MILITARY SPECIFICATION

INSERT, SCREW THREAD, THIN WALL, LOCKED IN: GENERAL SPECIFICATION FOR

This specification is mandatory for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements for thin wall, solid bushing, locked in, screw thread inserts. The method of locking in the insert into the parent material to resist rotation to be by means of an integral locking device, either metallic or non-metallic.

2. APPLICABLE DOCUMENTS

2.1 The following documents are of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

L-P-410	Plastic, Polyamide (Nylon) Rigid: Rods, Tubes, Flats, Molded and Cast Parts.
QQ-A-225/6	Aluminum Alloy Bar, Rod, and Wire: Rolled, Drawn, or Cold Finished 2024.

QQ-A-250/6	Aluminum Alloy 5083. Plate and Sheet.
QQ-P-35	Passivation Treatments for Austenitic, Ferritic, and Martensitic Corrosion-Resisting Steel (Fastening Devices).
QQ-P-416	Plating, Cadmium (Electrodeposited).
QQ-S-365	Silver Plating, Electrodeposited: General Requirements for.
PPP-H-1581	Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage of.

Military

MIL-I-6866	Inspection, Penetrant Method of.
MIL-S-7742	Screw Threads Standard, Optimum Selected Series: General Specification for.
MIL-A-8625	Anodic Coatings for Aluminum and Aluminum Alloys.
MIL-S-8879	Screw Threads, Controlled Radius Root with Increased Minor Diameter: General Specification for.
MIL-L-8937	Lubricant, Solid Film, Heat Cured.

STANDARDS

Federal

Federal Standard No. 66: Steel: Chemical Composition and Hardenability
Federal Test Method, Std. No. 151 - Metals: Test Methods

Military

MIL-STD-105	Sampling Procedures and Tables For Inspection by Attributes
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-1312	Fasteners, Test Methods

(Copies of specifications, standards, drawings, and publications required by suppliers in connection with specific procurement functions should be obtained from the procuring activity or as directed by the procuring officer).

"See Supplement 1 for list of associated specification sheets or detail specifications."

2.2 Other Publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on the date of invitation for bids or requests for proposal shall apply:

National Bureau of Standards
Handbook H28
Screw-Thread Standards for Federal Services

(Application for copies should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402).

Aerospace Materials Specifications

AMS 4650 Copper - Beryllium Alloy Bars, Rods, and Forgings
AMS 5643 Steel Bars, Forgings, Tubing, and Rings, Corrosion Resistant
AMS 5734 Steel Bars, Forgings, and Tubing, Corrosion and Heat Resistant
AMS 5736 Steel, Bars, Forgings
AMS 6370 Steel, Bars, Forgings

(Applications for copies should be addressed to the Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001).

American Society of Testing and Materials (ASTM) Publications

E10 - Brinell Hardness of Metallic Materials, Test for

(Applications for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103).

American National Standards Institute, Incorporated

ANSI B46.1 - Surface Texture (Surface Roughness, Waviness and Lay)

(Applications for copies should be addressed to the American National Standards, Incorporated, 1430 Broadway, New York, New York 10018).

"Technical society and technical association specifications are generally available from reference libraries. They are also distributed among technical groups and using Federal agencies."

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets.

3.2 Material

3.2.1 Carbon steel. Unless otherwise specified, (see 6.2), inserts made of carbon steel shall conform to the requirements of Federal Standard No. 66, composition 1117.

3.2.2 Alloy steel. Unless otherwise specified, (see 6.2), inserts may be made of alloy steel conforming to the requirements of AMS 6370, composition 4130.

3.2.3 Corrosion-resistant steel. When specified in the contract or order, inserts shall be made of corrosion-resistant steel conforming to the requirements of Federal Standard No. 66, composition 303; or AMS 5734 or AMS 5736, composition A286; or AMS 5643, composition 17-4 PH.

3.2.4 Beryllium copper. When specified in the contract or order, inserts shall be made of beryllium copper conforming to the requirements of AMS 4650.

3.3 Protective plating or surface treatment. Inserts shall be furnished with a protective plating or surface treatment as specified herein.

3.3.1 Cadmium plating. Carbon steel, alloy steel, and beryllium copper inserts shall be cadmium plated in accordance with QQ-P-416, Type II, Class 2 or as specified in the applicable specification sheet.

3.3.2 Passivation. Corrosion-resistant steel inserts shall be passivated in accordance with QQ-P-35 or as specified in the applicable specification sheet.

3.3.3 Silver plating Inserts made of corrosion-resistant steel, shall be silver pla ed in accordance with QQ-S-365, Type II, Grade B, .0002 minimum thickness, as specified in the applicable specification sheet.

3.4 Lubrication. Inserts with self-locking internal threads shall be solid film lubricated as specified in the applicable specification sheet. The lubricant shall conform to MIL-L-8937 and be examined per 4.5.5.

3.5 Construction. The inserts shall be of metal, one piece, with an integral metallic or non-metallic locking device as specified on the applicable specification sheets.

3.6 Design, dimensions, and tolerances. Inserts shall be in accordance with the design, dimensions, and tolerances as specified on the applicable specification sheets. These dimensions and tolerances shall apply after the protective plating or surface treatment and prior to the application of the lubricant as specified in 3.4.

3.7 Threads. Unless otherwise specified (see 6.2) the insert internal and external threads shall be right-hand.

3.7.1 Internal threads. Internal threads shall conform to Handbook H28, Part I, MIL-S-7742, or MIL-S-8879. Sizes and dimensions shall be as specified on the applicable specification. Thread gaging shall be performed after plating and prior to the application of the lubricant where applicable. When an internal locking feature is employed, the GO plug gage shall enter a minimum of 3/4 turn before engagement of the internal locking device.

3.7.2 External threads. External threads shall be in accordance with Handbook H28, Part I, except minor diameters shall be as specified on the applicable specification.

3.7.3 Lead threads. External lead threads shall not exceed two pitches, including chamfer.

3.7.4 Thread forming. Threads may be produced either by machining, grinding, or fully formed by a single rolling process prior to plating.

3.7.5 Concentricity. The internal thread pitch diameter shall be concentric with the external thread pitch diameter within .006 TIR when tested as specified in 4.5.3.

3.7.6 Thread locking feature. The locking feature may be either metallic or non-metallic and may be installed in a location as described on the applicable specification sheet. The non-metallic locking feature shall be in accordance with L-P-401.

When the insert is properly installed in the parent material, it will provide a locking torque with a mating screw or bolt that is within the limits of Table I when tested as specified in 4.6.1. Inserts shall not be subject to self-locking tests after testing as specified in 4.6.2, 4.6.3, or 4.6.4.

TABLE I

INTERNAL THREAD SELF-LOCKING TORQUE (IN INCH-POUNDS)		
INSERT INTERNAL THREAD NOMINAL SIZE FINE OR COARSE	MAX LOCKING TORQUE	MIN BREAKAWAY TORQUE
.060	1/	1/
.086	2.5	1/
.112	5	1/
.138	10	1.0
.164	15	1.5
.190	18	2.0
.250	30	3.5
.3125	60	6.5
.375	80	9.5
.4375	100	14.0
.500	150	18.0
.5625	200	24.0
.625	300	32.0
.750	400	50.0
.875	600	70.0
1.000	800	90.0

1/ Some indication of torque

3.8 Surface roughness. Surface roughness of the inserts prior to plating shall not exceed the values stated on the applicable specifications and shall conform to ANSI B46.1.

3.9 Mechanical properties. Inserts conforming to the design and dimensions of the applicable specification sheets shall be capable of developing a load rating, ultimate tensile strength, and a minimum axial strength and have sheet encapsulated areas in accordance with Table II.

TABLE II

MECHANICAL PROPERTIES		
LOAD RATING PSI	MINIMUM TENSILE STRENGTH PSI	SHEAR ENGAGEMENT AREA (EXTERNAL THREADS)
125,000	125,000	TABLE IV

3.9.1 Minimum applied axial load. The installed insert shall develop the axial load as specified on Table III. Axial values are based on the tensile stress area of 125,000 PSI test bolt and the minimum tensile strength as specified in Table II of the applicable specification when tested as specified in 4.6.2.

TABLE III

AXIAL LOAD FOR INSERTS INTERNAL THREADS				
NOMINAL SIZE (INTERNAL THREADS)	TENSILE 1/ STRESS AREA (IN.^{2})		MINIMUM APPLIED AXIAL LOAD (LBS.) 2/	
	COARSE THREAD	FINE THREAD	COARSE THREAD	FINE THREAD
.060	----	.0018	----	225
.086	.0037	.0039	460	490
.112	.0060	.0066	750	825
.138	.0091	.0101	1,140	1,260
.164	.0140	.0147	1,750	1,840
.190	.0175	.0200	2,190	2,500
.250	.0318	.0364	4,000	4,550
.3125	.0524	.0580	6,600	7,300
.375	.0775	.0878	9,700	11,000
.4375	.1063	.1187	13,300	14,800
.500	.1419	.1599	17,700	20,000
.5625	.182	.203	22,700	25,400
.625	.226	.256	28,200	32,000
.750	.334	.373	41,700	46,600
.875	.462	.509	57,700	63,600
1.000	.606	.663	75,700	82,800

1/ The tensile stress area used for the calculation of the axial load values are based on the stress area per Screw-Thread Standards for Federal Services Handbook H28.

2/ The minimum applied axial load shown is the product of the applicable tensile stress area times 125,000 PSI.

3.9.2 Resistance to pullout. Inserts shall demonstrate average shear engagement areas as specified in Table IV. The installed insert shall have a mean (arithmetical average) resistance to pullout from the parent material as specified in Table V when tested as specified in 4.6.3. The values on the table are based on the mean shear engagement areas of the inserts when properly installed in a test block having a shear strength of 25,000 PSI.

TABLE IV

SHEAR ENGAGEMENT AREA OF INSERT EXTERNAL THREAD	
NOMINAL SIZE (INTERNAL THREAD)	MEAN SHEAR ENGAGEMENT AREA ($IN.^2$) 1/
.060	.0090
.086	.0196
.112	.0330
.138	.0504
.164	.0736
.190	.1000
.250	.1820
.3125	.2920
.375	.4400
.4375	.5920
.500	.8000
.5625	1.0160
.625	1.2800
.750	1.8640
.875	2.8430
1.000	3.4010

1/ Shear Engagement Area is the assembled dimensional value for the overall engaged area of mating thread members. It does not represent a dimension of either of the members in an unassembled condition.

TABLE V

RESISTANCE TO PULLOUT INSERT EXTERNAL THREAD	
NOMINAL SIZE (INTERNAL THREAD)	MEAN RESISTANCE TO PULLOUT (LBS.) 1/
.060	225
.086	490
.112	825
.138	1,260
.164	1,840
.190	2,500
.250	4,550
.3125	7,300
75	11,000
.4375	14,800
.500	20,000
.5625	25,000
.625	32,000
.750	46,000
.875	71,000
1.000	85,000

1/ Pullout Load = (Shear Engagement Area) X (25,000 PSI). To compute minimum pullout load in other materials, multiply Shear Engagement by applicable ultimate shear strength of material.

3.9.3 Rotational resistance. The installed inserts shall develop the values listed in Table VI when tested as specified in 4.6.4.

TABLE VI

EXTERNAL ROTATIONAL RESISTANCE (INSERT) (INCH-POUNDS)	
INSERT INTERNAL THREAD NOMINAL SIZE FINE OR COARSE	MINIMUM ROTATIONAL RESISTANCE
.060	4
.086	10
.112	20
.138	30
.164	45
.190	60
.250	100
.3125	160
.375	240
.4375	350
.500	450
.5625	600
.625	900
.750	1,200
.875	1,500
1.000	1,900

3.9.4 Hardness. Inserts shall have a hardness range as specified on the applicable specification sheets when tested as specified in 4.6.5.

3.10 Metallurgical properties.

3.10.1 Discontinuities. Inserts shall not contain discontinuities which exceed the following limitations when examined as specified in 4.6.7. When visual inspection discloses discontinuities which show cause for further examination, magnetic particle or penetrant inspection as applicable shall be specified.

3.10.1.1 Cracks. Inserts shall be free from cracks in any direction or location.

3.10.1.2 Laps and seams. Inserts shall not have laps or seams except in locations as shown in Figure 1. and as specified in 3.10.2. Laps and seams shall not exceed 20% of the thread height (sharp V thread).

3.10.1.3 Inclusions. Inserts shall show no evidence of surface or subsurface inclusions at the thread root when examined as specified in 4.6.7. Small inclusions in other parts of the insert, not indicative of unsatisfactory quality, shall not be cause for rejection.

3.10.2 Thread discontinuities. (Laps, seams, and surface irregularities in rolled threads). Threads shall have no laps at the root or along the flanks as shown in Figure 1. Laps at the crest shall not exceed 20% of the basic thread height. Slight deviation from the thread contour is permissible at the crest of the thread as shown in Figure 1. The incomplete thread at each end of the insert may also deviate slightly from contour. The basic thread height is shown in Table VII.

TABLE VII

BASIC THREAD HEIGHT UNIFIED THREADS		
THREADS PER INCH	BASIC THREAD HEIGHT (REF)	20% BASE THREAD HEIGHT
48	0.0135	0.0027
40	0.0162	0.0032
32	0.0203	0.0041
28	0.0232	0.0046
24	0.0271	0.0054
20	0.0325	0.0065
18	0.0361	0.0072
16	0.0406	0.0081
14	0.0464	0.0093
13	0.0500	0.0100
12	0.0541	0.0108
11	0.0590	0.0118
10	0.0650	0.0130

3.11 Workmanship. Workmanship shall be consistent with the type of product, finish and class of thread fit specified in the applicable specification sheets. Inserts shall be of uniform quality and free from defects which would be detrimental to the performance of the insert.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.2 Inspection terms. The definition of terms used in this section shall be in accordance with MIL-STD-109.

4.3 Acceptance tests. Test methods for acceptance shall consist of examination and tests.

4.4 Sampling for lot inspections.

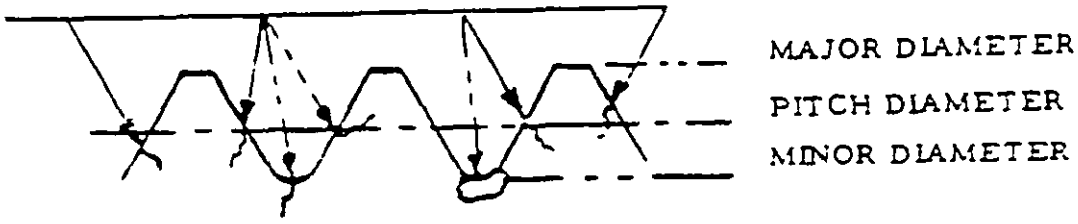
4.4.1 Lot. A lot shall consist of finished inserts which are of the same material, type, size, fabricated by the same process, and produced as one continuous run or order, or part thereof, and submitted for acceptance inspection at the same time.

4.4.2 Sampling for test materials.

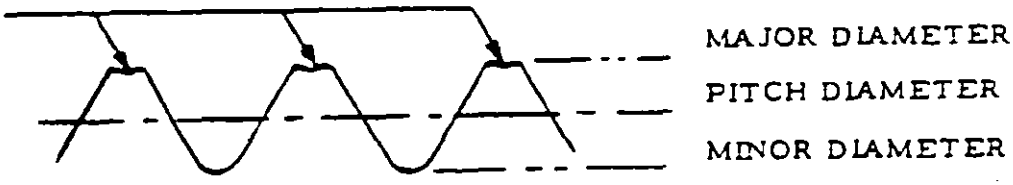
4.4.2.1 Test blocks. Test blocks shall be fabricated as specified in Figures 2 and 3 as applicable. Larger test blocks for multiple testing of inserts are permissible except for test of 4.6.2 and 4.6.3.

4.4.2.2 Test specimens. Test specimens taken in accordance with 4.4.4 shall be installed in accordance with the applicable specification sheets in test blocks as specified in 4.4.2.1.

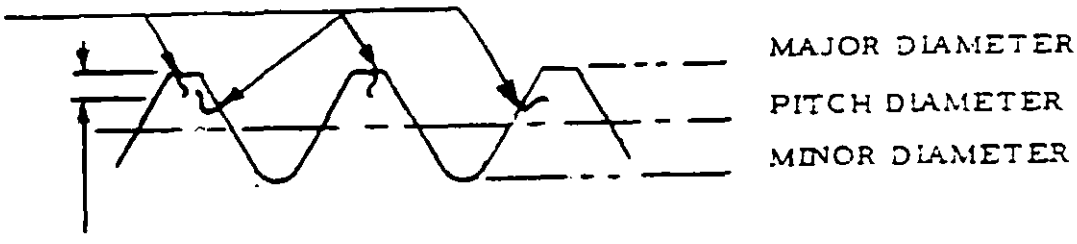
LAPS AND SEAMS
NOT PERMISSIBLE



PERMISSIBLE SURFACE
IRREGULARITIES



PERMISSIBLE LAPS
AND SEAMS



NOT MORE THAN 20% OF
BASIC THREAD HEIGHT

FIGURE 1

4.4.2.3 Test bolts and screws. Bolts and screws for use in all tests shall have class 3A threads.

4.4.2.3.1 Bolts and screws used for testing as specified in 4.6.2, 4.6.3, and 4.6.4 shall be heat treated to 160,000 PSI minimum tensile strength and shall be cadmium plated per QQ-P-416, Type II, Class 2.

4.4.2.3.2 Bolts and screws used for tests as specified in 4.6.1 shall be of corrosion-resistant steel and shall be passivated per QQ-P-35 for testing with corrosion-resistant steel inserts. Cadmium plated noncorrosion-resistant steel bolts shall be used for testing carbon steel and alloy steel inserts.

4.4.3 Sampling for examination. A random sample of inserts shall be taken from each lot in accordance with MIL-STD-105 at Inspection Level II. The Acceptance Quality Levels (AQL) shall be as specified in Table VIII.

4.4.4 Sampling for test. Sampling for test of inserts shall be in accordance with MIL-STD-105, Inspection Level S-1. The Acceptance Quality Level (AQL) shall be 1.5% defective.

4.4.5 Sampling for protective finishes. Sampling for test of protective finishes shall be in accordance with the applicable finish specification of 3.3.1, 3.3.2, and 3.3.3.

4.4.6 Sampling for packaging and packing. Sampling for packaging and packing shall be in accordance with PPP-B-1581.

4.5 Examination.

4.5.1 External threads. External threads shall be checked for thread form per Handbook H 28, Screw-Thread Standards for Federal Services, and minor diameter dimensions per applicable specification. Pitch diameters are to be inspected using the three (3) wire or equivalent method.

4.5.2 Internal threads. Internal threads shall be checked in accordance with Handbook H28 where applicable, with minor diameters as specified in MIL-S-8879 or as specified in applicable specification sheet.

4.5.3 Concentricity. The concentricity of the internal and external thread pitch diameters shall be checked following examination per 4.5.1 and 4.5.2. The internal thread pitch diameter shall be concentric with the external thread pitch diameter per 3.7.5. Method used for checking concentricity is optional.

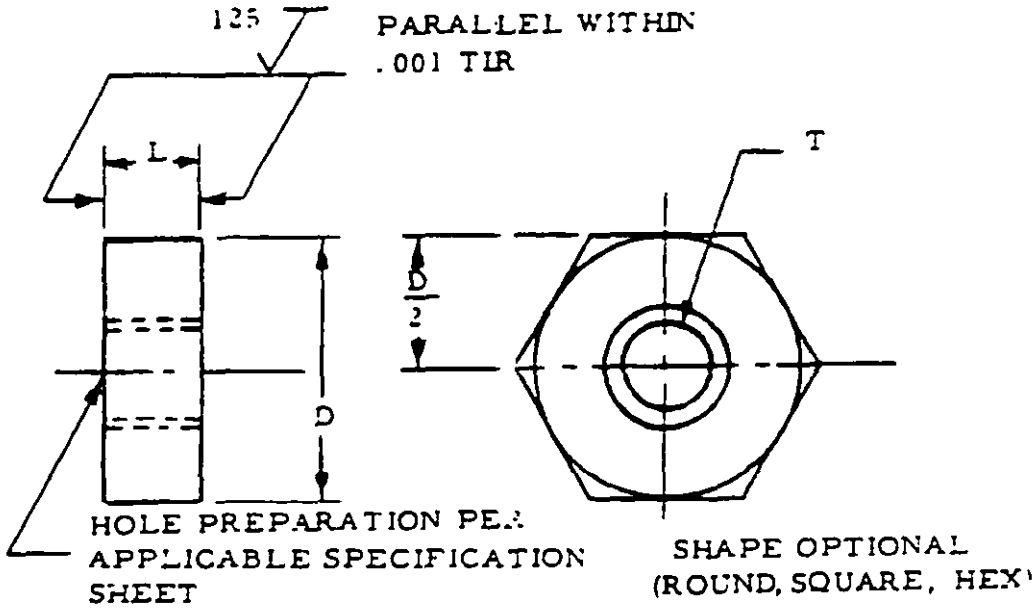
4.5.4 Finish, dimensions, and surface roughness. Finish, dimensions, and surface roughness shall be checked visually and by means of applicable gages.

4.5.5 Lubrication. The solid film lubricant coating shall be examined visually and microscopically at a magnification of 10X for uniformity in color, smoothness, and thickness, and evidence of cracks, bubbles, blisters, runs, foreign matter, grit, separation of ingredients, and other surface imperfections.

4.5.6 Classification of defects. The classification of defects and the Acceptable Quality Level (AQL) for inserts shall be in accordance with Table VIII. Any insert containing one or more defects shall be considered a defective unit. The total number of defective units which will reject a lot shall be in accordance with Tables I and IV-A of MIL-STD-105.

TABLE VIII - Classification of Defects.

Categories	Defects	Method of Inspection
Critical	None	
Major	AQL = 1.5 per cent defective	
101	Material (3.2)	Chemical Analysis
102	Lubrication (3.4)	Visual
103	Description and dimensions (3.6)	Measure
104	Thread size and form (3.7.1 & 3.7.2)	Measure
105	Concentricity (3.7.5)	Measure
106	Thread locking element present (3.7.6)	Visual
107	Surface roughness (3.8)	Measure or Comparison
108	Thread discontinuities (3.10.2)	Measure
Minor	AQL = 2.5 per cent defective	
201	Lead threads (3.7.3)	Visual



1. DIMENSIONS:
   T = NOMINAL THREAD DIAMETER OF APPLICABLE INSERT EXTERNAL THREAD.
   D = 4 x T.
   L = LENGTH OF APPLICABLE INSERT PLUS .063.

2. MATERIAL:
   (a) AXIAL TEST (3.9.1) - ALUMINUM ALLOY 2024-T4 PER QQ-A-225/6 (BARS & RODS).
   (b) PULLOUT TEST (3.9.2) - ALUMINUM ALLOY 5083-H321 PER QQ-A-250/6

3. ANODIZE PER MIL-A-8625, TYPE I, CLASS 1 OR CLASS 2.

4. PENETRANT INSPECT PER MIL-I-6866 DISCONTINUITIES OR CRACKS NOT ACCEPTABLE.

FIGURE 3
AXIAL LOAD TEST BLOCK

4.5.7 Inspection of installed inserts. The inserts when installed as specified in the applicable specification sheets shall be visually inspected under 10X magnification. The presence of cracks in either test block or insert as a result of installation shall be cause for rejection. When visual inspection discloses a condition which shows cause for further examination, test specimen shall be penetrant inspected in accordance with MIL-I-6866.

4.5.8 Packaging and packing. Examination and testing of packaging and packing shall be in accordance with PPP-H-1581.

4.6 Test methods.

4.6.1 Internal thread self-locking test. Test specimens installed in test blocks (Figure 2) as specified, shall be used for the torque testing of the internal locking feature when applicable.

4.6.1.1 Screw locking torque. The locking torque shall consist of a 15-cycle room temperature torque test, using test blocks conforming to Figure 2 and screws conforming to 4.4.2.3.2 with sufficient thread length to extend beyond the locking feature a minimum of two (2) pitches (including bolt thread chamfer). A new bolt or screw and a new test specimen shall be used for each complete 15-cycle test. Bolts and screws must assemble freely, with the fingers up to the locking feature. The bolt or screw shall be engaged or disengaged from the assembled insert self-locking area for 15 full installation and removal cycles without axial load on the insert. The test shall be run at a rate slow enough to yield a dependable measure of torque and avoid heating of the bolt. A bolt shall be considered fully installed when two threads extend past the end of the locking feature of the insert; the removal cycle shall be considered complete when the locking feature is disengaged.

4.6.1.2 Maximum locking torque. Maximum locking torque shall be the maximum torque value encountered on any installation or removal cycle, and shall not exceed values specified in Table I. Maximum locking torque readings shall be recorded on the first, seventh, and fifteenth installation cycles.

4.6.1.3 Minimum breakaway torque. Minimum breakaway torque shall be the minimum torque required to start removal of the screw or bolt from a fixed position located between the first 1/4 turn to 1 turn of the removal cycle. Minimum breakaway torque readings shall be recorded at the start of the first, seventh, and fifteenth removal cycles. The torque value for any cycle shall not be less than the applicable value shown in Table I.

4.6.2 Axial strength test. Test specimens installed in test blocks (Figure 3) as specified in 4.4.2.2 shall be used for axial strength testing. The test bolt shall assemble freely into the insert prior to engaging the self-locking device with finger torque. The test bolt thread shall be of sufficient length to fully engage the entire length of the insert internal thread. The bushing and test block clearance holes in the upper and lower yokes (see Figure 4) shall have a free fit not in excess of 0.060 inches greater than the bushing and test block diameters. The bolt clearance hole in the upper bushing (see Figure 4) shall be .005 to .015 inches diameter larger than the nominal diameter of the test bolt. The bolt clearance hole in the lower yoke shall have a diameter of 1 1/2 times the nominal insert external thread diameter ± .015. The axial load value determined by Table II and specified in Table III, shall be applied to the assembly and the failure of the insert shall not occur below the loads specified. In the event of bolt failure below the axial strength rating, the tests shall be repeated until the applicable axial strength rating of the insert is reached or exceeded. Rate of loading shall not exceed 100,000 PSI per minute based on the shank diameter area of the bolt.

4.6.3 Resistance to pullout test. Test specimens installed in test blocks (Figure 3) as specified in 4.4.2.2 shall be used for the resistance to pullout tests. The minimum single shear strength of the test block material, shall be determined by means of double shear tests of coupons taken from the material from which the test blocks are fabricated. The procedure shall be the same as required for 4.6.2 except to demonstrate the average shear engagement area, an axial load of a magnitude sufficient to produce failure (pullout) shall be applied to the assembly. The axial load test result shall be adjusted for test block shear strength as follows: the product

of the axial load test results (pounds) and the ratio of the 25,000 PSI to the actual minimum shear strength shall be used as the resistance to pullout (pounds). The mean (arithmetical average) value as determined by five (5) or more tests, must meet or exceed the values as shown in Table V. In the event of bolt failure below the applicable strength rating, the test shall be repeated until the applicable pullout strength rating of the insert is reached or exceeded. Rate of loading shall not exceed 100,000 PSI per minute per square inch based on the shank diameter area of the bolt. Whenever the pullout values exceed the tensile strength of the test bolt or the test loads exceed the capabilities of the test equipment, it is permissible to use lower shear strength materials (15,000 PSI approx.) in lieu of test block materials specified in 4.4.2.1. Double shear tests on coupons taken from the lower shear strength test blocks shall be performed and the resultant shear strength used to adjust the test results as stated above.

4.6.4 Rotational resistance tests. Test specimens installed in test blocks (Figure 2) shall be used for the rotational resistance test. Torque values shall not be less than the values specified in Table VI, using a test assembly as illustrated in Figure 5. When the forward side of the insert is installed per the applicable specification sheet, the far side of the insert shall be flush or below the far side of the test block. A hardened steel bushing, which has been counterbored shall be positioned over the insert. The counter bore in the steel bushing shall be to a diameter greater than the external thread major diameter of the applicable insert. The test bolt of 160,000 PSI minimum tensile shall be positioned through the bushing and shall enter the insert from the back side (opposite normal entry). The test bolt shall be torqued in a clockwise direction. Failure at values below those specified in Table VI shall be cause for rejection.

4.6.5 Hardness test. Samples taken in accordance with 4.4.4 shall be tested for hardness requirements of 3.9.4. The test procedure shall be test No. 6 for MIL-STD-1312 for alloy steel and ASTM E10 for corrosion-resistant steel of Federal Test Methods No. 151.

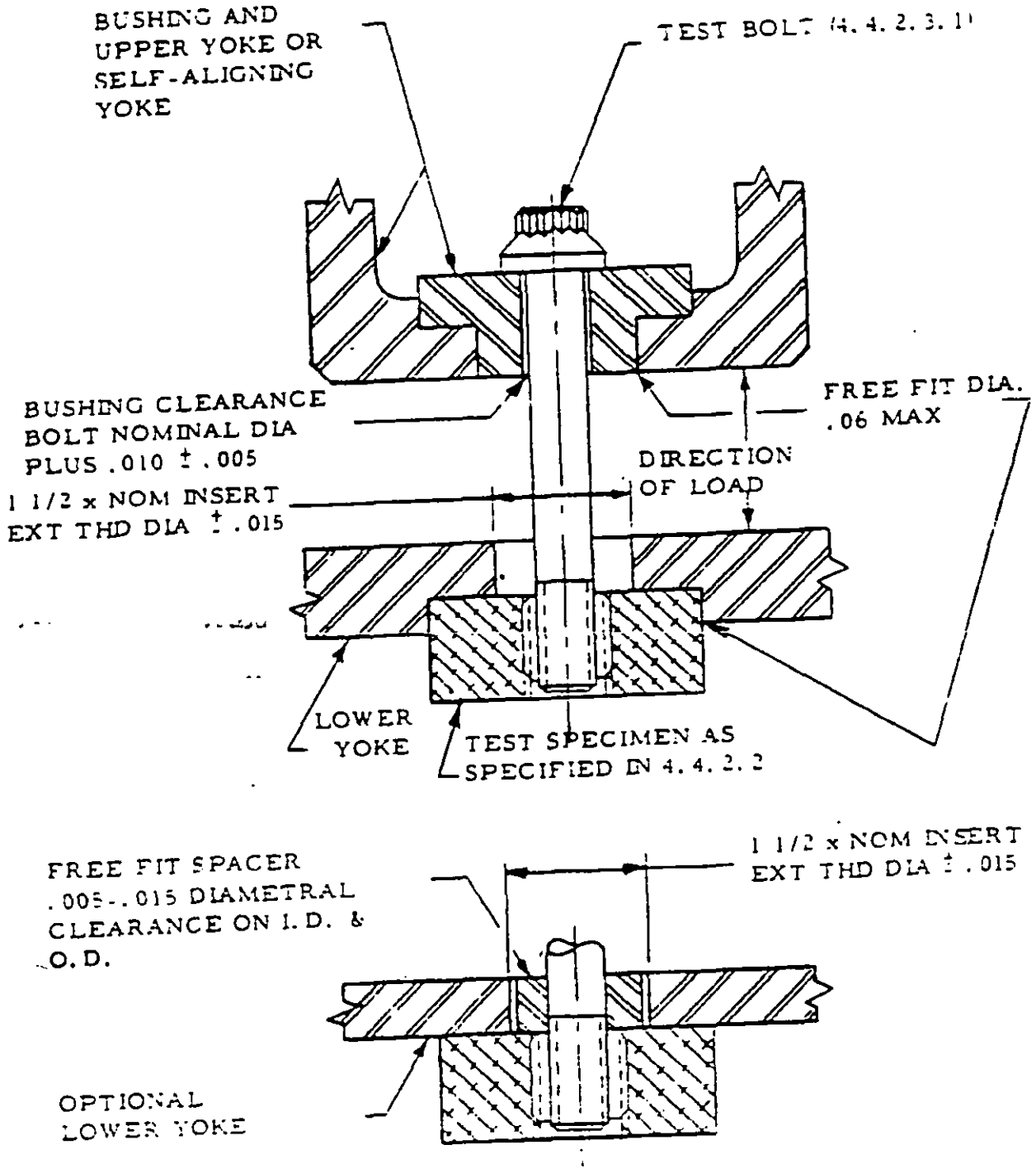
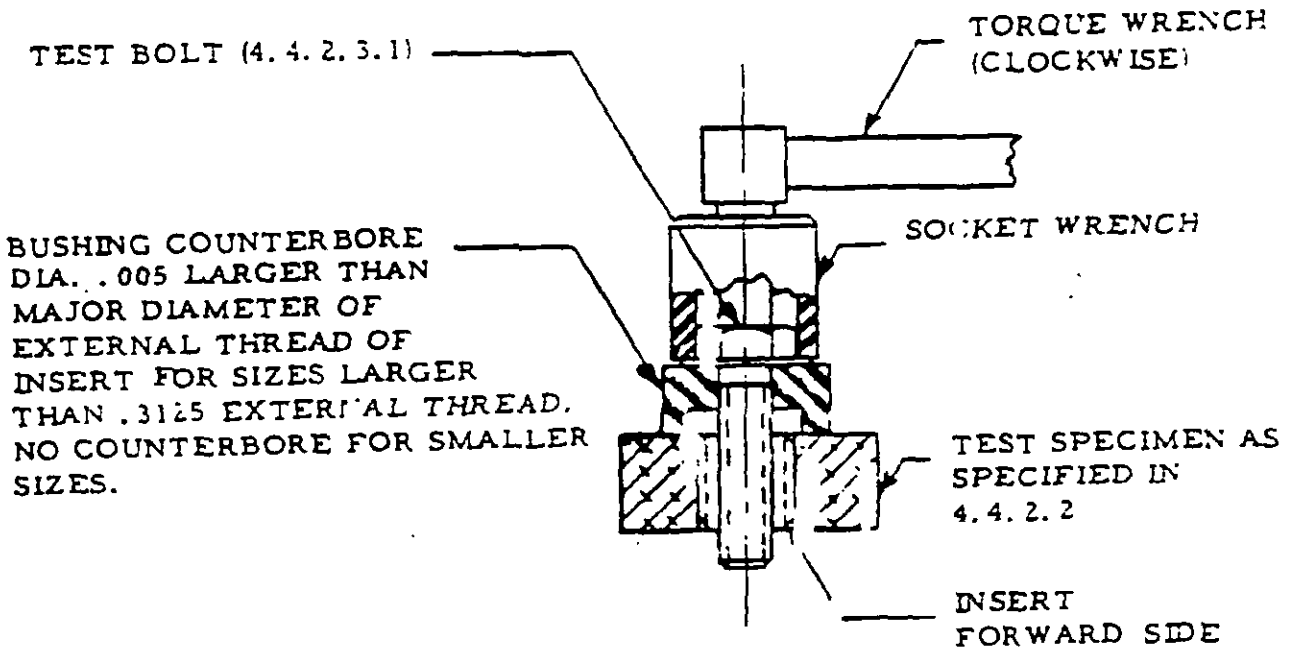


FIGURE 4
AXIAL LOAD TEST FIXTURE (3.9.1) AND
RESISTANCE TO PULLOUT FIXTURE (3.9.2).



NOTE: ABOVE TEST PROCEDURE USED WITH INSERTS IN THE AS RECEIVED CONDITION PER 3.9.3.

FIGURE 5
TORQUE TEST FIXTURES

4.6.6 Chemical analysis. The sample insert taken in accordance with 4.4.4 shall be tested for composition requirements of 3.2. The test procedure shall be method 111.2 or 112.2 of Federal Test Method No. 151. Manufacturer's material certification may be accepted in lieu of this test.

4.6.7 Discontinuities. Penetrant inspection performed in accordance with MIL-I-6866 for corrosion-resistant steel shall be used to determine the presence of discontinuities such as cracks, laps, seams, and inclusions. Penetrant inspection alone shall not be cause for rejection. If indications are considered cause for rejection, representative samples shall be taken from those inserts showing indications and these samples shall be further examined. Inserts may be sectioned and discontinuities measured microscopically under 10X magnification to determine conformance to the requirements of 3.10.1. The inspection shall be performed on finished inserts, free of lubrication and subsequent to any processing operation which could adversely affect the inserts. Requirements for dye as an indication of particle inspection may be waived.

5. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, packing and marking. Preservation, packaging, packing and marking shall be in accordance with PPP-H-1581.

5.2 Levels. Levels of packaging and packing shall be as specified by the procuring activity (see 6.2)

6. NOTES

6.1 Intended use. Inserts covered by this specification are intended for use as a general purpose fastener with a metallic or a non-metallic locking device to resist rotation.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number, and date of this specification.
b. Military part number.
c. Quantity required.
d. Material, if other than as specified in 3.2.
e. Threads other than [illegible] shall be specified (3.1).
f. Selection of applicable levels of packaging and packing (5.1).

6.3 Definitions.

6.3.1 Crack. A crack is a clean crystalline break passing through the grain or grain boundary without the inclusion of foreign elements.

6.3.2 Lap. A lap is a surface defect appearing as a seam, caused by the folding over of metal fins or sharp corners and then rolling them or forging them into a surface but not welding them.

6.3.3 Seam. A seam is an unwelded fold or lap which appears as an opening in the raw material as received from the source.

6.3.4 Inclusions. Inclusions are non-metallic materials in a solid metallic matrix.

Custodians:
Army - WC
Navy - None
Air Force - 11

Preparing Activity:
Army - WC
Project No. 5340-0863

Review Activities:
Army - AV, MU
Navy - None
Air Force - 82
DSA-IS
NSA

User Activities:
Army - AT, EL,
Navy - MC, YD,
Air Force - None

SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will assure that suitable products can be procured at minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold lines on reverse side, staple in corner, and send to preparing activity (see instructions on reverse hereof).

SPECIFICATION

ORGANIZATION (Of submitter)	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT
		$

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?

A. GIVE PARAGRAPH NUMBER AND WORDING.

B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)

SUBMITTED BY (Printed or typed name and activity)	DATE

DD, FORM 1426

REPLACES NAVSHIPS FORM 4863 WHICH IS OBSOLETE