

FF-S-1362
May 18, 1970

SUPERSEDING
MIL-S-18247A
July 30, 1964 and
Fed. Spec. FF-B-571A
January 9, 1934 (in part)

FEDERAL SPECIFICATION

STUD, PLAIN; GENERAL PURPOSE

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for use of all Federal agencies.

1. SCOPE

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

2. APPLICABLE DOCUMENTS

2.1 Specifications and standards. The following specifications and standards, of the issue in effect on date of invitations for proposal, form a part of this specification to the extent specified herein.

Federal Specifications:

- QQ-B-637 - Brass, Naval: Rod, Wire, Shapes, Forgings, and Flat Products with Finished Edges (Bar, Flat Wire, and Strip).
- QQ-N-281 - Nickel-Copper Alloy Bar, Plate, Rod, Sheet, Strip, Wire, Forgings and Structural and Special Shaped Sections.
- QQ-P-35 - Passivation Treatments for Austenitic, Ferritic, and Martensitic Corrosion-Resisting Steel (Fastening Devices).
- QQ-P-416 - Plating, Cadmium (Electrodeposited).

Federal Standards:

- Fed. Std. No. 66 - Steel: Chemical Composition and Hardenability.
- Fed. Std. No. 123 - Marking for Domestic Shipment (Civilian Agencies).
- Fed. Test Method Std. No. 151 - Metals; Test Methods.

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from Business Service Centers at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Fort Worth, Denver, San Francisco, Los Angeles and Seattle, Washington.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from the established distribution points in their agencies.)

Military Specifications:

- MIL-F-495 - Finish, Chemical, Black, for Copper Alloys.
- MIL-H-3982 - Hardware (Fasteners and Related Items), Packaging and Packing for Shipment and Storage of.
- MIL-I-6866 - Inspection, Penetrant Method of.
- MIL-I-6868 - Inspection Process, Magnetic Particle.
- MIL-H-6875 - Heat Treatment of Steels (Aircraft Practice, Process for).
- MIL-I-17214 - Indicator, Permeability, Low-Mu (Go-No Go).

Military Standards:

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-109 - Quality Assurance Terms and Definitions.
- MIL-STD-129 - Marking for Shipment and Storage.
- MS51864 - Stud - Plain, General Purpose.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

National Bureau of Standards Handbook:

H28, Parts I and III - 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.)

American National Standards Institute Standard:

ANSI B1.12 Class 5 Interference - Fit Thread.

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

American Society for Testing and Materials (ASTM) Standards:

- E8 - Tension Testing of Metallic Materials
- E10 - Brinell Hardness of Metallic Materials, Test for
- E18 - Rockwell Hardness and Rockwell Superficial Hardness of Metallic Materials, Test for
- E112 - Estimating the Average Grain Size of Metals

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

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

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 Fed. Std. No. 66 and Table I. Studs of MS51864 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 MS51864 shall be made in accordance with the applicable specification.

3.1.3 Brass. Unless otherwise specified, studs shall conform with the requirements of QQ-B-637, Composition 1 and Table I. Studs of MS51864 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 Fed. Std. No. 66 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 MS51864 shall be made in accordance with the applicable specification.

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Table I. Mechanical properties of studs of the ferrous and non-ferrous materials

MATERIAL	SPECIFICATIONS	STUD NOM. SIZE DIA., IN.	PROOF LOAD PSI	YIELD STRENGTH MIN. PSI	TENSILE STRENGTH MIN. PSI	HARDNESS ROCKWELL	
						MIN.	MAX.
Steel (Carbon or Alloy)	FED. STD. NO. 66	1/4 thru 1	85,000		120,000	C25	C34
		Over 1 to 1-1/2	74,000		105,000	C19	C30
Brass	QQ-B-637 Comp 1			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 p.s.i. minimum tensile strength
Proof load	- 30,000 p.s.i. minimum yield strength
Hardness	- Brinell 140 minimum
Elongation	- 35 percent minimum
Reduction in area	- 45 percent minimum

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 3.2.3.

3.2.1 Cadmium plating. Carbon and alloy steel studs shall be cadmium plated in accordance with 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 QQ-P-35 or as specified in the applicable document.

3.3 Design and dimensions. Unless otherwise specified design, dimensions, and tolerances shall be in accordance with MS51864. 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 NBS Handbook H28, Part I and shall be of the sizes and lengths as specified on MS51864.

3.3.1.3 Tap end threads. Unless otherwise specified tap end threads shall be in accordance with ANSI B1.12 and Handbook H28, Part III for NC5 HF, NC5 CSF, and NC5 ONF threads as specified in the contract or order. Sizes and lengths shall be as specified on MS51864.

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.

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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 MS51864.

3.3.1.6 Gaging of threads. Threads shall be gaged in accordance with the standards and practices specified in NBS Handbook H28.

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.

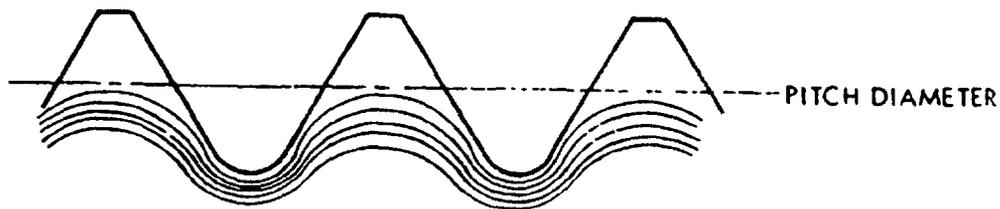


Figure 1. Grain flow.

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
.375 - .4375	0.0025
.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 MIL-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.

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Table IV. Discontinuity depth ^{1/}

STUD SIZE (NUT END)	0.250 THRU .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.

3.5.1.3 Inclusions. Studs shall show no evidence of surface or subsurface inclusions at the thread root when examined as specified in 4.6.9. Small inclusions in other parts of the stud, not indicative of unsatisfactory quality, shall not be cause for rejection.

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.

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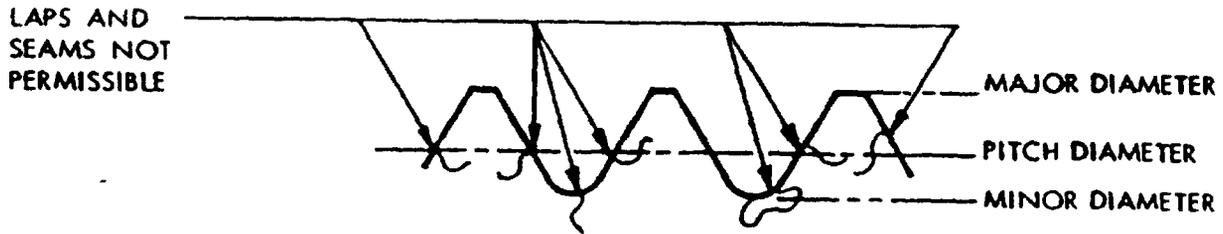


Figure 2.

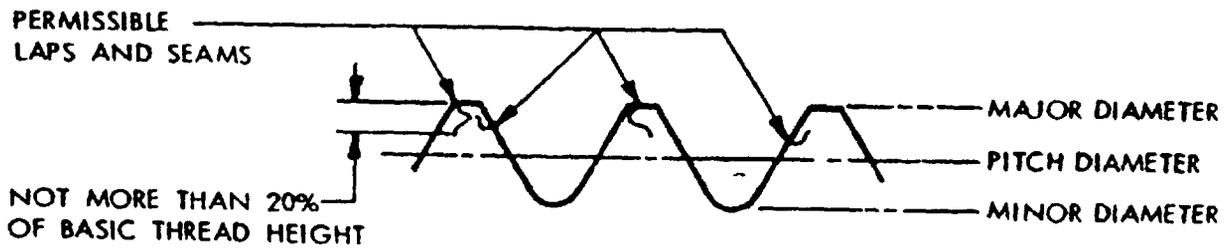


Figure 3a.

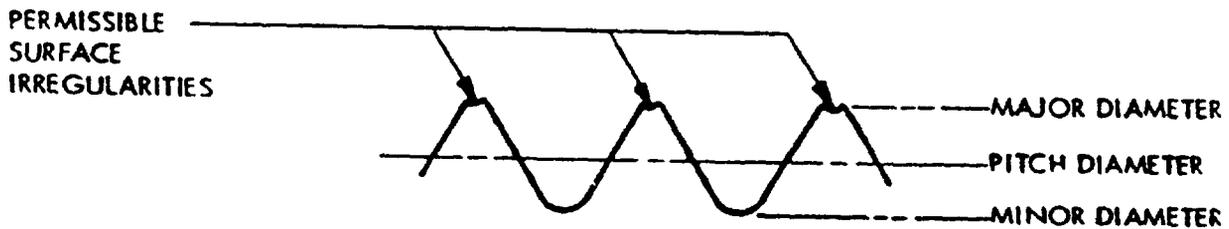


Figure 3b.

Laps, Seams, and Surface Irregularities in Thread

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Table V. Basic thread height - unified threads

THREADS PER INCH	BASIC THD HEIGHT (REF)	20% BASIC THD 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, seams, 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 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 and definitions. Inspection terms and definitions shall be as defined in MIL-STD-109.

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

4.4 Sampling for lot acceptance.

4.4.1 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.

4.4.2 Sampling for visual and dimensional examination. A random sample of studs shall be selected from each lot in accordance with MIL-STD-105, Inspection Level S-4. The Acceptable Quality Levels (AQL) shall be as specified in Table VII.

4.4.3 Sampling for test. Unless otherwise specified herein, sampling for test of studs shall be in accordance with MIL-STD-105, Inspection Level S1. The Acceptable Quality Level (AQL) shall be 1.5 percent defective.

4.4.3.1 Sampling for hardness test. Samples shall be drawn from each lot in accordance with MIL-STD-105, Inspection Level S1. The Acceptable Quality Level (AQL) shall be 1.5 percent defective.

4.4.3.2 Sampling for protective finish. Sampling for test of protective finishes shall be in accordance with the applicable specifications of 3.2.1 thru 3.2.3.

4.4.3.3 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.

4.4.3.4 Sampling for packaging and packing. Sampling for inspection of packaging and packing shall be in accordance with MIL-H-3982.

4.5 Examination.

4.5.1 Visual and dimensional examination. Each of the samples selected in accordance with 4.4.2 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 toleranced dimensions specified in MS51864 (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 Bureau of Standards shall govern. For convenience, the toleranced dimensions which are normally examined are summarized in Table VI.

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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 MS51864.

4.5.5 Classification of defects. The Acceptable Quality Level (AQL) and classification of defects for studs shall be as specified in Table VII.

Table VII. Classification of defects

Categories	Defects	Method of Inspection
Critical 1	AQL = 1.0 percent Circumferential cracks (3.5.1.1)	Metallographic Microscope
Major 101 102 103 104 105 106	AQL = 2.5 percent Protective finish (3.2) Shank diameter (3.3) Design and dimensions (3.3) Thread size and form (3.3.1.4) Incomplete threads (3.3.1.5) Straightness of stud (3.3.2)	Visual Gage and micrometer Measure Ring/Plug gage Scale Surface plate & feeler gage

Table VII. Classification of defects (con.)

Categories	Defects	Method of Inspection
107	Hardness (3.4.2)	Measure
108	Thread discontinuities (3.5.2)	Measure
Minor	AQL = 4.0 percent	
-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

4.5.6 Packaging and packing. Examination and testing of the preservation, packaging, packing, and marking shall be in accordance with MIL-H-3982.

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 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.

4.6.3 Hardness. Samples of studs taken in accordance with 4.4.3 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 4.4.3.3) chemical analysis shall be made in accordance with Method 111.2 of Fed. Test Method Std. No. 151. 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 3.2.3.

4.6.7 Hydrogen embrittlement. The contractor shall furnish the Government certification that electroplated alloy steel studs have been subjected to

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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 MIL-I-17214.

4.6.9 Discontinuities. Magnetic particle inspection performed in accordance with MIL-I-6868 for carbon and alloy steels, and penetrant particle inspection performed in accordance with MIL-I-6866 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 .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 macrostructure property.

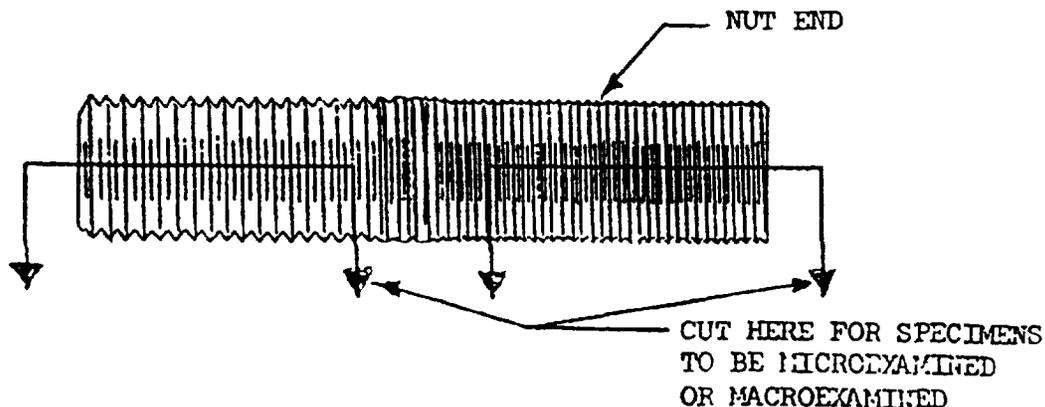


Figure 4. Metallurgical Specimen

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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 MIL-STD-105.

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. PREPARATION FOR DELIVERY

5.1 Preservation, packaging, and packing. Preservation, packaging, and packing for levels A, B, and C shall be in accordance with MIL-H-3982 (see 6.2). When level B packaging is specified for civil agency procurement, requirements in 3.3.1 of MIL-H-3982 shall apply.

5.2 Marking.

5.2.1 Civil agencies. In addition to markings required by the contract or order (see 6.2), the packages and shipping containers shall be marked in accordance with Fed. Std. No. 123.

5.2.2 Military activities. In addition to markings required by the contract or order, the packaging and shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

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 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

- a. Title, number and date of this specification.
- b. Title, MS number, and part number of applicable Military Standard.

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- c. Material and condition (3.1).
- d. Mechanical properties if other than those specified (Tables I and II).
- e. Protective finish, as specified (3.2).
- f. Length, thread series, form, class, and hand (3.3.1).
- g. Copper alloy grain size, if required (3.4.4).
- h. Availability of gages, when required (4.5.2).
- i. Hardness and tensile tests (4.6.1 and 4.6.3).
- j. If certificate of conformance is acceptable for chemical analysis (4.6.4).
- k. Embrittlement relief test, if required (4.6.7).
- l. Selection of applicable levels of preservation, packaging, packing, and marking, if required (5.1).

6.3 Military procurement. Items procured under this specification for military use are to be limited to the varieties delineated within this specification and on the applicable MS (see 3.3). Personnel of the military departments are requested to refer to these documents for guidance.

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.

MILITARY CUSTODIANS:

Army - WC
Navy - None
Air Force - 82

Preparing activity:

Army - WC

Review activities:

Army - AV
Navy - None
Air Force - 85
DSA - IS
NSA

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User activities:

Army - AT, CE, EL, MI, MO
Navy - MC, OS, SH
Air Force - None

CIVIL AGENCY INTEREST:

AGR
D.C.
GSA
JUS

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