

FED. SUPPLY CLASS

5320

1. SCOPE.

1.1 Purpose. This specification establishes the requirements for procurements of taper shank threaded fasteners. These taper shank fasteners are products of licensed manufacturers.

1.2 Classification. The fasteners covered by this specification shall be the type, size and material designated by the part number specified on the applicable NAS standard.

Type I – 100° Countersunk Head Pin (NAS1724, NAS1725)

Type II – Protruding Head Pin (NAS1728, NAS1729)

1.3 Unless otherwise specified, part inventory manufactured to previous revisions of the applicable standard or drawing and this specification may be procured and used until stock is depleted.

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

2.1 Federal Specifications.

~~PPP T 76 Tape, Pressure Sensitive Adhesive Paper, Water Resistant (For Carton Sealing)~~

Copies of federal specifications and standards may be obtained by application to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. The price may be obtained from the federal specification index of the superintendent of document.

2.2 Military Specifications.

~~MIL S 5000 Steel, Chrome Nickel Molybdenum (4340) Bars and Reforging Stock~~

~~MIL S 6049 Steel, Chrome Nickel, Molybdenum (8740) Bars, Rods and Reforging Stock (Aircraft Quality)~~

~~MIL H 6875 Heat Treatment of Steels (Aerospace Practice, Process For)~~

~~MIL S 8879 Screw Threads, Controlled Radius Root with Increased Minor Diameter, General Specification For~~

~~MIL L 46010 Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting~~

~~MIL I 25135 Inspection Materials, Penetrant~~

2.3 Military Standards.

~~MIL-STD-105 Sampling Procedures and Table For Inspection By Attributes~~

~~MIL-STD-129 Marking For Shipment and Storage~~

~~MIL-STD-1312 Fasteners, Test Methods~~

~~MIL-STD-1949 Inspection, Magnetic Particle~~

~~MIL-STD-6866 Inspection, Liquid Penetrant~~

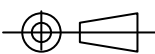
Copies of military specifications and standards may be obtained from the Commander, Air Material Command, Wright-Patterson Air Force Base, Dayton, Ohio or to the Commanding Officer, U.S. Naval Air Development Station, Johnsville, PA. The price may be obtained from the index of military aeronautical standards, or from application to the above two agencies, make payment payable to treasurer of the United States or superintendent of documents.

Copies can be obtained from the Department of Defense Single Stock Point (DODSSP).

<http://dodssp.daps.dla.mil>

FOR DESCRIPTION OF STATUS NOTES SEE NAS380.

③ COMPLETELY REVISED

THIRD ANGLE PROJECTION 	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 3
PROCUREMENT SPECIFICATION NONE	TITLE FASTENER, TAPER SHANK ③	CLASSIFICATION SPECIFICATION NAS1730 SHEET 1 OF 28

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. THIS DOCUMENT IS PRODUCED UNDER NATIONAL AEROSPACE STANDARD: AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. ANY PARTICULAR APPLICATION OR (2) THE EXISTENCE OF OR APPLICABLE LICENSEE: www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME
PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

FORM 09-01

REVISION DATE: NOVEMBER 30, 2012

ISSUE DATE: SEPTEMBER 1973



Documents
SHEET 1 OF 28

Document Sharing Hub

2.4

Industry Standards.

SAE International

AMS2644	Inspection Materials, Penetrants
AMS2759	Heat Treatment of Steel Parts
AMS2801	Heat Treatment of Titanium Alloy Parts
AMS4928	Titanium Alloy Bars and Forgings, 6Al-6V, Annealed, 120,000 PSI Yield (UNS R56400)
AMS4967	Titanium Alloy Bars and Forgings, 6Al-6V, Annealed, Heat Treatable (UNS R56400)
AMS5629	Steel Bars, Forgings, Tubings and Rings Corrosion Resistant, 13Cr-8Ni-2 .2Mo (UNS S13800)
AMS5731	Steel Bars, Forgings and Rings, Corrosion and Heat-Resistant (A286 CRES) (UNS S66286)
AMS5732	Steel Bars, Forgings and Wire, Corrosion and Heat-Resistant (A286 CRES) (UNS S66286)
AMS5737	Steel, Corrosion and Heat-Resistant, A286 (UNS S66286)
AMS5853	A286 Cold Worked and Aged, (UNS S66286)
AMS6322	Steel Bars, Forgings and Rings (SAE8740), (UNS G87400)
AMS6382	Steel Bars, Forgings and Tubing (SAE4140), (UNS G41400)
AMS6415	Steel Bars, Forgings and Tubing (SAE4340), (UNS G43406)
AMS6484	Steel Bars, Forgings and Tubing (SAE4340), (UNS S43406)
AMS6487	Steel Bars and Forgings, Vacuum Melted, H-11 (UNS T20811)
~~AMS-H-6875~~	~~Heat Treatment of Steel Raw Material~~
AMS-QQ-P-416	Plating, Cadmium (Electrodeposited)
AMS-H-81200	Heat Treatment of Titanium and Titanium Alloys
AS5272	Lubricant, Solid Film, Heat Cured, Corrosion Inhibiting Procurement Specification
AS8879	Screw Threads - UNJ Profile, Inch; Controlled Radius Root with Increased Minor Diameter

Copies can be obtained from SAE International, 400 Commonwealth Dr., Warrendale, PA 15096-0001.
www.sae.org

ASME

ASME B46.1 Surface Texture

Copies can be obtained from ASME, Three Park Ave., New York, NY 10016-5990. www.asme.org

ASTM International

ASTM E 112	Standard Test Method for Determining Average Grain Size
ASTM E 140	Standard Hardness Conversion Tables for Metals
ASTM E 1417	Standard Practice for Liquid Penetrant Testing
ASTM E 1444	Standard Practice for Magnetic Particle Inspection
ASTM D 3951	Hardware (Fasteners and Related Items) Packaging of
ASQ Z1.4	Sampling Procedures and Tables for Inspection Attributes
ASTM D 5486/D 5486M	Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing

Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. www.astm.org

Aerospace Industries Association

NAS498	Fasteners, Alloy Steel, Externally Threaded
NAS1495	Recommended Qualification Test Procedure for Compliance With NAS Specification and Standard Drawings
NAS4004	Fasteners, Titanium Alloy, Externally Threaded, 160 KSI Fsu, 450 °F

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME
PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

FORM 08-01

③ COMPLETELY REVISED

REVISION
3
NAS1730
SHEET 2



Documents

Document Sharing Hub

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. ALL RIGHTS RESERVED. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
 Provided by IHS under license with AIA/NAS. Licensee= www.sepana.ir/5991803002, User=sam, albert
 No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

NASM1312-1 (MIL-STD-1312-1) Fastener Test Method 1, Salt Spray
 NASM1312-8 (MIL-STD-1312-8) Fastener Test Method, Tension Test
 NASM1312-12 (MIL-STD-1312-12) Fastener Test Method, Thickness of Metallic Coatings
 NASM1312-13 (MIL-STD-1312-13) Fastener Test Method, Double Shear Test

Copies can be obtained from the Aerospace Industries Association, 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209. www.aia-aerospace.org

3. REQUIREMENTS.

3.1 Qualification. Pins supplied to this specification shall comply with all the requirements of this specification and shall have passed all of the applicable tests herein (reference qualification test procedure NAS1495).

3.2 Basic Requirements.

TABLE I – BASIC REQUIREMENTS

CHARACTERISTICS	ENGINEERING REQUIREMENTS	INSPECTION REQUIREMENTS (SEE 4.1)	
		TEST METHOD	SAMPLING (SEE 4.2)
	a. Alloy Steel 8740 (UNS G87400) per AMS6322 or MIL-S-6049, 4340 (UNS G43406) per AMS6415 or AMS6484, 4140 (UNS G41400) per AMS6382 b. H-11 Steel Alloy per AMS6487 c. A286 Heat Resistant Alloy per AMS5731, AMS5732, AMS5737 or AMS5853 d. 6Al-4V Titanium Alloy per AMS4928 OR AMS4967. PH13-8Mo Martensitic Precipitation Hardening Stainless Steel (UNS S13800) per AMS5629	Per material specification spectrographic analysis for routine checking. Chemical analysis for doubtful material.	Check material composition for 25% (or more) of the parts used for metallurgical examination.
DIMENSIONS		See Paragraph 4.7	Per Table II
HEAD PROTRUSIONS 100° HEADS	Per Fastener Drawing	See Paragraph 4.5	ASQ Z1.4 2% AQL
SURFACE ROUGHNESS		Per ASME B46.1	Per Table X 1.0% AQL
IDENTIFICATION		Visual examination. Depth or height of marking to be measured from an undisturbed surface.	Per Table X 4.0% AQL
THREADS	Threads per MIL-S-8879 AS8879 except major diameter per applicable part drawing. Runout and incomplete threads per Figure 1. Surface irregularities per Figure 2.	See Figure 1	Per Table II
HEAD TO SHANK FILLET	Shall be rolled after all thermal treatment. Fillet radius after rolling shall conform to applicable drawing. Fillet area may be distorted per Figure 5.	Comparator measurement	ASQ Z1.4 1.5 AQL

REVISION

3

NAS1730
 Documents
 SHEET 3



Document Sharing Hub

③ COMPLETELY REVISED

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America Inc. THIS DOCUMENT IS PRODUCED UNDER NATIONAL AEROSPACE STANDARD: AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
 Provided by IHS under license with AIA/NAS. Licensee: www.sepana.ir/5991803002, User=sam, albert
 No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

TABLE I – BASIC REQUIREMENTS (CONT)

CHARACTERISTICS	ENGINEERING REQUIREMENTS	INSPECTION REQUIREMENTS (SEE 4.1)	
		TEST METHOD	SAMPLING (SEE 4.2)
HEAT TREATMENT	Heat treatment shall be in accordance with the specifications listed in paragraph 4.4. Heat treatment shall develop mechanical properties as defined herein, and without adverse effect on metallurgical properties as defined herein.	Test of tensile, shear and metallurgical properties as applicable verifies heat treat. Check test equipment and fixtures periodically for conformance to applicable specifications.	
HARDNESS	Individual hardness readings shall be within the limits of the values specified for each material in 4.4, except for titanium and A-286. Hardness shall not be used as an acceptance or rejection criteria unless parts are unable to be tested for actual mechanical properties.	Rockwell C test on flat prepared surface of thread end, protective finish removed.	ASQ Z1.4 1.5 AQL
TENSILE STRENGTH	Titanium material only. Minimum strength per Table IV. Not applicable to fasteners having grip less than the nominal diameter.	Static test in fixtures conforming to MIL-STD-1312-8.	Per Table VI
SHEAR STRENGTH	Per Table III. Not applicable to fasteners having grip length less than 2-1/2 times the nominal diameter	Double shear per MIL-STD-1312-13. Single shear permissible when bolt length does not permit double shear. See Table III.	Per Table VI
METALLURGICAL	No cracks permitted in any location. Other discontinuities permitted only as described in Tables V or VA as applicable, and Figure 2.	Materials: a. Alloy steels and H-11 only, magnetic particle inspection per ASTM E 1444 (longitudinal method only). Inspection stamp need not be applied to individual fasteners. Evaluate magnetic particle indications by metallurgical examination per Table VII. b. A286, 6Al-4V AND PH13-8 Mo only, penetrant inspection per ASTM E 1417, type I, method B. Use penetrant conforming to MIL-I-25135 AMS2644, Group VI. For plated parts, apply penetrant inspection before plating or with plating removed. Fasteners shall not be marked for identification of penetrant inspection. Penetrant inspection is not required on fasteners with thread size smaller than .1900-32.	Sample per Table X .15% AQL. Increase to 100% if any indications are found in sample.
GRINDING BURNS	None permitted on shank, head to shank fillet or bearing surface of head.	Examine fasteners for grinding burns during metallurgical examination.	Use samples for metallurgical examination.

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST REVISION DATE.

FORM 09-01

③ COMPLETELY REVISED

REVISION

3

NAS1730
SHEET 4



Document Sharing Hub

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. ALL RIGHTS RESERVED. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. ANY PARTICULAR APPLICATION OR (2) THE EXISTENCE OF OR APPLICABLE LICENSEE= www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

TABLE I – BASIC REQUIREMENTS (CONT)

CHARACTERISTICS		ENGINEERING REQUIREMENTS	INSPECTION REQUIREMENTS (SEE 4.1)	
			TEST METHOD	SAMPLING (SEE 4.2)
MICROSTRUCTURE		Shall be free from bursts and voids. Alloy segregation which adversely affects the mechanical or physical properties of the part is not acceptable. Titanium shall be free from indications that material has been heated above beta transus temperature without subsequent significant mechanical reduction in alpha-beta temperature range. Slight overheating adjacent to the top of the head is permissible, providing the greatest depth of overheating does not exceed the limits in Table VA when measured normal to the top surface. Microstructure with outlines of equiaxial prior alpha-beta grains and no primary alpha is considered overheated and unacceptable. Evidence of shear deformation in thread root area of titanium is unacceptable.	Metallurgical Examination See 4.3	Per Table VII.
GRAIN GROWTH		In H-11 Steel, grain size in vicinity of head or threads shall not differ from grain size in shank by more than one size (defined in ASTM E 112).		
GRAIN FLOW	THREADS	Per Figure 3. Formed by single rolling process.		
	HEADS	Per Figure 3. Formed by forging process.		
HYDROGEN EMBRITTLEMENT		Where Applicable: Bake at 375 °F ± 25 °F for 23 hours minimum. Plated pin shall be capable of sustaining a load equal to 80% of the strength specified in 4.4 for 48 hours at room temperature, without cracking or failing.	Apply load by any suitable dead weight or hydraulic test apparatus with an accuracy of ± 25% of test load.	Per Table VIII, not mandatory. See 4.1
HYDROGEN		Heads of finished titanium fasteners shall not have a hydrogen content exceeding .0125% (125 PPM).	Determine hydrogen from a material removed from the head of finished fastener. Use procedures and equipment that are capable of measuring hydrogen to an accuracy of .0010% (10 PPM).	Check one random part per lot. If hydrogen is below max. limit, accept lot. If not, select sample per Table VII. Reinspect for high element(s). Reject lot of parts if one additional part shows excessive hydrogen.
OXYGEN		Areas of the fastener not influenced by hot forging shall not have an oxygen content exceeding .0000% (2000 PPM).	Determine oxygen from material removed from the shank of a finished fastener. Use procedures and equipment that are capable of measuring oxygen to an accuracy of .0100% (100 PPM).	
DECARBURIZATION (WHERE APPLICABLE)		100° Head Type Pin: None permitted on surface of shank, and shank to head radius. Protruding head type bolts. None permitted on surface of shank, shank to head radius and bearing surface of head. All other surfaces per Table VIII.	Metallurgical Examination – see 4.3	Per Table VIII.
CARBURIZATION		No carburization permitted.		

REVISION

3

NAS1730
SHEET 5



Document Sharing Hub

③ COMPLETELY REVISED

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. Licensee= www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

TABLE I – BASIC REQUIREMENTS (CONT)

CHARACTERISTICS	ENGINEERING REQUIREMENTS	INSPECTION REQUIREMENTS (SEE 4.1)	
		TEST METHOD	SAMPLING (SEE 4.2)
FINISH	Per part drawing referencing this specification and 4.6.	Non-destructive test of coating thickness per MIL-STD-1312-12. Salt spray test per MIL-STD-1312-1.	Apply non-destructive test of coating thickness to every lot with sampling per Table X. Salt spray tests are not mandatory on every lot. See 4.1. However, fastener manufacturer shall use adequate material handling and process controls to insure that parts ready for plating and plated parts will be capable of passing salt spray test. These controls must be verified by salt spray test of random samples at intervals not to exceed 30 days.
PLATED PARTS	Coating thickness is subject to non-destructive test method of AMS-QQ-P-416. All parts shall be capable of passing 96 hour salt spray test after plating. No corrosion products shall appear.		
PASSIVATED (UNPLATED) PARTS	All parts shall be capable of passing 96 hour salt spray test after passivation. No corrosion products shall appear.	Salt spray test per MIL-STD-1312-1	Salt spray tests are not mandatory on every lot. See 4.1. However, manufacturer shall use adequate material handling and process controls to insure that passivated parts will be capable of passing salt spray tests. These controls must be verified by salt spray test of random samples at intervals not to exceed 30 days.
LUBRICATION	Per part drawing referencing this specification, applied per 4.6	Visual examination	
PACKAGING	Package to prevent nicking or scratching of ground surfaces of threads or other damage during handling, transportation or storage. Unit packages may contain fasteners of one part number and one inspection lot only. Assortment of unit packages may be in larger packages. Packaging must allow economical transportation and conform to consolidated freight classification rules. <u>The quantities shall conform to Table XII unless otherwise specified.</u>	Visual examination	Not applicable
MARKING	Durable and legible marking on each package and container located so it will not be damaged when package is opened. Marking shall include at least the following: name of part, part number, purchase order number and fastener manufacturer's inspection lot number.	Visual examination	Not applicable

③ COMPLETELY REVISED

REVISION

3

NAS1730
SHEET 6



Document Sharing Hub

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. ALL RIGHTS RESERVED. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. Licensee= www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

4 QUALITY ASSURANCE PROVISIONS

- 4.1 Inspection Tests, listed in Table I, are mandatory, on each lot as defined in 4.1.1, for the fastener manufacturer, except as noted in Table I. Tests which are not mandatory for the fastener manufacturer may be applied to any lot by the receiving contractor at the discretion of the contractor's inspection department. All other inspection tests shall be applied periodically by the receiving contractor to provide reasonable assurance that specification requirements are met on a continual basis. Receiving contractor may apply any or all tests, specified herein, to any production lot of fasteners, at any time, if there is doubt about the quality.
- 4.1.1 Inspection Lot. Inspection lot shall consist of finished parts which are of the same part number, fabricated by the same process, from the same heat of material, heat treated in the same batch, plated in the same continuous sequence and submitted for manufacturer's inspection at the same time. For the purpose of reducing the number of destructive tests, it shall be permissible to consider two or more lots as one large lot which shall also be defined as above except that sub-lots may vary in grip length. Test specimens shall be selected from each sub-lot on a proportional basis and each sub-lot shall be represented by at least one part except where parts are too short for tensile tests, then these tests shall apply to sub-lots of longer parts.
- 4.1.2 Inspection Report. Each shipment shall be accompanied by an inspection report as part of or separate from the shipment notice. If more than one inspection lot is included in a shipment, a separate inspection report is necessary for each inspection lot and unit packages must clearly identify the applicable lot. The report(s) shall be in duplicate and be signed by an authorized employee of the manufacturer. Report shall provide the following:
1. A statement substantially as follows: "The parts contained in this shipment have been manufactured and inspected in accordance with applicable drawings and specifications."
 2. Customer's name (and division, if applicable).
 3. Purchase order number and date.
 4. Part number (manufacturer's part number shall also be included).
 5. Part name or type.
 6. Inspection lot size(s) and lot number(s).
 7. Quantity shipped.
 8. Material heat number.
 9. Material composition (include mill heat report, independent lab test or part manufacturer's test and state which).
 10. Mechanical test results (individual test results, averages or statistical analysis as required) and required minimums.
 11. Deviations, if any (explanation required).
 12. Other data desired by vendor.
- 4.2 Sampling. Samples for inspection shall be selected at random except as noted under Table VII for metallurgical examination. The same sample may be used for inspection of dimensions, surface texture, identification and thread dimensions. If this sample passes these inspections, the sample for destructive tests may be selected at random from this group. A separate sample is necessary for metallurgical examination. Penetrant inspection may be omitted if unacceptable discontinuities are discovered during other inspection. Penetrant indications shall not be cause for acceptance. Acceptance or rejection of fasteners for metallurgical properties shall be based upon metallurgical examination per 4.3.
- 4.2.1 Screening. Screening (100% inspection, accompanied by rejection of defective parts) may be applied at the inspector's discretion to any lot which is not acceptable by sampling plans described herein. Screening may be applied only to characteristics inspected by non-destructive tests. For characteristics inspected by destructive tests, the entire lot shall be accepted or rejected according to test results of prescribed sample.

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.
1000 WILSON BLVD.
ARLINGTON, VA 22209

THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME
PRODUCT AND SHALL BECOME EFFECTIVE NO LATER THAN SIX MONTHS FROM THE LAST
REVISION DATE.

FORM 09-01

③ COMPLETELY REVISED

REVISION
3
NAS1730
SHEET 7



Documents

Document Sharing Hub

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. Licensee: www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012

- 4.3 Metallurgical Examination. Metallurgical examination shall consist of macro and micro examination of fasteners selected per Table IX. Specimens shall be cut as shown in Figure 4 and etched, or with other suitable etchants:

MATERIAL	MACRO	MICRO	EXAMINE PER METHOD
ALLOY STEEL	METHOD 1	METHOD 2	A
H-11	METHOD 1	METHOD 2	A
A286	METHOD 3	METHOD 4	B
T1-6Al-4V	METHOD 6	METHOD 6	C
PH13-8Mo	METHOD 1	METHOD 5	B

ETCH

METHOD 1 – Etch specimen in aqueous solution containing 50% (by volume) hydrochloric acid at 160 °F to 180 °F.

METHOD 2 – Etch specimen in nital.

METHOD 3 – Etch specimen at room temperature in aqueous solution containing by volume 40% hydrochloric acid and 10% hydrogen peroxide.

METHOD 4 – Etch specimen with ferric chloride for examination of grain size, carburization, and general structure. Examine specimen unetched for examination for oxidation and intergranular attack.

METHOD 5 – Etch specimen in ferric chloride reagent or marble's reagent.

METHOD 6 – Etch specimen in aqueous solution containing 1% hydrofluoric acid and 2% nitric acid.

EXAMINE FOR:	TYPE EXAMINATION	MAGNIFICATION		
		METHOD A	METHOD B	METHOD C
Thread Grain Flow	Micro	50X to 60X	100X to 150X	50X to 60X
Head Grain Flow	Macro	10X to 25X	10X to 25X	10X to 25X
Microstructure				
(Grain Growth, Decarb, And Carburization)	Micro	60X to 100X	—	—
(Oxidation, Intergranular Attack And Carburization)	Micro	—	—	100X to 500X
Discontinuities	Micro	50X to 60X	100X to 150X	50X to 60X
Surface Contamination	Micro	—	—	500X to 600X

- 4.4 Heat Treatment.

- Alloy Steel – Shall develop mechanical properties of 108 KSI min shear per ~~AMS-H-6875~~ or AMS2759, 39 to 42 HRC. All parts shall be stress relieved at 50 °F ± 25 °F below original tempering temperature after final grind.
- H-11 Alloy Steel – Heat treat in accordance with AMS-QQ-P-416.
132 KSI min shear, 46 to 50 HRC
156 KSI min shear, 51 to 55 HRC
In addition to heat treatment in accordance with ~~AMS-H-6875~~ AMS2759 for the applicable strength range, all fasteners shall undergo a thermal treatment subsequent to grind and prior to thread roll at 50 °F ± 10 °F less than the tempering temperature for two hours.
- A286 Alloy – Shall develop mechanical properties of 95 KSI min shear per ~~AMS-H-6875~~ or AMS2759, or 110 KSI min shear.
- 6Al-4V Titanium Alloy – Shall develop mechanical properties of 95 KSI min shear per AMS-H-81200 or AMS2801.
- PH13-8Mo Stainless Steel – Shall develop mechanical properties of 125 KSI min shear.

TABLE II – CLASSIFICATION OF DEFECTS (SAMPLE SIZE PER TABLE X EXCEPT AS NOTED)

CLASSIFICATION	DIMENSIONAL CHARACTERISTICS (DIMENSIONS OUT OF TOLERANCE ARE DEFECTIVE)
MAJOR	Shank Diameter Grip Shank Taper R. Rad. (Head To Shank Fillet) Thread: See Table I
MINOR A	Overall Length Squareness of Head Bearing Surface to Center Line of Shank For Protruding Head Concentricity of Head and Thread to Shank Head Angle for Countersink Head
MINOR B 2.5% AQL	Countersink Head Land Height

TABLE III – SHEAR PROPERTIES

1. ALLOY STEEL, 108 KSI MINIMUM SHEAR

SIZE OR NOMINAL DIAMETER IN INCHES	SHANK DIAMETER /a/		ULT. DOUBLE SHEAR LBS. MIN. /b/	LOAD RATE MAX. LBS. PER MINUTE
	MAX.	MIN.		
.1640	.1635	.1630	4,500	4,170
.1900	.1895	.1890	6,100	5,600
.2500	.2495	.2490	10,600	10,000
.3125	.3120	.3115	16,600	15,400
.3750	.3745	.3740	23,900	22,000
.4375	.4370	.4365	32,500	30,000
.5000	.4995	.4990	42,400	39,000
.5620	.5620	.5615	53,700	50,000
.6250	.6245	.6240	66,300	61,000
.7500	.7495	.7490	95,400	88,000
.8750	.8745	.8740	129,900	120,000
1.0000	.9995	.9990	169,000	156,000

2. H-11 ALLOY STEEL, 132 KSI MINIMUM SHEAR AND 156 KSI MINIMUM SHEAR

NOMINAL FASTENER DIAMETER IN INCHES	SHANK DIAMETER IN INCHES /a/		ULTIMATE DOUBLE SHEAR /b/ (POUNDS)				LOAD RATE MAX. POUNDS PER MINUTE
			132 KSI		156 KSI		
	MAX.	MIN.	MIN.	MAX.	MIN.	MAX.	
	.1640	.1635	.1630	5,470	5,990	6,470	
.1900	.1895	.1890	7,480	8,160	8,850	9,860	5,600
.2500	.2495	.2490	13,000	14,200	15,300	17,100	10,000
.3125	.3120	.3115	20,000	22,100	23,900	26,700	15,400
.3750	.3745	.3740	29,200	32,000	34,500	38,400	22,000
.4375	.4370	.4365	39,700	43,300	46,900	52,800	30,000
.5000	.4995	.4990	51,800	56,500	61,300	68,400	39,000
.5620	.5620	.5615	65,600	71,500	77,500	86,400	50,000
.6250	.6245	.6240	81,000	98,000	95,700	107,000	61,000
.7500	.7495	.7490	116,600	116,600	137,800	154,000	88,000
.8750	.8745	.8740	158,700	173,500	187,600	210,000	120,000
1.0000	.9995	.9990	207,300	226,100	245,000	273,000	156,000

REVISION

3

③ COMPLETELY REVISED



NAS1730
SHEET 9

Document Sharing Hub

USE OF OR RELIANCE UPON THIS DOCUMENT OR ANY NATIONAL AEROSPACE STANDARD IS ENTIRELY VOLUNTARY. AIA DOES NOT QUALIFY SUPPLIERS OR CERTIFY

Copyright Aerospace Industries Association of America, Inc. AIA MAKES NO REPRESENTATION OR CLAIM RESPECTING (1) THE SUITABILITY OF
Provided by IHS under license with AIA/NAS. Licensee= www.sepana.ir/5991803002, User=sam, albert
No reproduction or networking permitted without license from IHS. Not for Resale, 01/04/2016 08:22:20 MST. TRADEMARKS RIGHTS.

Full document details: AIA NAS1730 2012