may be obtained from the qualifying activity.

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6.3.1.3 Procurement of bearings from a distributor not listed on the QPL. Government contractors and subcontractors who plan to procure a qualified bearing from a distributor not listed on the QPL should be aware that distributors frequently stock bearings which were manufactured several years earlier. Since specification requirements are occasionally changed without a corresponding change in part marking the parts offered for sale by the distributor may not meet current specification requirements. To assure that parts meet current specification requirements, the contractor should require the following information from the distributor:

- (1) Certification that the bearings have been inspected for compliance to the current specification requirements.
- (2) Certification of the original manufacturer's name, part number and date of lubrication on the outside of each unit package.

(NOTE: DOD regulations state that only distributors who have been approved by the qualifying activity for listing on a QPL may rebrand a QPL listed item.)

Custodians:  
Navy - AS  
Air Force - 99  
Army - AV

Preparing Activity:  
Navy - AS  
(Project No. 3110-0730)

Review Activities:  
Air Force - 84  
Army -  
DLA - IS

User Activities:  
Army - AT