INCH-POUND

FF-S-1362A
8 October 2014
SUPERSEDING
FF-S-1362
18 May 1970

FEDERAL SPECIFICATION

STUD, PLAIN, GENERAL PURPOSE

The General Services Administration has authorized the use of this federal specification by all federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers plain general purpose carbon or alloy steel, corrosion resisting steel, brass, and nickel-copper studs.

1.2 Classification. Plain general purpose studs may be of the style and sizes specified on NASM51864.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

FEDERAL STANDARDS

FED-STD-H28/2	Screw-Thread Standards for Federal Services Section 2 Unified Inch Screw Threads- UN and UNR Thread Forms
FED-STD-H28/6	Screw-Thread Standards for Federal Services Section 6 Gages and Gaging for Unified Screw Threads- UN and UNR Thread Forms
FED-STD-H28/23	Screw-Thread Standards for Federal Services Section 23 Class 5 Interference-Fit Screw Threads
QQ-N-281	Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings and Structural and Special Shaped Sections

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Philadelphia (DSCP), ATTN: DSCP-NASA, 700 Robbins Avenue, Philadelphia, PA 19111-5096 or e-mail to dscpg&ispecomments@dla.mil . Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil .

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-F-495	Finish, Chemical, Black, for Copper Alloys
MIL-DTL-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys

(Copies of these documents are available online at http://quicksearch.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME B1.12	Class 5 Interference Fit Thread

(Copies of this document are available from www.asme.org American Society of Mechanical Engineers, Three Park Avenue, M/S 10E, New York, NY 10016-5990.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

ASQ Z1.4	Sampling Procedures and Tables for Inspection by Attributes.

(Copies of this document are available from www.asq.org American Society for Quality Control, 600 North Plankinton Avenue, Milwaukee, WI 53203.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A342/A342M	Standard Test Methods for Permeability of Weakly Magnetic Materials
ASTM B21/21M	Standard Specification for Naval Brass Rod, Bar, and Shapes
ASTM B124/B124M	Standard Specification for Copper and Copper Alloy Forging Rod, Bar, and Shapes
ASTM B283/B283M	Standard Specification for Copper and Copper-Alloy Die Forgings (Hot-Pressed)
ASTM E8/E8M	Standard Test Methods for Tension Testing of Metallic Materials
ASTM E10	Standard Test Method for Brinell Hardness of Metallic Materials
ASTM E18	Standard Test Methods for Rockwell Hardness of Metallic Materials
ASTM E112	Standard Test Methods for Determining Average Grain Size
ASTM E1282	Standard Guide for specifying the Chemical Compositions and Selecting Sampling Practices and Quantitative Analysis Methods for Metals, Ores, and Related Materials
ASTM E1417/E1417M	Standard Practice for Liquid Penetrant Testing
ASTM E1444/E1444M	Standard Practice for Magnetic Particle Testing
ASTM F1941	Standard Specification for Electrodeposited Coatings on Threaded Fasteners (Unified Inch Screw Threads (UN/UNR))

(Copies of these documents are available from www.astm.org or the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

NATIONAL AEROSPACE STANDARD (NAS)

NASM51864	Stud, Plain, General Purpose

(Copies of this document are available from www.aia-aerospace.org or the Aerospace Industries Association, 1250 Eye Street, N. W., Suite 1200, Washington DC, 20005-3924.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE AIR4127	Steel: Chemical Composition and Hardenability
SAE AMS2700	Passivation of Corrosion Resistant Steels
SAE AMS-H-6875	Heat Treatment of Steel Raw Materials
SAE AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)

(Copies of these documents are available from www.sae.org or the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Material. Studs shall be a one piece, all metal unit. Unless otherwise specified in the invitation for bids, contract or order, they shall be made of materials specified in 3.1.1 through 3.1.4 which meet the requirements of Tables I and II (see 6.2).

3.1.1 Steel. Unless otherwise specified, studs shall be made of carbon or alloy steel conforming to the requirements of SAE AIR4127 and Table I. Studs of NASM51864 shall be made in accordance with the applicable specification.

3.1.2 Nickel-copper alloy. Unless otherwise specified, studs shall be made from a nickel-copper alloy conforming to the requirements of QQ-N-281, Class B and Table I. Studs of NASM51864 shall be made in accordance with the applicable specification.

3.1.3 Brass. Unless otherwise specified, studs shall conform with the requirements of ASTM B21/B21M, ASTM B124/124M or ASTM B283, UNS No. C46400 and Table I. Studs of NASM51864 shall be made in accordance with the applicable specification.

3.1.4 Corrosion resisting steel. Unless otherwise specified, corrosion resisting steel studs shall be manufactured from 300 series corrosion resisting steel as specified in SAE AIR4127 or any other austenitic corrosion resisting steel developed for cold heading or free machining, i.e., steel which meets the mechanical properties in Table II, and has a magnetic permeability of 2.0 maximum (air = 1.0) at a field strength of H = 200 oersteds (see 4.6.8). Studs of NASM51864 shall be made in accordance with the applicable specification.

3.1.5 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.2 Protective finish. When specified in the contract or order (see 6.2), studs shall be uncoated, plated, or treated as indicated in 3.2.1 thru 3.2.4.

3.2.1 Cadmium. Carbon and alloy steel studs shall be cadmium plated in accordance with SAE AMS-QQ-P-416, Type II, Class 3.

3.2.2 Oxide and black chemical finishes. Oxide and black chemical finishes shall be applied to brass studs in accordance with MIL-F-495 as specified in the contract or order.

3.2.3 Passivation. Corrosion resisting steel studs shall be passivated in accordance with SAE AMS2700 or as specified in the applicable document.

3.2.4 Zinc Nickel plating. As an alternative to Cadmium plating, carbon and alloy steel studs may be ZnNi plated in accordance with ASTM F1941 Fe/Zn-Ni 8ET alkaline zinc nickel electroplate, 12%-16% mass percent nickel, with chemical conversion coating per MIL-DTL-5541 TYPE II CLASS 1A.

TABLE I. Mechanical Properties of Studs of the Ferrous and Non-ferrous Materials.

Material	Specifications	Mechanical Requirements					
		Stud Nom Size Dia Inch	Proof Load PSI	Yield Strength Min PSI	Tensile Strength Min PSI	Hardness Rockwell	
						Min	Max
Steel (Carbon Or Alloy)	SAE AIR4127	1/4 thru 1	85,000		120,000	C25	C34
		Over 1 to 1 1/2	74,000		105,000	C19	C30
Brass	ASTM B21/B21M, B124/B124M or B283 UNS No. C46400			27,000	60,000	B65	
Nickel-Copper	QQ-N-281 Class B			40,000	80,000	B80	

TABLE II. Mechanical Properties of Corrosion-resisting Steel Studs.

Ultimate Loads	- 80,000 PSI minimum tensile strength
Proof Load	- 30,000 PSI minimum yield strength
Hardness	- Brinell 140 minimum
Elongation	- 35 percent minimum
Reduction in Area	- 45 percent minimum

3.3 Design and dimensions. Unless otherwise specified design, dimensions, and tolerances shall be in accordance with NASM51864. Studs shall conform to dimensions and tolerances after application of plating.

3.3.1 Threads. Unless otherwise specified (see 6.2) the threads shall be right hand.

3.3.1.1 Length of thread. The length of thread shall be measured from the extreme ends of the studs and is the distance from the respective ends to the thread runout .

3.3.1.2 Nut end threads. Unless otherwise specified nut end threads shall be unified fine thread (UNF) series, Class 2A, in conformance with FED-STD-H28/2 and shall be of the sizes and lengths as specified on NASM51864.

3.3.1.3 Tap end threads. Unless otherwise specified tap end threads shall be in accordance with ASME B1.12 and FED-STD-H28/23 for NC-5 HF, NC-5 CSF, and NC-5 ONF threads as specified in the contract or order. Sizes and lengths shall be as specified on NASM51864.

3.3.1.4 Thread forming. Threads of all grades and sizes of studs may be rolled, cut, or ground as specified in the contract or order.

3.3.1.5 Incomplete threads. Unless otherwise specified the runout threads shall be faired into the shank within a maximum of 3 1/2 incomplete threads at the tap end of the stud, and within a maximum of 2 1/2 incomplete threads at the nut end of the stud, as specified in NASM51864.

3.3.1.6 Gaging of threads. Threads shall be gaged in accordance with the standards and practices specified in FED-STD-H28/6.

3.3.1.7 Grain flow. The grain flow in rolled threads shall follow the general thread contour with the maximum density at the bottom of the root radius as shown in Figure 1. It shall be determined as specified in 4.6.10.

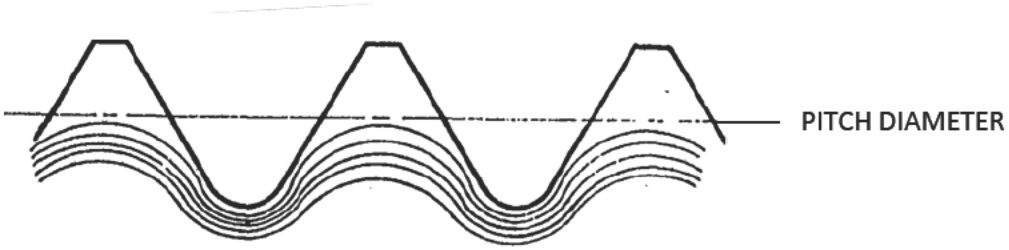

FIGURE 1. Grain flow.

3.3.2 Straightness. The straightness of the stud shall be within the values specified in Table III and tested in accordance with paragraph 4.5.3.

TABLE III. Straightness.

Stud Size Nut End	Deviation of Stud from Plate, Maximum (Inches per Inch of Stud Nut End Length)
0.250 – 0.3125	0.0030
0.375 – 0.4375	0.0025
0.500 and larger	0.0020

3.4 Mechanical properties.

3.4.1 Heat treatment. Carbon and alloy steel studs shall be heat treated in accordance with the quality provisions of SAE AMS-H-6875 and develop the mechanical properties specified herein.

3.4.2 Hardness. Rockwell and Brinell hardnesses of specified materials are as shown in Tables I and II and shall be measured as specified in 4.6.3.

3.4.3 Hydrogen embrittlement. Alloy steel studs required to be electroplated (see 3.2.1) shall be subjected to a relief treatment in accordance with the methods specified in the applicable plating operation to minimize the embrittlement that results from these processes.

3.4.4 Grain size of copper alloy. When specified (see 6.2) grain size of copper alloy in studs shall be an option of the contracting officer in accordance with the material specification.

3.4.5 Minimum tensile strength. Studs made of carbon steel, alloy steel, corrosion resisting steel, or nonferrous metal shall conform to the tensile strength requirements of Tables I and II as indicated by samples tested in accordance with 4.6.1.

3.4.6 Yield strength. Corrosion resisting steel and nonferrous studs shall conform to the yield strength requirements of Tables I and II as indicated by samples tested in accordance with 4.6.2.

3.5 Metallurgical properties.

3.5.1 Discontinuities. Studs shall not contain discontinuities which equal or exceed the following limitations. Care must be exercised not to confuse cracks with discontinuities, as described herein. When visual inspection disclosed discontinuities which show cause for further examination, magnetic or penetrant inspection, as applicable, shall be as specified in 4.6.9.

3.5.1.1 Cracks. Studs shall be free from cracks in any direction or location.

3.5.1.2 Laps and seams. Studs may possess laps and seams, except in locations specified in 3.5.2. The depths shall not exceed the amounts specified in Table IV.

TABLE IV. Discontinuity depth 1/.

Stud Size (Nut End)	0.250 thru 0.3125	0.375	0.4375	0.500 thru 1.250
Discontinuity Depth in Inches (Max)	0.005	0.006	0.007	0.008

1/ Depth of discontinuity shall be measured normal to the surface at a point of greatest penetration.

3.5.2 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 2. Multiple laps on the sides of threads are not permissible regardless of location. A single lap is permissible along the side of the thread above the pitch diameter on either the pressure or non-pressure side (one lap per thread) provided it extends toward the crest and generally parallel to the side as shown in Figure 3a. Crest craters, crest laps, or a crest lap in combination with a crest crater are permissible, provided the imperfection does not extend deeper than 20% of the basic thread height (see Table V) as measured from the thread crest when the thread major diameter is at a minimum size (see Figure 3a). Slight deviation from the thread contour is permissible at the crest of the thread within the major diameter limits as shown in Figure 3b. The incomplete thread at each end of the thread may also deviate slightly from contour.

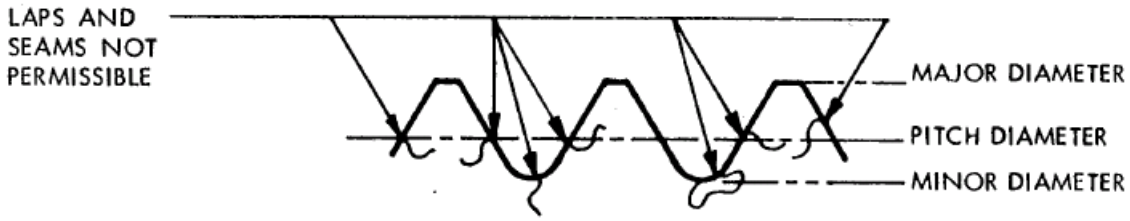

Figure 2.

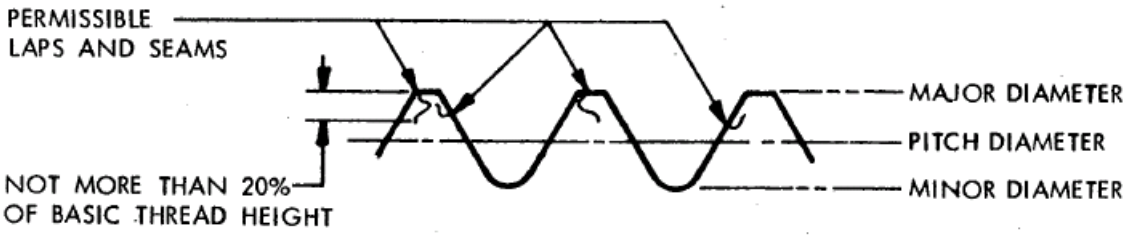

Figure 3a.

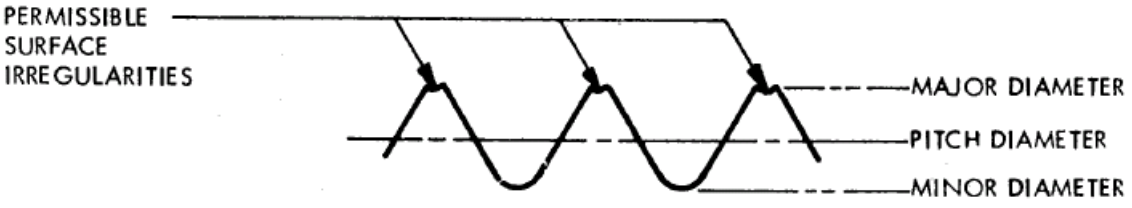

Figure 3b.

Laps, Seams, and Surface Irregularities in Thread

TABLE V. Basic thread height – unified threads.

Threads Per Inch	Basic Thread Height (Ref)	20% Basic Thread Height
40	0.0162	0.0032
36	.0180	.0036
32	.0203	.0041
28	.0232	.0046
24	.0271	.0054
20	.0325	.0065
18	.0361	.0072
16	.0406	.0081
14	.0464	.0093
13	.0500	.0100
12	.0541	.0108
11	.0590	.0118
10	.0650	.0130

3.5.3 Grinding burns. The studs shall show no evidence of grinding burns.

3.6 Workmanship. Workmanship shall be consistent with the type of product, finish, and class of thread fit specified. Studs shall be of uniform quality free from injurious scale, fins, burrs, seams, slivers, gouges, or other defects or irregularities which would be detrimental to the performance of the stud in service use.

4. QUALITY ASSURANCE PROVISIONS

4.1 Conformance inspection. Conformance inspection shall include the following.

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

4.3 Inspection lot. A lot shall consist of studs of the same type, size, material, coating, and thread series manufactured under like conditions and offered for delivery at one time.

4.4 Sampling for lot inspection.

4.4.1 Sampling for visual and dimensional examination. A random sample of studs shall be selected from each lot in accordance with ASQ Z1.4, Inspection Level S-4.

4.4.2 Sampling for test. Unless otherwise specified herein, sampling for test of studs shall be in accordance with ASQ Z1.4, Inspection Level S1.

4.4.2.1 Sampling for hardness test. Samples shall be drawn from each lot in accordance with ASQ Z1.4, Inspection Level S1.

4.4.2.2 Sampling for protective finish. Sampling for test of protective finishes shall be in with the applicable specifications of 3.2.1 thru 3.2.4.

4.4.2.3 Sampling for chemical analysis. For determining the chemical composition requirements of 3.1, a sample size of studs shall be drawn from each lot presented for acceptance. The sample shall consist of at least 4 ounces of clean fine drillings, millings, or chips and shall comply with 4.6.4.

4.5 Examination.

4.5.1 Visual and dimensional examination. Each of the samples selected in accordance with 4.4.1 shall be examined for compliance to this specification. Visual examination shall consist of an examination for conformance with all requirements not requiring test or measurements. Examination for dimensions shall consist of gaging or checking by suitable measuring instruments the threads and tolerance dimensions specified in NASM51864 (see 3.3).

4.5.2 Gaging. Unless otherwise specified (see 6.2), the supplier shall make available the necessary gages and measuring instruments. The accuracy of the gages and measuring instruments shall be certified. In case of controversy, the certification of the National Institute of Standards and Technology shall govern. For convenience, the toleranced dimensions which are normally examined are summarized in Table VI.

TABLE VI. Dimensional examination.

Description of Dimension	Method of Checking
Pitch diameter	Thread gage
Major diameter	Ring gage
Body diameter	Gage and micrometer
Thread length	Scale
Overall length	Scale
Straightness	Surface plate, and feeler gage

4.5.2.1 Nut end threads. The pitch diameter of class 2A threads shall be gaged by means of GO and NOT GO thread ring and thread plug gages. The major diameter shall be gaged by means of GO and NOT GO plain thread ring gages.

4.5.2.2 Tap end threads. The pitch diameter of class 5 threads shall be measured by means of a cone point snap gage or thread micrometers. The major diameter shall be gaged by means of GO and NOT GO plain thread ring or snap gages.

4.5.3 Straightness. Straightness of the stud shall be checked when rolled on a surface plate. The clearance measured by a feeler gage shall not exceed the values in 3.3.2 and Table III.

4.5.4 Protective coating. Protective coating shall be checked as indicated on NASM51864.

4.5.5 Classification of defects. The classification of defects for studs shall be as specified in Table VII.

TABLE VII. Classification of Defects.

Categories	Defects	Method of Inspection
Critical		
1	Circumferential cracks (3.5.1.1)	Metallographic Microscope
Major		
101	Protective Finish (3.2)	Visual
102	Shank Diameter (3.3)	Gage and micrometer
103	Design and dimensions (3.3)	Measure
104	Thread size and form (3.3.1.4)	Ring/Plug gage
105	Incomplete threads (3.3.1.5)	Scale
106	Straightness of stud (3.3.2)	Surface plate and feeler gage
107	Hardness (3.4.2)	Measure
108	Thread discontinuities (3.5.2)	Measure

TABLE VII. Classification of Defects (continued).

Categories	Defects	Method of Inspection
Minor		
201	Chamfer on thread ends (3.3)	Visual
202	Overall length (3.3.1.1)	Scale
203	Grinding burns (3.5.3)	Visual
204	Workmanship (3.6)	Visual

4.6 Test methods.

4.6.1 Axial strength (tensile). Nut end threads of the studs shall be tested in accordance with the applicable requirements by ASTM E8/E8M in tension between the nut end and the tap end. Samples shall be of sufficient length to develop the full length of the nut end thread of the stud without stripping the thread. The tensile load values specified in Tables I and II, as applicable, shall be applied to the test assembly and failure of the nut end threads shall not occur below these loads. Studs not having sufficient length for tensile tests shall be accepted on the basis of hardness tests (see 6.2).

4.6.2 Yield strength. When determination of yield strength is required, tests shall be conducted in accordance with ASTM E8/E8M.

4.6.3 Hardness. Sample of studs taken in accordance with 4.4.2 shall be tested for hardness requirements of 3.4.2 (see 6.2). The test procedure shall be in accordance with ASTM E10 or ASTM E18 as applicable.

4.6.4 Chemical analysis. Unless otherwise specified by the procuring agency (see 4.4.2.3) chemical analysis shall be made in accordance with ASTM E1282. The sample shall be analyzed by a Government approved laboratory. When permitted by the procuring agency (see 6.2), the metal manufacturer's certificate of conformance showing the chemical composition is acceptable.

4.6.5 Grain size of copper alloys. Determination of grain size of copper alloy shall be made in accordance with ASTM E112.

4.6.6 Protective coating. Protective coating and plating tests shall be conducted in accordance with the applicable specifications shown in 3.2.1. thru 3.2.4.

4.6.7 Hydrogen embrittlement. The contractor shall furnish the Government certification that electroplated alloy steel studs have been subjected to the hydrogen embrittlement relief treatment specified in 3.4.3. When specified (see 6.2), electroplated studs shall be subjected to the embrittlement relief test specified in the applicable plating or coating specification, except that the studs shall be held under load for 23 hours and then examined for cracks or fractures.

4.6.8 Magnetic permeability. Austenitic corrosion resisting steel studs, subjected to visual and dimensional examination, shall also be tested to determine magnetic permeability (see 3.1.4) in accordance with ASTM A342/A342M.

4.6.9 Discontinuities. Magnetic particle inspection performed in accordance with ASTM E1444/E1444M for carbon and alloy steels, and penetrant particle inspection performed in accordance with ASTM E1417/E1417M for corrosion resistant steel, shall be used to determine the presence of cracks and discontinuities such as laps, seams and inclusions. Magnetic or penetrant indications alone shall not be cause for rejection. If indications are considered cause for rejection, representative samples shall be taken from those studs showing indications and these samples shall be further examined. Studs may be sectioned and inspected parallel to the axis. Discontinuities are measured microscopically under 10X magnification to determine conformance to the requirements of 3.5.1 and 3.5.2. The inspection shall be performed on finished studs free of lubrication and subsequent to any processing operation which could adversely affect the studs.

Requirement for dye as an indication of particle inspection may be waived. Particle inspection shall not be required for studs having a nut end diameter of less than 0.250 inch.

4.6.10 Grain flow. Grain flow for rolled threads shall be determined by microexamination (see 3.3.1.7). Specimens shall be taken from the finished stud as shown in Figure 4. The studs shall be etched in a suitable etchant for sufficient time to reveal the microstructure property.

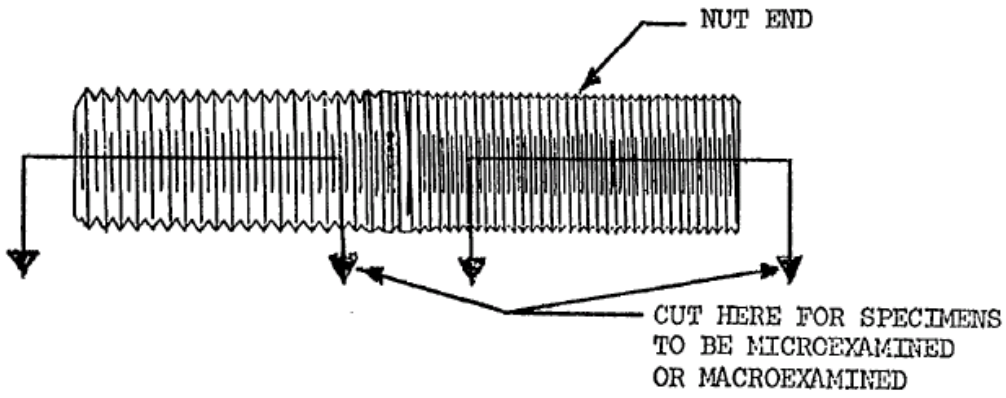

FIGURE 4. Metallurgical Specimen.

4.6.11 Rejection and reinspection criteria.

4.6.11.1 Failures in examination. Rejection and resubmission of lots shall be accomplished in accordance with ASQ Z1.4.

4.6.11.2 Failures in hardness test. If one or more studs of the sample fail, another like sample shall be taken and tested. If any specimen of the second sample fails to meet the requirements, the lot represented shall be rejected. After reworking the lot (by heat treatment, if applicable), the lot may be resubmitted.

4.6.11.3 Failures in the tests for the protective surface finishes. Rejected lots may be reprocessed in accordance with pertinent coating specification (see 3.2), and resubmitted.

4.6.11.4 Chemical analysis. Any variation between the chemical composition of the sample and the applicable material specification (see 3.1) shall be cause for rejection of the lot. Lots that fail in chemical analysis may not be resubmitted.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Studs covered by this specification are intended as general purpose full threaded fasteners utilizing class 2 and class 5 threads.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.
b. Title, part standard number, and part number of applicable part standard.
c. Material and condition (see 3.1).
d. Mechanical properties if other than those specified (see Tables I and II).
e. Protective finish, as specified (see 3.2).
f. Length, thread series, form, class, and hand (see 3.3.1).
g. Copper alloy grain size, if required (see 3.4.4).
h. Availability of gages, when required (see 4.5.2).
i. Hardness and tensile tests (see 4.6.1 and 4.6.3).
j. If certificate of conformance is acceptable for chemical analysis (see 4.6.4).
k. Embrittlement relief test, if required (see 4.6.7).
l. Packaging requirements (see 5.1).

6.3 Subject term (key word) listing.

Cadmium plating
Oxide and black chemical finishes
Passivation

6.4 Definitions.

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

6.4.2 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 or forging them into the surface, but not welding them.

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

6.4.4 Inclusions. Inclusions are non-metallic material in a solid metallic matrix.

6.4.5 Basic thread height. Basic thread height is equivalent to 0.650 times the pitch.

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodian:
Army - AR
Navy - OS
Air Force - 99
DLA - IS

Preparing Activity:
DLA - IS

(Project 5307-2014-001)

Review Activity:
Army - AT, AV, CE, CR, MI
Navy - MC

NOTE: The activities listed above were interested in this document as of the date of document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.