FEDERAL SUPPLY CLASS
5307

RATIONALE

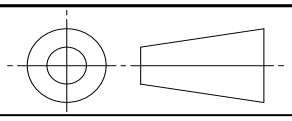
AS51989A HAS BEEN REAFFIRMED TO COMPLY WITH THE SAE FIVE-YEAR REVIEW POLICY.

WARNING

THIS DOCUMENT INCLUDES CADMIUM AS A PLATING MATERIAL. THE USE OF CADMIUM HAS BEEN RESTRICTED AND/OR BANNED FOR USE IN MANY COUNTRIES DUE TO ENVIRONMENTAL AND HEALTH CONCERNS. THE USER SHOULD CONSULT WITH LOCAL OFFICIALS ON THE ENVIRONMENTAL AND HEALTH REGULATIONS REGARDING ITS USE.

ISSUED 1999-04 REVISED 2006-06 REAFFIRMED 2014-04

THIRD ANGLE PROJECTION



SAE values your input. To provide feedback on this Technical Report, please visit
http://www.sae.org/technical/standards/AS51989A

CUSTODIAN: E-25

PROCUREMENT SPECIFICATION: NASM45909

SAE INTERNATIONAL

AEROSPACE STANDARD

STUD, LOCKED IN-RING LOCKED, SERRATED

AS51989
SHEET 1 OF 7

REV. A

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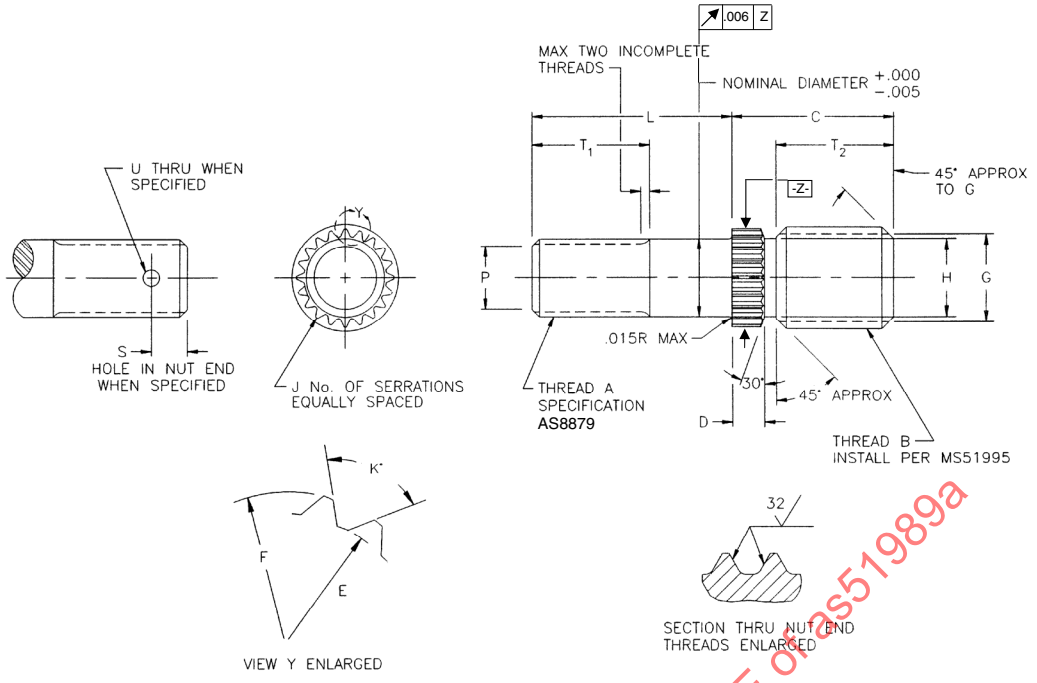

FIGURE 1

TABLE 1 - FINE THREAD NUT END - COARSE THREAD STUD END

MS51989 DASH NO.	A NUT END THREAD UNJF-3A	B STUD END THREAD (COARSE) SEE THREAD NOTE			C ±.015	D ±.015	E DIA +.005 −.004	F DIA +.007 −.002	G DIA ±.010	H DIA	J	K° +2° −1°	T_1 ±.015	T_2 ±.015	P DIA ±.010	S ±.015	U DIA	LOCKRING PART NO. (REF) SEE NOTE 16
	SIZE	SIZE	PITCH DIA	MINOR DIA														
-102	.1380-40	.1640-32	.1461 .1446	.1280 .1215	.250	.060	.152	.175	.113	.116	14	102°	.380	.140	.096	--	--	MS51990-102P
-103	.1640-36	.1900-24	.1654 .1639	.1413 .1334	.380	.080	.178	.201	.122	.128	16	90°	.410	.230	.117	.110	.070	MS51990-103P
-104	.1900-32	.2500-20	.2204 .2187	.1915 .1824	.440	.080	.203	.230	.169	.177	13	102°	.440	.280	.137	.120	.070	MS51990-104P
-105	.2500-28	.3125-18	.2795 .2778	.2474 .2373	.560	.080	.255	.284	.222	.232	17	86°	.500	.390	.190	.160	.076	MS51990-105P
-106	.3125-24	.3750-16	.3378 .3358	.3017 .2906	.690	.080	.316	.345	.274	.285	20	102°	.560	.510	.242	.160	.076	MS51990-106P
-107	.3750-24	.4375-14	.3946 .3926	.3534 .3411	.750	.120	.380	.407	.322	.336	24	102°	.620	.520	.305	.170	.106	MS51990-107P
-108	.4375-20	.5000-13	.4537 .4512	.4093 .3963	.810	.120	.456	.487	.375	.391	26	102°	.690	.570	.354	.170	.106	MS51990-108P
-109	.5000-20	.5625-12	.5122 .5097	.4641 .4503	.880	.120	.567	.601	.427	.445	26	111°	.810	.630	.416	.190	.106	MS51990-109P
-110	.5625-18	.6250-11	.5699 .5674	.5174 .5028	1.000	.140	.567	.601	.477	.497	26	111°	.940	.720	.469	.220	.141	MS51990-109P
-111	.6250-18	.7500-10	.6891 .6866	.6314 .6156	1.120	.160	.687	.721	.588	.610	30	111°	1.000	.820	.532	.220	.141	MS51990-110P
-112	.7500-16	.8750-9	.8071 .8046	.7430 .7257	1.310	.160	.783	.820	.695	.721	30	111°	1.120	.990	.645	.220	.141	MS51990-111P

TABLE 2 - FINE THREAD NUT END - FINE THREAD STUD END

MS51989 DASH NO.	A NUT END THREAD UNJF-3A	B STUD END THREAD (FINE) SEE THREAD NOTE			C ±.015	D ±.015	E DIA +.005 −.004	F DIA +.007 −.002	G DIA ±.010	H DIA	J	K° +2° −1°	T_1 ±.015	T_2 ±.015	P DIA ±.010	S ±.015	U DIA	LOCKRING PART NO. (REF) SEE NOTE 16
	SIZE	SIZE	PITCH DIA	MINOR DIA														
-202	.1380-40	.1640-36	.1483 .1468	.1323 .1262	.250	.060	.152	.175	.119	.121	14	102°	.380	.140	.096	--	--	MS51990-102P
-203	.1640-36	.1900-32	.1721 .1706	.1541 .1475	.380	.080	.178	.201	.139	.143	16	90°	.410	.250	.117	.110	.070	MS51990-103P
-204	.1900-32	.2500-28	.2296 .2281	.2090 .2014	.440	.080	.203	.230	.192	.197	13	102°	.440	.310	.137	.120	.070	MS51990-104P
-205	.2500-28	.3125-24	.2884 .2869	.2643 .2559	.560	.080	.255	.284	.245	.251	17	86°	.500	.420	.190	.160	.076	MS51990-105P
-206	.3125-24	.3750-24	.3512 .3497	.3271 .3185	.690	.080	.316	.345	.307	.306	20	102°	.560	.550	.242	.160	.076	MS51990-106P
-207	.3750-24	.4375-20	.4084 .4067	.3795 .3700	.750	.120	.380	.407	.356	.365	24	102°	.620	.550	.305	.170	.106	MS51990-107P
-208	.4375-20	.5000-20	.4711 .4694	.4422 .4325	.810	.120	.456	.487	.419	.427	26	102°	.690	.610	.354	.170	.106	MS51990-108P
-209	.5000-20	.5625-18	.5301 .5784	.4980 .4873	.880	.120	.567	.601	.472	.482	26	111°	.810	.670	.416	.190	.106	MS51990-109P
-210	.5625-18	.6250-18	.5927 .5910	.5606 .5498	1.000	.140	.567	.601	.535	.545	26	111°	.940	.780	.469	.220	.141	MS51990-109P
-211	.6250-18	.7500-16	.7134 .7114	.6773 .6656	1.120	.160	.687	.721	.648	.661	30	111°	1.000	.880	.532	.220	.141	MS51990-110P
-212	.7500-16	.8750-14	.8328 .8308	.7916 .7786	1.310	.160	.783	.820	.759	.773	30	111°	1.120	1.050	.645	.220	.141	MS51990-111P

TABLE 3 - COARSE THREAD NUT END - COARSE THREAD STUD END

MS51989 DASH NO.	A NUT END THREAD UNJC-3A	B STUD END THREAD (COARSE) SEE THREAD NOTE			C ±.015	D ±.015	E DIA +.005 −.004	F DIA +.007 −.002	G DIA ±.010	H DIA	J	K° +2° −1°	T_1 ±.015	T_2 ±.015	P DIA ±.010	S ±.015	U DIA	LOCKRING PART NO. (REF) SEE NOTE 16
	SIZE	SIZE	PITCH DIA	MINOR DIA														
-302	.1380-32	.1640-32	.1461 .1446	.1280 .1215	.250	.060	.152	.175	.113	.116	14	102°	.380	.140	.085	--	--	MS51990-102P
-303	.1640-32	.1900-24	.1654 .1639	.1413 .1334	.380	.080	.178	.201	.122	.128	16	90°	.410	.230	.111	.110	.070	MS51990-103P
-304	.1900-24	.2500-20	.2204 .2187	.1915 .1824	.440	.080	.203	.230	.169	.177	13	102°	.440	.280	.120	.120	.070	MS51990-104P
-305	.2500-20	.3125-18	.2795 .2778	.2474 .2373	.560	.080	.255	.284	.222	.232	17	86°	.500	.390	.166	.160	.076	MS51990-105P
-306	.3125-18	.3750-16	.3378 .3358	.3017 .2906	.690	.080	.316	.345	.274	.285	20	102°	.560	.510	.219	.160	.076	MS51990-106P
-307	.3750-16	.4375-14	.3946 .3926	.3534 .3411	.750	.120	.380	.407	.322	.336	24	102°	.620	.520	.270	.170	.106	MS51990-107P
-308	.4375-14	.5000-13	.4537 .4512	.4093 .3963	.810	.120	.456	.487	.375	.391	26	102°	.690	.570	.318	.170	.106	MS51990-108P
-309	.5000-13	.5625-12	.5122 .5097	.4641 .4503	.880	.120	.567	.601	.427	.445	26	111°	.810	.630	.371	.190	.106	MS51990-109P
-310	.5625-12	.6250-11	.5699 .5674	.5174 .5028	1.000	.140	.567	.601	.477	.497	26	111°	.940	.720	.423	.220	.141	MS51990-109P
-311	.6250-11	.7500-10	.6891 .6866	.6314 .6156	1.120	.160	.687	.721	.588	.610	30	111°	1.000	.820	.473	.220	.141	MS51990-110P
-312	.7500-10	.8750-9	.8071 .8046	.7430 .7257	1.310	.160	.783	.820	.695	.721	30	111°	1.120	.990	.583	.220	.141	MS51990-111P

TABLE 4 - COARSE THREAD NUT END - FINE THREAD STUD END

MS51989 DASH NO.	A NUT END THREAD UNJC-3A	B STUD END THREAD (FINE) SEE THREAD NOTE			C ±.015	D ±.015	E DIA +.005 −.004	F DIA +.007 −.002	G DIA ±.010	H DIA	J	K° +2° −1°	T_1 ±.015	T_2 ±.015	P DIA ±.010	S ±.015	U DIA	LOCKRING PART NO. (REF) SEE NOTE 16
	SIZE	SIZE	PITCH DIA	MINOR DIA														
-402	.1380-32	.1640-36	.1483 .1468	.1323 .1262	.250	.060	.152	.175	.119	.121	14	102°	.380	.140	.085	--	--	MS51990-102P
-403	.1640-32	.1900-32	.1721 .1706	.1541 .1475	.380	.080	.178	.201	.139	.143	16	90°	.410	.250	.111	.110	.070	MS51990-103P
-404	.1900-24	.2500-28	.2296 .2281	.2090 .2014	.440	.080	.203	.230	.192	.197	13	102°	.440	.310	.120	.120	.070	MS51990-104P
-405	.2500-20	.3125-24	.2884 .2869	.2643 .2559	.560	.080	.255	.284	.245	.251	17	86°	.500	.420	.166	.160	.076	MS51990-105P
-406	.3125-18	.3750-24	.3512 .3497	.3271 .3185	.690	.080	.316	.345	.307	.306	20	102°	.560	.550	.219	.160	.076	MS51990-106P
-407	.3750-16	.4375-20	.4084 .4067	.3795 .3700	.750	.120	.380	.407	.356	.365	24	102°	.620	.550	.270	.170	.106	MS51990-107P
-408	.4375-14	.5000-20	.4711 .4694	.4422 .4325	.810	.120	.456	.487	.419	.427	26	102°	.690	.610	.318	.170	.106	MS51990-108P
-409	.5000-13	.5625-18	.5301 .5784	.4980 .4873	.880	.120	.567	.601	.472	.482	26	111°	.810	.670	.371	.190	.106	MS51990-109P
-410	.5625-12	.6250-18	.5927 .5910	.5606 .5498	1.000	.140	.567	.601	.535	.545	26	111°	.940	.780	.423	.220	.141	MS51990-109P
-411	.6250-11	.7500-16	.7134 .7114	.6773 .6656	1.120	.160	.687	.721	.648	.661	30	111°	1.000	.880	.473	.220	.141	MS51990-110P
-412	.7500-10	.8750-14	.8328 .8308	.7916 .7786	1.310	.160	.783	.820	.759	.773	30	111°	1.120	1.050	.583	.220	.141	MS51990-111P

1. MATERIAL: STEEL, ALLOY, COMPOSITION 4130 PER AMS-S-6758.
STEEL, CORROSION RESISTANT, A286 (UNS S66286) PER AMS 5731, AMS 5732, AMS 5734 OR AMS 5737.

2. PROTECTIVE COATING: STEEL, ALLOY, SHALL BE CADMIUM PLATED IN ACCORDANCE WITH AMS-QQ-P-416, TYPE II, CLASS 3.
STEEL, CORROSION RESISTANT, SHALL BE PASSIVATED IN ACCORDANCE WITH AMS 2700, METHOD 1, TYPE 2 OR TYPE 8.

3. SURFACE TEXTURE: SYMBOLS PER ASME Y14.36. REQUIREMENTS PER ASME B46.1. UNLESS OTHERWISE SPECIFIED SURFACE TO BE 125 MICROINCHES Ra, EXCEPT SERRATED COLLAR.

4. THREADS: THE STUD END THREAD HAS A SPECIAL PITCH DIAMETER AND MINOR DIAMETER WHICH INSTALLS INTO A NATIONAL CLASS 3 TAPPED HOLE. THREADS SHALL BE IN ACCORDANCE WITH PROCUREMENT SPECIFICATION.

5. HEAT TREATMENT: STUDS SHALL BE HEAT TREATED TO 125,000 PSI MINIMUM TENSILE STRENGTH IN ACCORDANCE WITIH PROCUREMENT SPECIFICATION.

6. HARDNESS: STEEL, ALLOY, 26 HRC MINIMUM.
STEEL, CORROSION RESISTANT, BRINELL 269 MINIMUM.

7. FILLETS: .015 R MAXIMUM.

8. EDGES: BREAK SHARP EDGES .003 TO .015 UNLESS OTHERWISE SPECIFIED.

9. DIMENSIONS: DIMENSIONS IN INCHES TO BE MET AFTER PLATING. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M-1982.

10. TOLERANCES: LINEAR DIMENSIONS ±.005, ANGULAR DIMENSIONS ±2°.

11. PROCUREMENT SPECIFICATION: NASM45909

12. PART NUMBERS: THE MS PART NUMBER CONSISTS OF THE MS NUMBER, PLUS THE DASH NUMBER, PLUS THE LENGTH DASH NUMBER (TABLE 5). ADD "E" IN LIEU OF THE FIRST "DASH" FOR CORROSION RESISTANT STEELS. ADD "D" IN LIEU OF THE SECOND "DASH" FOR DRILLED HOLE IN NUT END. EXAMPLE:

MS51989-105-24	STUD, ALLOY STEEL, 1.5 INCH NUT END LENGTH
MS51989E105-24	STUD, CRES, 1.5 INCH NUT END LENGTH
MS51989-105D24	STUD, ALLOY STEEL, DRILLED HOLE, 1.5 INCH NUT END LENGTH
MS51989E105D24	STUD, CRES, DRILLED HOLE, 1.5 INCH NUT END LENGTH

13. FOR DESIGN FEATURE PURPOSES, THIS STANDARD TAKES PRECEDENCE OVER PROCUREMENT DOCUMENTS REFERENCED HEREIN.

14. REFERENCED DOCUMENTS SHALL BE OF THE ISSUE IN EFFECT ON DATE OF INVITATION FOR BID.

15. THE DASH NUMBERS "C100, C200, C300 AND C400" SERIES CRES STUDS IN THE ORIGINAL ISSUE OF THIS MS51989 STANDARD ARE CANCELLED/INACTIVATED AFTER THE APPROVAL DATE OF REVISION "A" INDICATED ON THIS DOCUMENT. THE CANCELLED STUDS SHOULD BE USED ON EXISTING CALLOUTS UNTIL STOCK IS DEPLETED. USE THE NEW "E100, E200, E300, AND E400" SERIES CRES STUDS FOR REPLACEMENT OF "C100, C200, C300, AND C400" SERIES CRES STUDS IN ACCORDANCE WITH TABLE 6.

/16/ FOR APPLICABLE LOCKRING DASH NUMBER CODING USE AS51990.

17. THE CHANGE BAR (I) LOCATED IN THE LEFT MARGIN IS FOR THE CONVENIENCE OF THE USER IN LOCATING AREAS WHERE TECHNICAL REVISIONS, NOT EDITORIAL CHANGES, HAVE BEEN MADE TO THE PREVIOUS ISSUE OF THIS DOCUMENT. AN (R) SYMBOL TO THE LEFT OF THE DOCUMENT TITLE INDICATES A COMPLETE REVISION OF THE DOCUMENT.

18. INVENTORIES OF PARTS MANUFACTURED PRIOR TO SEPTEMBER 2005 HAVING NUT END THREAD PER MIL-S-7742 USING UNR CONFIGURATION THREAD ROLL DIES ARE ACCEPTABLE UNTIL DEPLETION. PREREQUISITE: MEETING ALL PERFORMANCE REQUIREMENTS OF THE PROCUREMENT SPECIFICATION.