

REVIEWER ACTIVITIES:  
Army - AV

REVIEWER ACTIVITIES:  
Air Force - W  
Navy - SH, MC  
DLA - IS  
Other - PG

This military standard is approved for use by all Departments and Agencies of the Department of Defense. Selection for all new engineering and design applications and for repetitive use shall be made from this document.

		OIL HOLES AND GROOVE												
APRMA (A) bearing number (See Note 11) Cone-Cup		Dash No.		A	B	C	D	R	Y	Recommended shoulder (A) diameter		K factor	Basic dynamic load ratings (lb) (A)	
				Bore	Outside dia.	Bearing width over cup	Cones width	Max. shaft fillet radius	Max. housing fillet radius	Shaft	Housing		Radial	Thrust
• 1	NA21075-71226D	0.7500	2.2500	1.4375	1.9375	0.06	0.03	2.01	0.99	3260	1730			
• 2	NA43131-43319D	1.3125	3.1875	1.5625	2.1875	0.09	0.06	2.91	0.87	5500	3320			
• 10	NA44143-44363D	1.4375	3.6250	1.5625	2.1875	0.03	0.06	2.01	0.75	6050	4250			
• 3	NA44163-44363D	1.6250	3.6250	1.5625	2.1875	0.03	0.06	2.13	0.75	6050	4250			
• 4	NA53176-53390D	1.7500	3.8750	1.7500	2.5625	0.09	0.06	2.40	0.79	7350	4900			
• 5	NA55200-55444D	2.0000	4.4375	1.8125	2.5625	0.09	0.06	2.72	0.66	7900	6300			
• 6	NA62112-66463D	2.1250	4.6250	2.1250	2.8750	0.14	0.03	2.87	0.93	11100	6200			
• 11	NA72212-72488D	2.1250	4.8750	2.1875	3.0625	0.09	0.06	2.91	0.79	11900	7900			
• 7	NA93378-93300D	3.0000	7.0000	2.9375	4.3063	0.14	0.09	4.13	0.76	22800	15800			
• 8	NA98350-98789D	3.5000	7.8750	3.1581	4.5625	0.14	0.09	4.65	0.92	31500	17900			
• 9	NA97450-97901D	4.5000	9.0000	3.3125	4.5625	0.14	0.09	5.51	0.79	29800	19800			
*Ineffective for new design after 13 Jan 82.														
A denotes changes. For NOTES see sheets 2 and 3.														
APPROVED 30 Apr 59 REVISED A 13 Jan 82														

P. A. OS Other Code AT 11	INTERNATIONAL INTEREST	TITLE BEARING, ROLLER, TAPERED, DOUBLE ROW OF ROLLERS, STEEP ANGLE, TWO SINGLE CONES, ONE DOUBLE CUP, NON-ADJUSTABLE, TYPE 767 (TNA)	MILITARY STANDARD MS 19089
PROCUREMENT SPECIFICATION FF-B-187		SUPERSEDED:	SHEET 1 OF 3

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Schedules for all new engineering and design applications and for repetitive use shall be made from this document.

REVIEWER ACTIVITIES:  
Air Force - 98  
Navy - SM, MC  
DIA - IS  
Other - NS

USER ACTIVITIES:  
Army - AV

P. A. OS Other Com. AT 11		INTERNATIONAL INTEREST	TITLE BEARING, ROLLER, TAPERED, DOUBLE ROW OF ROLLERS, STEEP ANGLE, TWO SINGLE CONES, ONE DOUBLE CUP, NON-ADJUSTABLE, TYPE 767 (TNA)		MILITARY STANDARD MS 19089	
PROCUREMENT SPECIFICATION FF-B-187		SUPERSEDES:		SHEET 2 OF 3		

  

BEARINGS MANUFACTURED WITH CORRECT RUNNING CLEARANCE FOR THESE FITS.						
Bearing bore A	Live shaft diameter limits		Dead shaft diameter limits		Housing	
	Tight fit	Loose fit	Tight fit	Loose fit	Live shaft bore limits	Dead shaft bore limits
0.7500	0.7515-0.7510	0.7505	0.7505	0.7500	2.2530-2.2520	2.2490-2.2480
1.3125	1.3140-1.3135	1.3130	1.3130	1.3125	3.1905-3.1895	3.1865-3.1855
1.4375	1.4390-1.4385	1.4380	1.4380	1.4375	3.6280-3.6270	3.6240-3.6230
1.6250	1.6265-1.6260	1.6255	1.6255	1.6250	3.6280-3.6270	3.6240-3.6230
1.7500	1.7515-1.7510	1.7505	1.7505	1.7500	3.8780-3.8770	3.8740-3.8730
2.0000	2.0020-2.0010	2.0005	2.0005	2.0000	4.4405-4.4395	4.4365-4.4355
2.1250	2.1270-2.1260	2.1255	2.1255	2.1250	4.6280-4.6270	4.6240-4.6230
2.1250	2.1270-2.1260	2.1255	2.1255	2.1250	4.8780-4.8770	4.8740-4.8730
3.0000	3.0025-3.0015	3.0005	3.0005	3.0000	7.0030-7.0020	6.9990-6.9980
3.5000	3.5030-3.5020	3.5010	3.5010	3.5000	7.8780-7.8770	7.8740-7.8730
4.5000	4.5035-4.5025	4.5010	4.5010	4.5000	9.0030-9.0020	8.9990-8.9980

  

NOTES:

1. MATERIAL: Cones, cups, and rollers: bearing quality - carburizing grade alloy or through-hardening grade alloy steel in accordance with FED-STD-66.  
Cups: carbon steel (stamped). Powdered process steel, e.g., Sinta Forge may be used.
2. HARDNESS: Cones, cups and rollers: 58 to 64 Rockwell C.
3. TOLERANCES: Standard grade (AFBMA Class 4) (allowable tolerances are in 0.0001 inch).

  

Cone bore (A) ④				Cup diameter (B)				Bearing width (C) ④				Assembled bearing maximum radial runout			
Size range		Tolerance		Size range		Tolerance		Bore size range		Tolerance		Cup O.D. (B)		Tolerance	
Over	Incl.	Plus	Minus	Over	Incl.	Plus	Minus	Over	Incl.	Plus	Minus	Over	Incl.	Over	24.0μ
0	3.0000	5	0	0.0000	12.0000	10	0	0	5.0000	100	0	0	5.0000	0	24.0μ
3.0000	6.0000	10	0	12.0000	24.0000	20	0	5.0000	12.0000	300	0				

  

4. DIMENSIONS: All dimensions are in inches. Dimensions P and S are recommended shaft and housing shoulder diameters.  
Dimensions R and Y are the maximum fillet radii on the shaft and the housing respectively, which will be cleared by the bearing corners.

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P. A. OS  
D. C. AT  
11

INTERNATIONAL  
INTEREST

TITLE  
BEARING, ROLLER, TAPERED, DOUBLE ROW  
OF ROLLERS, STEEP ANGLE, TWO SINGLE CONES,  
ONE DOUBLE CUP, NON-ADJUSTABLE, TYPE 767 (TNA)

PROCUREMENT SPECIFICATION  
FF-B-187

SUPERSEDES:

MILITARY STANDARD

MS 19089

SHEET 3 OF 3

DD FORM 672-1 COORDINATED

3110-0520

FED. SUP CLASS  
3110

5. OPERATING TEMPERATURE: Recommended operating temperature not to exceed 121° Celsius (250° Fahrenheit).
6. LUBRICATION: Bearings shall be furnished without lubrication. Bearings shall be furnished with preservative per MIL-C-11796, Class 3.
7. BASIC DYNAMIC LOAD RATING: Basic dynamic load rating is that constant stationary load which a group of apparently identical bearings with stationary cups (outer rings) can endure for a rating life of 90 million revolutions of the cone (inner ring). The basic dynamic load ratings listed herein are based on a rated life of 90 million revolutions or 3000 hours at 500 r/min.  
To compare the load ratings on this document with others whose basis for rating are other than 90 million revolutions or 3000 hours at 500 r/min use the following formula:  
$$C = \text{Other Bearing Rating} \times \left( \frac{R_1}{500} \right)^{1/3} \times \left( \frac{H_1}{3000} \right)^{1/3}$$
where:  
 $R_1$  = r/min at which other bearing is rated  
 $H_1$  = Hours life at which other bearing is rated  
 $C$  = Other bearing fatigue factor
8. RATING LIFE (HOURS): Rating life is the number of hours at some constant speed of the cone (inner ring) that 90 percent of a group of apparently identical bearings will complete or exceed before first evidence of fatigue develops. The magnitude of the rated life in hours is found from the following:  
$$L_{10} = \frac{1.5 \times 10^6}{R} \left( \frac{C}{P} \right)^{10/3} \text{ hours}$$
where:  
 $C$  = Basic dynamic load rating, lb.  
 $P$  = Equivalent load (combined radial and thrust load), lb.  
 $R$  = Revolutions per minute, r/min.  
The average life is approximately four times the rating life.
9. K FACTOR: The K factor is the ratio of the basic radial dynamic load rating (for a one-row bearing) to basic thrust dynamic load rating.
10. CONTACT ANGLE: All bearings are steep angle bearings having a contact angle (α) between 22 and 31 degrees. The contact angle is the angle between the line of action of the roller load and a plane perpendicular to the bearing axis.
11. PART NUMBER: The MS part number consists of the MS number, plus the dash number. Example: MS19089-3. The AFBMA (Anti-Friction Bearing Manufacturers Association) cup and cone numbers are for reference only and are not to be used for ordering purposes.
12. CAGE CLEARANCE: Designers should provide a clearance of .123 inch minimum between the outside edge of the cage and the housing counterbore.
13. For design feature purposes, this standard takes preference over procurement documents referenced herein.
14. Referenced documents shall be of the issue in effect on the date of invitation for bids, or request for proposal.

APPROVED 30 Apr 59 REVISED A For changes see sheets 1, 2, and 3.