SAE Aerospace
An SAE International Group

AEROSPACE STANDARD

SAE AS7456 | REV. A

Issued 1991-02
Reaffirmed 2006-05
Revised 2009-07

Superseding AS7456

(R) Studs, Steel, Low Alloy Heat Treated, Roll Threaded

RATIONALE

Added addittional definitions to para 2.2. Update para 3.5 by adding “two to” three threads in agreement with NASM1312-8 test methodology. Added para 4.2 and completely revised para 4.4.3, 4.4.5 and TABLES 4, 5, 6 and 7 by removing sampling in accordance with MIL-STD-105 (AQL) and replacing with accept on “zero”. General updating for SAE requirements for obsolete specifications and standards.

1. SCOPE

1.1 Type

This procurement specification covers aircraft quality studs made from a low alloy steel of the type identified under the Unified Numbering System as UNS G87400, and of a series of room temperature tensile strengths ranging from 125 000 psi to 185 000 psi.

1.2 Application

Primarily for aerospace propulsion system applications in light alloys where good strength is required and the part is protected against corrosion.

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

2. REFERENCES

2.1 Applicable Documents

2.1.1 The following publications for a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of the other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and 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.

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SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2750 Pyrometry

AMS6322 Steel Bars, Forgings, and Rings 0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 8740)

AMS6327 Steel Bars and Forgings, 0.50Cr - 0.55Ni - 0.25Mo (0.38 - 0.43C) (SAE 8740), Heat Treated, 125 ksi (862 MPa) Tensile Strength

AS3062 Bolts, Screws, and Studs, Screw Thread Requirements

AS3063 Bolts, Screws, and Studs, Geometric Control Requirements

2.1.2 U.S. Government Publications

Available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch.

MIL-STD-2073-1 Military Packaging, Standard Practice for

2.1.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM E140 Standard Hardness Tables for Metals

ASTM E1444 Magnetic Particle Examination

ASTM E8 Tension Testing of Metallic Materials

2.1.4 ASME Publications

Available from American Society ofMechanical Engineers, 22 Law Drive, P.O. Box 2900, Fairfield, NJ 07007-2900, Tel: 973-882-1170, www.asme.org.

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

2.1.5 AIA Publications

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 973-358-1000, www.aia-aerospace.org.

NASM1312-6 Fastener Test Methods, Method 6, Hardness

NASM1312-8 Fastener Test Methods, Method 8, Tensile Testing

NASM1312-12 Fastener Test Methods, Method 12, Plating Thickness

2.2 Definitions

BURR: A rough edge or ridge left on the metal due to cutting, grinding, piercing, or blanking operation.

COLD ROLLING: Forming material below the recrystallization temperature.

CRACK: Rupture in the material which may extend in any direction and which may be intercrystalline or transcrystalline in character.

DEFECT: Any nonconformance of the unit or the product with specified requirements.

DEFECTIVE: A unit of the product which contains one or more defects.

DISCONTINUITY: An interruption in the normal physical structure or configuration of a part; such as a lap, seam, inclusion, crack, machining tear, or stringer.

HEAT PATTERN: A discernible difference in etched appearance between the head and the shank caused by forming of the head.

INCLUSION: Nonmetallic particles originating from the material making process. They may exist as discrete particles or strings of particles extending longitudinally.

LAP: Surface imperfection caused by folding over metal fins or sharp corners and then rolling or forging them into the surface. The allowable lap depth shall not exceed the limit specified herein. The minimum condition that shall be rated as a lap is a fold having its length equal to or greater than three times its width with a depth of 0.0005 in when viewed at 200X magnification.

MACHINING TEAR: A pattern of short jagged individual cracks, generally at right angles to the direction of machining, frequently the result of improperly set cutting tools, or dull cutting tools.

PRODUCTION INSPECTION LOT: Shall be all finished parts of the same part number, made from a single heat of alloy, heat treated at the same time to the same specified condition, produced as one continuous run, and submitted for manufacturer's inspection at the same time.

SEAM: Longitudinal surface imperfection in the form of an unwelded, open fold in the material.

STRINGER: A solid nonmetallic impurity in the metal bar, often the result of an inclusion that has been extended during the rolling process.

TIGHT BURR: A burr closely compacted and binding in the periphery of a part without loose ends and is within the dimensional limits of the part.

2.3 Unit Symbols

A	-	ampere
°F	-	degree Fahrenheit
h	-	hour
in	-	inch
in^2	-	square inch
min	-	minute of time
%	-	percent (1% = 1/100)
lbf	-	pounds force
psi	-	pounds force per square inch
sp gr	-	specific gravity

3. TECHNICAL REQUIREMENTS

3.1 Material

Shall be AMS6322 or AMS6327 steel, unless otherwise specified on the part drawing.

3.2 Design

Finished (completely manufactured) parts shall conform to the following requirements

3.2.1 Dimensions

The dimensions of finished parts, after all processing, including plating, shall conform to the part drawing. Dimensions apply after plating but before coating with solid film lubricants.

3.2.2 Surface Texture

Surface texture of finished parts, prior to plating or coating, shall conform to the requirements as specified on the part drawing, determined in accordance with ASME B46.1.

3.2.3 Threads

Screw thread UNJ profile and dimensions shall be in accordance with AS8879, unless otherwise specified on the part drawing. Tolerances for pitch diameter of stud end threads shall be as specified on the part drawing. The special stud end thread requirements shall be in accordance with AS3062 for the following requirements:

a. Lead and half-angle variations

b. Taper

c. Out-of-roundness

d. Stud lead threads

e. Stud thread runout

3.2.3.1 The requirements for thread crest variations, locking holes in the nut end thread, incomplete lead thread, and thread runout on nut end thread shall be as specified in AS3062.

3.2.3.2 Chamfer

The entering end of the thread (both ends) shall be chamfered as specified on the part drawing.

3.2.4 Geometric Tolerances

Part features shall be within the geometric tolerances specified on the part drawing and, where applicable, controlled in accordance with AS3063.

Fabrication

3.2.5 Blanks

Shall be machined sufficiently to remove surface defects and decarburization except as noted in 3.7.2.3. Blanks may be produced by machining, upsetting, extruding, or by a combination of these methods.

3.2.5.1 When a shoulder or shoulders are produced by upsetting, the metal removed from the bearing surface shall be as little as practicable to provide a clean, smooth surface.

3.2.6 Heat Treatment

Unless machined from heat treated stock, blanks shall, before finishing the shank and rolling the threads, be heat treated as follows

3.2.6.1 Heating Equipment

Furnaces may be any type ensuring uniform temperature throughout the parts being heated and shall be equipped with, and operated by, automatic temperature controllers and data recorders conforming to AMS2750. The heating medium or atmosphere shall cause no surface hardening by carburizing or nitriding nor decarburization other than that permitted by 3.7.2.2 and 3.7.2.3.

3.2.6.2 Hardening

Blanks of AMS6322 shall be uniformly heated to 1550 °F, held at heat for not less than 15 min, and quenched in oil. For other steels, when specified, the temperature shall be as agreed upon by purchaser and vendor.

3.2.6.3 Tempering

Hardened blanks shall be tempered by heating uniformly to the temperature necessary to produce the specified hardness and microstructure, holding at heat for not less than 1 h, and cooling.

3.2.7 Oxide and Decarburization Removal

Surface oxide, oxide penetration, and decarburization except as permitted in 3.7.2.3, resulting from prior heat treatment, shall be removed from the full body diameter and the bearing surfaces, as applicable, of the heat treated blanks prior to rolling the threads. The removal process shall produce no intergranular attack or corrosion of the blanks.

3.2.8 Thread Rolling

Threads shall be formed on the heat treated and finished blanks by a single rolling process for each end after removal of oxide and decarburization as in 3.3.3.

3.3 Product Marking

Each part shall be marked for oversize on stud end thread and for material code on the nut end as specified on the part drawing. The markings may be formed by stamping, depressed 0.010 in maximum, with rounded root form on depressed characters.

3.4 Plating

When required, any protective treatment shall be as specified on the part drawing.

3.5 Mechanical Properties

Parts shall conform to the requirements of 3.6.1 and 3.6.2. Threaded members of gripping fixtures for tensile test shall be of sufficient size and strength to develop the full strength of the part without stripping the thread. The loaded portion of the shank shall have two to three full thread turns from the thread runout exposed between the loading fixtures during tensile test. Finished parts shall be tested in accordance with the following applicable test methods

a. Hardness: MIL-STD-1312-6 in accordance with NASM1312-6.

b. Room Temperature Ultimate Tensile Strength: MIL-STD-1312-8 in accordance with NASM1312-8.

3.5.1 Ultimate Tensile Strength at Room Temperature

3.5.1.1 Finished Parts

Parts having hardness not lower than 26 HRC shall have an ultimate tensile load not lower than that specified in Table 3 and shall be tested to failure, first measuring and recording the maximum tensile load achieved. If the size or shape of the part is such that failure would occur outside the threaded section but the part can be tested satisfactorily, such as parts having a shank diameter equal to or less than the thread root diameter or having an undercut, parts shall conform to only the ultimate tensile requirements of 3.6.1.2; for such parts, the diameter of the area on which stress is based shall be the actual measured minimum diameter of the part.

3.5.1.2 Machined Test Specimens

If the size or shape of the part is such that a tensile test cannot be made on the part, tensile tests shall be conducted in accordance with ASTM E 8 on specimens prepared as in 4.5. Such specimens shall meet the following requirements in Table 1 for the applicable hardness:

TABLE 1 - TENSILE PROPERTIES OF SPECIMENS

MINIMUM HARDNESS OF SPECIFIC RANGE HRC	ULTIMATE TENSILE STRENGTH PSI, MINIMUM	ELONGATION IN 2 IN OR 4D %, MINIMUM	REDUCTION OF AREA %, MINIMUM
26	125 000	15	52
32	145 000	13	50
36	165 000	12	47
40	185 000	10	43

3.5.1.2.1 When permitted by purchaser, hardness tests on the end of parts may be substituted for tensile tests of machined specimens.

3.5.2 Hardness

Shall be uniform within the range 26 to 32 HRC, unless otherwise specified on the part drawing, but hardness of the threaded sections may be higher as a result of the cold working operations.

3.6 Quality

Parts shall be uniform in quality and condition, clean, sound, smooth, and free from burrs and foreign materials, and from imperfections detrimental to their performance.

3.6.1 Macroscopic Examination

Parts or sections of parts, as applicable, shall be etched in a solution consisting of approximately 50% hydrochloric acid (sp gr 1.19), and 50% water for sufficient time to reveal flow lines but not longer than 15 min, and then be examined at a magnification of approximately 20X to determine conformance to the requirements of 3.7.1.1, 3.7.1.2, and 3.7.1.3, except that examination for thread imperfections as specified in 3.7.1.3 should be made by microscopic examination of specimens polished and etched as in 3.7.2.

3.6.1.1 Flow Lines

Flow lines in threads shall be continuous, shall follow the general thread contour, and shall be of maximum density at the root of the thread (see Figure 1). Below the thread roots, flow lines not affected by forming shall be parallel to the axis except that on the nut end of studs formed by extruding, the flow lines may be oblique to the axis for a distance from the end of the larger diameter to the smaller diameter equal to 1.5 times the "B" dimension of Table 2 of AS3062.

3.6.1.2 Internal Defects

Examination of longitudinal sections of parts shall reveal no cracks, laps, or porosity except laps in threads as permitted in 3.7.1.3.3 and 3.7.1.3.4.

3.6.1.3 Threads

3.6.1.3.1 Root defects such as laps, seams, notches, slivers, folds, roughness, and oxide scale are not permissible (see Figure 2).

3.6.1.3.2 Multiple laps on the flanks of threads are not permissible regardless of location. Single laps on the flanks of threads that extend toward the root are not permissible (see Figures 3 and 4).

3.6.1.3.3 There shall be no laps along the flank of the thread below the pitch diameter (see Figure 5). A single lap is permissible along the flank of the thread above the pitch diameter on either the pressure or nonpressure flank (one lap at any cross-section through the thread) provided it extends toward the crest and generally parallel to the flank (see Figure 5).

3.6.1.3.4 Crest craters, crest laps, or a crest lap in combination with a crest crater are permissible provided that the imperfections do not extend deeper than 20% of the basic thread height (see Table 2) as measured from the thread crest when the thread major diameter is at minimum size (see Figure 6). The major diameter of the thread shall be measured prior to sectioning. As the major diameter of the thread approaches maximum size, values for depth of crest crater and crest lap imperfections listed in Table 2 may be increased by one-half of the difference between the minimum major diameter and the actual major diameter as measured on the part.

3.6.2 Microscopic Examination

Specimens cut from parts shall be polished, etched in 2% Nital, and examined at a magnification not lower than 100X to determine conformance to the requirements of 3.7.1.3, 3.7.2.1, and 3.7.2.2.

3.6.2.1 Microstructure

Parts shall have microstructure of tempered martensite.

3.6.2.2 Surface Hardening

Parts shall have no change in hardness from core to surface except as produced during rolling of threads. There shall be no evidence of carburization, recarburization, or nitriding. In case of dispute over results of the microscopic examination, microhardness testing shall be used as a referee method; a Vickers hardness reading within 0.003 in of an unrolled surface, which exceeds the reading in the core by more than 30 points shall be evidence of nonconformance to this requirement.

3.6.2.3 Decarburization

3.6.2.3.1 The bearing surface of the shoulder, the shoulder-to-shank fillet radius, the shank, and the threads shall be free from decarburization.

3.6.2.3.2 The periphery of the shoulder of shouldered parts may be decarburized to a depth not exceeding that permitted by the applicable material specification for the size of stock used to make the part.

3.6.2.3.3 Depth of decarburization at any point on the surface not covered by 3.7.2.3.1 or 3.7.2.3.2 shall not exceed 0.002 in.

3.6.3 Magnetic Particle Inspection

Parts shall be subject to magnetic particle inspection in accordance with ASTM E1444; any method may be used but resolution of disputed rejections shall be based upon the wet, continuous, fluorescent suspension method using amperages shown in 3.7.3.3.

3.6.3.1 The following conditions shall be cause for rejection of parts inspected.

3.6.3.1.1 Discontinuities transverse to grain flow (i.e., at an angle of more than 10 degrees to the axis of the shank), such as grinding checks and quench cracks.

3.6.3.1.2 Longitudinal indications (i.e., at an angle of 10 degrees or less to the axis of the shank) due to imperfections other than seams, forming laps, and nonmetallic inclusions.

3.6.3.2 The following conditions shall be considered acceptable on parts inspected.

3.6.3.2.1 Parts having longitudinal indications (i.e., at an angle of 10 degrees or less to the axis of the shank) of seams, forming laps, and nonmetallic inclusions parallel to the grain flow that are within the limits specified in 3.7.3.2.2 through 3.7.3.2.5 provided the separation between indications in all directions is not less than 0.062 in.

3.6.3.2.2 Sides of Shoulders

There shall be not more than six surface or subsurface indications per shoulder. The length of each indication may be the full height of the surface, but no indication shall break over either edge to a depth greater than 0.031 in or the equivalent of the basic thread height (see Table 2), whichever is less.

3.6.3.2.3 Shank or Stem

There shall be not more than 10 subsurface and hairline surface indications. The length of any indication may be the full length of the surface but the total length of all indications shall not exceed twice the length of the surface. No indication shall break into a fillet or over an edge.

3.6.3.2.4 Threads

There shall be no indications, except as permitted in 3.7.1.3.

3.6.3.2.5 End of Stem

The number of indications is not restricted, but the depth of any individual indication shall not exceed 0.010 in, as shown by sectioning representative samples. No indication, except those of 3.7.3.2.2, shall break over an edge.

3.6.3.3 Procedures

3.6.3.3.1 Circular Magnetization

A current of 800 to 1000 A per in^2 of contact area passed through the part longitudinally.

3.6.3.3.2 Longitudinal Magnetization

Sufficient to provide 5000 A-turns per inch of shank diameter with the part placed in a standard solenoid of appropriate size.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The manufacture of parts shall supply all samples and shall be responsible for performing all required tests. Purchaser reserves the right to perform such confirmatory testing as deemed necessary to ensure that the parts conform to the requirements of this specification.

4.2 Responsibility for Compliance

The manufacturer's system for parts production shall be based on preventing product defects, rather than detecting the defects at final inspection and then requiring corrective action to be invoked. An effective manufacturing in-process control system shall be established, subject to the approval of the purchaser, and used during production of parts.

4.3 Acceptance Tests

Tests for all technical requirements are acceptance tests and shall be performed on each production inspection lot. A summary of acceptance tests is specified in Table 4.

4.4 Acceptance Test Sampling

4.4.1 Nondestructive Test - Visual and Dimensional

A random sample will be selected from each production inspection lot; the size of the sample to be as specified in Table 5. The classification of defects for parts shall be as specified in Table 6. Defects not classified in Table 6 shall be classified as Minor B defects. All dimensional characteristics are considered defective when out of tolerance.

4.4.2 Hardness Test (See 3.6.2)

A random sample shall be selected from each production inspection lot; the size of the sample shall be as specified in Table 7. The sample units may be selected from those that have been subjected to and passed the visual and dimensional inspection, with additional units selected at random from the production inspection lot as necessary.

4.4.3 Magnetic Particle Inspection

A random sample shall be selected from each production inspection lot; the size of the sample shall be as specified in Table 5 shall be as classified in Table 6. The sample units may be selected from those that have been subjected to and passed the visual and dimensional inspection, with additional units selected at random from the production inspection lot as necessary.

4.4.4 Destructive Tests

A random sample shall be selected from each production inspection lot; the size of the sample shall be as specified in Table 7. The sample units may be selected from those that have been subjected to and passed the nondestructive tests and the magnetic particle inspection, with additional units selected at random from the production inspection lot as necessary.

4.4.5 Acceptance Quality

Of random samples tested, acceptance quality shall be based on zero defects.

4.5 Test Specimens

Specimens for tensile testing of machined test specimens shall be of standard proportions in accordance with ASTM E 8 with either 0.250 in diameter at the reduced parallel gage section or smaller specimens proportional to the standard when required. Specimens shall be machined from finished parts or coupons of the same lot of alloy and be processed together with the parts they represent. Specimens shall be machined from the center of parts 0.750 in and under in nominal diameter, from the center of coupons 0.800 in and under in nominal diameter or distance between parallel sides, and from mid-radius of larger parts or coupons.

4.6 Reports

The manufacture of parts shall furnish with each shipment a report stating that the chemical composition of the parts conforms to the applicable material specification, showing the results of tests to determine conformance to the hardness and room temperature tensile strength requirements, and stating that the parts conform to the other technical requirements of this specification. This report shall include the purchase order number, AS7456**A**, lot number, contractor or other direct supplier of material, part number, nominal size, and quantity.

4.7 Resampling and Retesting

If any part or specimen used in the above tests fails to meet the specified requirements for design as in 3.2, mechanical properties and quality as in 3.6 and 3.7, disposition of parts may be based on the results of testing three additional parts or specimens for each original nonconforming part or specimen. Failure of any retest part or specimen to meet the specified requirement shall be cause for rejection of the parts represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY

5.1 Packaging and Identification

5.1.1 Parts having different part numbers shall be packed in separate containers.

5.1.2 Each container of parts shall be marked to show not less than the following information:

FASTENERS, STEEL, LOW ALLOY
AS7456A
PART NUMBER
PURCHASE ORDER NUMBER
QUANTITY
MANUFACTURER'S IDENTIFICATION

5.1.3 Threaded fasteners shall be suitably protected from abrasion and chafing during handling, transportation, and storage.

5.1.4 Containers of parts shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the product to ensure carrier acceptance and safe delivery.

5.1.5 For direct U.S. Military procurement, packaging shall be in accordance with MIL-STD-2073-1, industrial packaging, unless Level A is specified in the request for procurement.

6. ACKNOWLEDGMENT

A manufacture shall mention this specification number in all quotations and when acknowledging purchase orders.

7. REJECTIONS

Parts not conforming to this specification shall be subject to rejection.

8. NOTES

8.1 Direct U.S. Military Procurement

Purchase documents should specify the following:

Title, number, and date of this specification
Part number of parts desired
Quantity of parts desired
Level A packaging, if required (see 5.1.5)

8.4 Hardness conversion tables for metal are presented in ASTM E140.

8.5 A change bar (|) located in the left margin is for the convenience of the user in locating areas where technical revisions, not editorial changes, have been made to the previous issue of this document. An (R) symbol to the left of the document title indicates a complete revision of the document, including technical revisions. Change bars and (R) are not used in original publications, nor in documents that contain editorial changes only.

FIGURE 1 - FLOW LINES, ROLLED THREAD

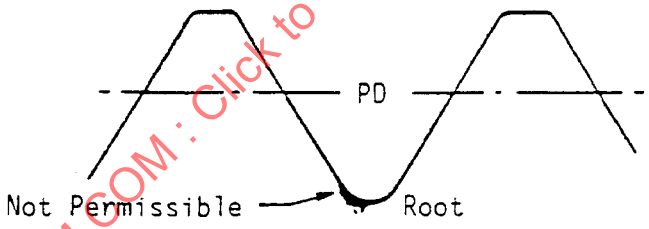


FIGURE 2 - ROOT DEFECTS, ROLLED THREAD

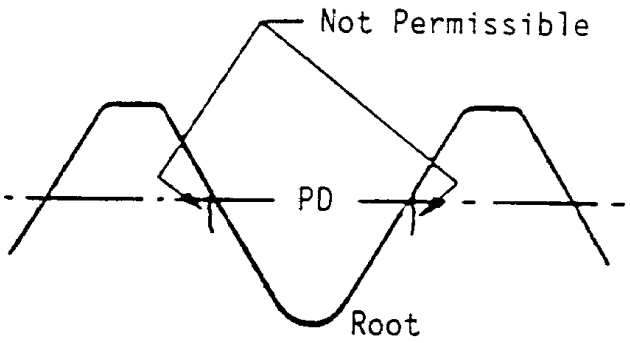


FIGURE 3 - LAPS BELOW PD EXTENDING TOWARD ROOT, ROLLED THREAD

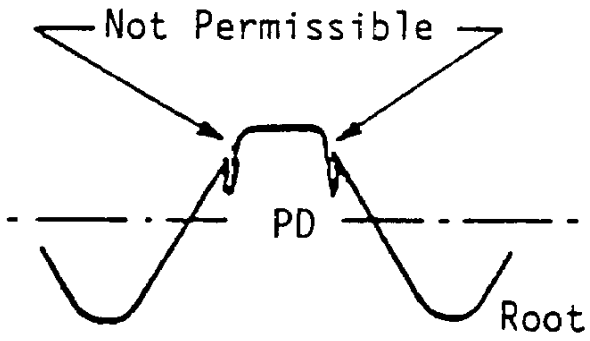


FIGURE 4 - LAPS ABOVE PD EXTENDING TOWARD ROOT, ROLLED THREAD

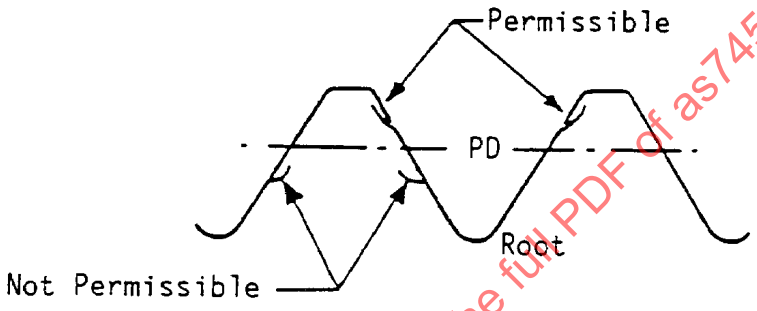
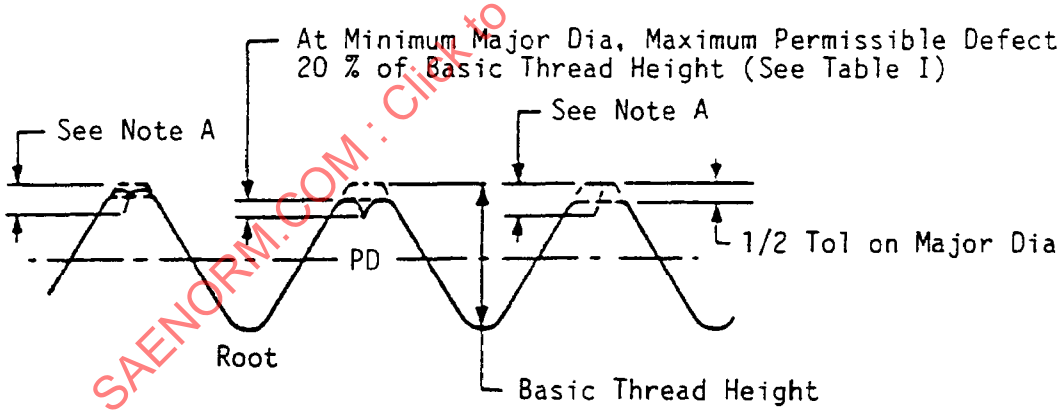


FIGURE 5 - LAPS EXTENDING TOWARDS CREST, ROLLED THREAD



Note A: Depth of defect equals 20% of basic thread height plus 1/2 the difference of the actual major diameter and minimum major diameter.

FIGURE 6 - CREST CRATERS AND CREST LAPS, ROLLED THREAD

TABLE 2 - THREAD HEIGHT

THREAD PITCHES PER INCH n	BASIC THREAD HEIGHT REF (SEE NOTE 1) INCH	20% BASIC THREAD HEIGHT INCH
80	0.0081	0.0016
72	0.0090	0.0018
64	0.0102	0.0020
56	0.0116	0.0023
48	0.0135	0.0027
44	0.0148	0.0030
40	0.0163	0.0033
36	0.0181	0.0036
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	0.0542	0.0108
11	0.0591	0.0118
10	0.0650	0.0130
9	0.0722	0.0144
8	0.0813	0.0163

Note 1: Basic trhread height is defined as being equivalent to 0.650 times the pitch, where pitch equals 1/n.

TABLE 3 - TEST LOADS

THREAD SIZE	ULTIMATE TENSILE STRENGTH TEST LOAD LBF, MINIMUM
0.112 -40	865
0.112 -48	914
0.138 -32	1 310
0.138 -40	1 400
0.164 -32	1 950
0.164 -36	2 010
0.190 -24	2 500
0.190 -32	2 720
0.250 -20	4 460
0.250 -28	4 850
0.3125-18	7 200
0.3125-24	7 680
0.375 -16	11 000
0.375 -24	11 900
0.4375-14	15 000
0.4375-20	16 100
0.500 -13	19 900
0.500 -20	25 500
0.5625-12	25 400
0.5625-18	27 200
0.625 -11	31 400
0.625 -18	34 000
0.750 -10	46 100
0.750 -16	49 400
0.875 -9	63 300
0.875 -14	67 400
1.000 -8	82 900
1.000 -12	87 800

Note 1: Requirements above apply to parts with UNC, UNF, UNJC, or UNJF threads, as applicable to the sizes shown and having hardness within the range of 26 to 32 HRC. For nominal thread major diameter 0.3125 in and smaller, area upon which stress for room temperature ultimate tensile strength test load requirements is based is 98% of the maximum pitch diameter, calculated from Equation 1:

$$A = 0.7854[0.98(D - (0.6495/n))]^2 \quad \text{(Eq. 1)}$$

where:

A = area at 98% of maximum PD

D = maximum major diameter

N = number of thread pitches per inch