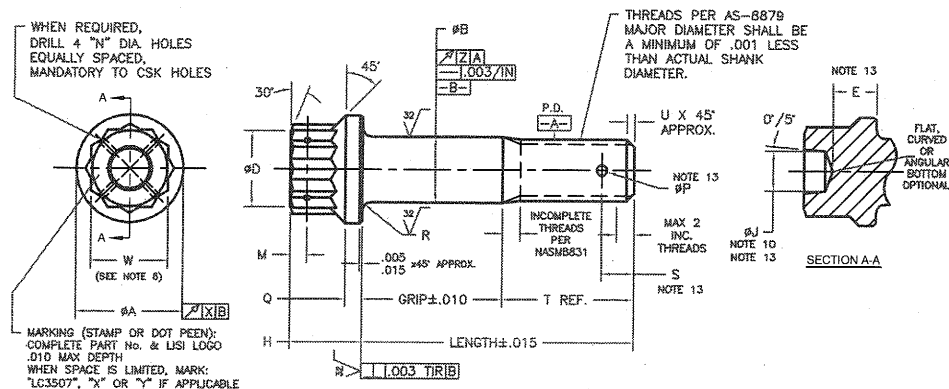


REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED



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SCALE: NONE	DATE: 08/28/2008
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ANSI Y14.5M	

REF. P/N:
NASM 21250 EXCEPT AS NOTED
UNLESS OTHERWISE SPECIFIED:
DIMENSIONS: INCH [mm]
SURFACE ROUGHNESS: 125 MICRONS [1,6]
TOLERANCE: .XX = ± 0.2
 XXX = ± 0.10
 ANGLES: $\pm 2^\circ$
BREAK ALL SHARP EDGES: .005/.015

NAME / SIGNATURE: _____

TITLE: _____ DATE: _____

DRAWING TITLE:
BOLT, 12-POINT HEAD,
NICKEL ALLOY 718,
220 KSI MIN. TENSILE STRENGTH
(STANDARD & OVERSIZE SHANK)

DRAWING NUMBER:

LC3507

SHEET 1 OF 4

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REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

FIRST DASH NO	THREAD SIZE: UNJF-3A	Ø A ± .005	Ø B				Ø D MIN MAX	E MIN	H ± .010	Ø J MIN MAX	M ± .010	N DIA ± .005
			STANDARD SIZE (NO CODE)		.0156 C/S (CODE "Y")	.0312 C/S (CODE "Y")						
			AFTER FINISH	BEFORE CHROME	AFTER FINISH	AFTER FINISH						
3	.1900-32	.364	.1885 .1895	.1835 .1850	.2016 .2026	.2172 .2182	.235 .250	.092	.200	.085 .135		
4	.2500-28	.470	.2485 .2495	.2435 .2651	.2641 .2651	.2797 .2807	.297 .312	.135	.235	.150 .190	.062	.037
5	.3125-24	.580	.3110 .3120	.3060 .3075	.3266 .3276	.3422 .3432	.360 .375	.162	.290	.185 .225		
6	.3750-24	.644	.3735 .3745	.3685 .3700	.3891 .3901	.4047 .4057	.422 .437	.197	.340	.230 .270	.070	
7	.4375-20	.745	.4360 .4370	.4310 .4325	.4516 .4526	.4672 .4682	.485 .500	.228	.375	.290 .330		
8	.5000-20	.823	.4985 .4995	.4935 .4950	.5141 .5151	.5297 .5307	.547 .562	.254	.430	.350 .390		
9	.5625-18	.933	.5605 .5615	.5555 .5570	.5761 .5771	.5917 .5927	.610 .625	.287	.480	.410 .450		
10	.6250-18	1.045	.6230 .6240	.6180 .6195	.6396 .6396	.6542 .6552	.672 .687	.327	.530	.470 .510	.094	
12	.7500-16	1.225	.7480 .7490	.7430 .7445	.7636 .7646	.7792 .7802	.797 .812	.380	.630	.540 .580		.055
14	.8750-14	1.433	.8730 .8740	.8680 .8695	.8886 .8896	.9042 .9052	.922 .937	.438	.700	.620 .660		
16	1.0000-12	1.620	.9980 .9990	.9930 .9945	1.0138 1.0146	1.0292 1.0302	1.047 1.062	.493	.800	.710 .750		
18	1.1250-12	1.870	1.1225 1.1240	1.1175 1.1195	1.1381 1.1396	1.1537 1.1552	1.235 1.250	.556	.935	.810 .850	.125	
20	1.2500-12	2.120	1.2475 1.2490	1.2425 1.2445	1.2631 1.2646	1.2787 1.2802	1.297 1.312	.639	1.155	.920 .960		
22	1.3750-12	2.350	1.3725 1.3740	1.3675 1.3785	1.3881 1.3896	1.4037 1.4052	1.610 1.625	NOTE 13	1.435	NOTE 13	.188	
24	1.5000-12	2.585	1.4975 1.4990	1.4925 1.4945	1.5131 1.5146	1.5287 1.5302	1.735 1.750		1.596			

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SCALE: NONE	DATE: 08/28/2008
DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ANSI Y14.5M	

REF. P/N:
NASM 21250 EXCEPT AS NOTED

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS: INCH [mm]

SURFACE ROUGHNESS: 125 MICRONS [1.6]

TOLERANCE: .XX = ± 0.10
.XXX = ± 0.005
ANGLES: $\pm 2^\circ$

BREAK ALL SHARP EDGES: .005/015

SEE SHEET 1

DRAWING TITLE:
BOLT, 12-POINT HEAD,
NICKEL ALLOY 718,
220 KSI MIN. TENSILE STRENGTH
(STANDARD & OVERSIZE SHANK)

DRAWING NUMBER:

LC3507

SHEET 2 OF 4



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

TABLE 1 (CONTINUED)

FIRST DASH NO	P ±.005	Q ±.010	R MIN MAX	S ±.010	U REF.	T REF.	W NOM. SIZE NOTE 8	CONCENTRICITY (TIR)		MECHANICAL PROPERTIES (LB)	
								X	Z	TENSILE STRENGTH (MIN)	FATIGUE LOAD HIGH (NOTE 5)
3	.075	.050		.174	.031	.390	.2500	.004		4970	2580
4	.081	.042	.031 .041	.194		.500	.3125	.005	.0045	8885	4620
5		.050		.201		.593	.3750	.006		14080	7320
6		.091		.217		.643	.4375	.008		20920	10900
7	.111	.099	.047 .057	.227	.047	.733	.5000	.009		28300	14700
8		.123		.244		.813	.5625	.010		37800	19600
9		.133		.247		.910	.6250	.011	.006	47900	24900
10		.150		.279	.062	.970	.6875	.012		59900	31200
12		.178		.289		1.151	.8125	.015		86900	45200
14	.146	.198	.063 .073	.300		1.337	.9375	.018		119000	61700
16		.222		.315	.078	1.523	1.0625	.020	.009	155000	80400
18		.258		.408		1.683	1.2500	.022		198000	103000
20		.269		.440		1.823	1.3125	.025		247000	111000
22	NOTE 13	.335	.077 .089		.094	2.281	1.6250	.028		301000	136000
24		.361				2.468	1.7500	.030	.012	361000	163000

NOTES:

- 1) MATERIAL: AMS 5662 OR AMS 5962
- 2) PROCUREMENT SPECIFICATION: NASM 85604 EXCEPT AS NOTED HEREIN.
- 3) HEAT TREATMENT (AGE PER AMS5662): 220 KSI min U.T.S. AND 125 KSI min SHEAR
- 4) FLUORESCENT PENETRANT INSPECTION 100% PER ASTM-E-1417 TY.I CL.2
- 5) MECHANICAL TESTING PER NASM 85604 REQUIREMENTS, EXCEPT AS FOLLOWS:
 - a) FATIGUE TEST NOT APPLICABLE FOR DRILLED THREAD PARTS
 - b) FATIGUE TEST AND TENSILE STRENGTH TEST NOT APPLICABLE FOR PARTS WITH GRIP LENGTH LESS THAN 2 TIMES SHANK DIAMETER.
 - c) SHORT BOLTS MECHANICAL PROPERTIES ACCEPTANCE BASED ON HARDNESS TEST VERIFICATION: 44 HRC MIN
 - d) DOUBLE SHEAR TEST PERFORMED ONLY WHEN SPECIFIED BY CUSTOMER P.O./CONTRACT, WITH FOLLOWING EXEMPTIONS:
 - DOUBLE SHEAR TEST NOT APPLICABLE FOR PARTS WITH GRIP LENGTH LESS THAN 2 1/2 TIMES SHANK DIAMETER
 - DOUBLE SHEAR LOADS FOR OVERSIZE "X" & "Y" CODE PARTS ARE BASED ON 125 KSI & NOMINAL DIA
 - e) ELEVATED TEMPERATURE DOUBLE SHEAR AND STRESS RUPTURE TESTS NOT APPLICABLE
 - f) FATIGUE LOW LOAD IS 10% OF HIGH LOAD
 - g) DUCTILITY TEST NOT APPLICABLE:
 - RAW MATERIAL CERTIFICATION SHALL INDICATE 8% MIN ELONGATION & 220 KSI MIN U.T.S. AFTER AGING PER NOTE 3 (RAW MAT'L CAPABILITY TESTS)
 - h) QUALIFICATION TESTING PER NASM85604 NOT APPLICABLE
- 6) WRENCHING ELEMENT (W) SHALL BE IN ACCORDANCE WITH AS 870
- 7) DIMENSIONS IDENTIFIED WITH "REF" ARE FOR INFORMATION PURPOSES ONLY, NOT AN INSPECTION REQUIREMENT.

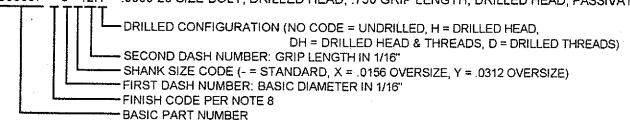
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DRAWN BY: VERIFIED BY: APPROVED BY: SCALE: NONE DATE: 08/28/2008 DIMENSIONING AND TOLERANCING IN ACCORDANCE WITH ANSI Y14.5M		REF. P/N: NASM 21250 EXCEPT AS NOTED UNLESS OTHERWISE SPECIFIED: DIMENSIONS: INCH (mm) SURFACE ROUGHNESS: 125 MICRONS [1.6] TOLERANCE: XX = ±0.005 ANGLES: ±2° BREAK ALL SHARP EDGES: .005/.015		DRAWING TITLE: BOLT, 12-POINT HEAD, NICKEL ALLOY 718, 220 KSI MIN. TENSILE STRENGTH (STANDARD & OVERSIZE SHANK) DRAWING NUMBER: LC3507 REV. - SHEET 3 OF 4	



REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED

NOTES (CONTINUED):

- 8) SURFACE TREATMENT / COATING / PLATING CODES (AS APPLICABLE PER DESIGNATED P/N CALL-OUT: SEE NOTE 11 & 15):
 - PASSIVATE PER AMS2700, METHOD 1, TYPE 2 or 8.
 - A - ALUMINUM COATING: HI-KOTE 1 PER HI-SHEAR SPEC 294.
 - B - PASSIVATE PER AMS2700, METHOD 1, TYPE 2 or 8 FOLLOWED BY APPLICATION OF ALUMINUM HI-KOTE 1 PER HI-SHEAR SPEC 294 ON THREADS AND THREAD END. NO OVERSPRAY COATING ALLOWED ON BOLT SHANK. THREAD RUNOUT AREA MAYBE COATED INCOMPLETE WITHIN LIMIT OF .030 FROM SHANK.
 - P - CADMIUM PLATE PER AMS-QQ-P-416, TY.II CL.2, WITH FOLLOWING EXEMPTIONS:
 - BRIGHTENERS ALLOWED.
 - PRE-PLATE STRESS RELIEF & POST-PLATE BAKE (HYDROGEN EMBRITTLEMENT RELIEF) NOT REQUIRED
 - C - CHROME PLATING ON SHANK ONLY PER AMS-QQ-C-320, CLASS 2. CHROME THICKNESS TO BE .0020 MINIMUM.
 - CHROME PLATING MAY EXTEND INTO THREAD RUNOUT AREA.
 - CHROME PLATING RUNOUT AREA (INCOMPLETE CHROME) ADJACENT TO FILLET RAD SHALL BE LOCATED WITHIN .020 AND .080 OF LINE OF TANGENCY BETWEEN SHANK AND RADIUS "R"
 - BEFORE CHROME PLATING BUT PRIOR THREAD ROLLING AND COLD WORKING OF THE FILLET RAD AND AFTER HEAT TREATMENT, SHANK SURFACE SHALL BE SHOT PEENED PER AMS-S-13165 WITH CAST SHOT, SIZE 170 TO 390, INTENSITY .016A. MINIMUM AREAS FOR SHOT PEEN ARE HEAD BEARING SURFACE, FILLET RAD, SHANK AND THREAD RUNOUT AREA.
 - FOLLOWING CHROME PLATING, ENTIRE BOLT SHALL BE PASSIVATED PER AMS2700, METHOD 1, TYPE 2 or 8.
 - CHROME PLATING (C) CODE AVAILABLE ON STANDARD SHANK ONLY (NOT APPLICABLE ON OVERSIZE "X" OR "Y" SHANKS)
 - CA - SAME AS CODE (C) EXCEPT ALL NON-CHROME PLATED AREAS TO BE ALUMINUM COATED, HI-KOTE 1 PER HI-SHEAR SPEC 294
 - (CA) CODE AVAILABLE ON STANDARD SHANK ONLY (NOT APPLICABLE ON OVERSIZE "X" OR "Y" SHANKS)
- 9) THREADS TO BE ROLLED AND HEAD TO SHANK FILLET RADIUS TO BE COLD WORKED AFTER HEAT TREATMENT.
- 10) DIA. "J" TO BE CONCENTRIC TO DIA. "B" WITHIN .010" TIR.
- 11) DESIGNATED P/N CALL-OUT (SEE EXAMPLE, NOTE 15):
 - BASIC PART NUMBER: DRAWING NUMBER LC3507;
 - SURFACE FINISH CODE FOLLOWS BASIC P/N:
 - PASSIVATE
 - A - ALUMINUM COATING
 - B - PASSIVATE & ALUMINUM COATING ON THREADS ONLY
 - P - CADMIUM PLATING
 - C - CHROME PLATING ON SHANK
 - CA - CHROME PLATING ON SHANK & ALUMINUM COATING ALL OTHER SURFACE
 - FIRST DASH NUMBER DESIGNATES DIAMETER IN SIXTEENTHS (USE WHOLE DASH NUMBERS ONLY)
 - SHANK SIZE CODE: - = STANDARD, X = .0156 OVERSIZE, Y = .0312 OVERSIZE
 - SECOND DASH NUMBERS DESIGNATE GRIP LENGTH IN SIXTEENTHS (USE WHOLE DASH NUMBERS ONLY)
 - ADD LETTER H AFTER SECOND DASH NO. TO DESIGNATE DRILLED HEAD
 - ADD LETTER D AFTER SECOND DASH NO. TO DESIGNATE DRILLED THREAD
- 12) TOTAL LENGTH EQUALS GRIP PLUS "T".
- 13) FEATURE NOT APPLICABLE FOR DIA. SIZE .22 & .24.
- 14) ALL DIMENSION TO BE MET AFTER PLATING AND/OR COATING, AS APPLICABLE.
- 15) PART NUMBER EXAMPLE : LC3507 - 8 - 12H = .5000-20 SIZE BOLT, DRILLED HEAD, .750 GRIP LENGTH, DRILLED HEAD, PASSIVATED.



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