

FED. SUP CLASS
5320

1. SCOPE

- 1.1 PURPOSE. THIS SPECIFICATION COVERS THE REQUIREMENTS FOR HI-SHEAR RIVET PINS REQUIRING HIGH STRENGTH AT TEMPERATURES UP TO 1200°F. TYPES AND SIZES ARE DEFINED BY PART NUMBERS LISTED ON DRAWINGS WHICH REFER TO THIS SPECIFICATION. IN THE EVENT OF A CONFLICT BETWEEN THE DRAWING AND THIS SPECIFICATION, THE DRAWING WILL TAKE PRECEDENCE.

2. REFERENCED DOCUMENTS

- 2.1 SPECIFICATIONS, STANDARDS, AND HANDBOOKS. UNLESS OTHERWISE SPECIFIED, THE FOLLOWING SPECIFICATIONS, STANDARDS, AND HANDBOOKS OF THE ISSUE LISTED IN THAT ISSUE OF THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS) SPECIFIED IN THE SOLICITATION FORM A PART OF THIS SPECIFICATION TO THE EXTENT SPECIFIED HEREIN.

2.1.1 GOVERNMENTAL.

SPECIFICATIONS

FEDERAL

PPP-H-1581 - HARDWARE (FASTENERS AND RELATED ITEMS), PACKAGING OF

MILITARY

MIL-I-6866 - INSPECTION, PENETRANT METHOD OF

STANDARDS

FEDERAL

FED-STD-151 - METALS; TEST METHODS

MILITARY

MIL-STD-105 - SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES

(COPIES OF LISTED MILITARY STANDARDS, SPECIFICATIONS, AND ASSOCIATED DOCUMENTS LISTED IN THE DEPARTMENT OF DEFENSE INDEX OF SPECIFICATIONS AND STANDARDS (DODISS), SHOULD BE OBTAINED FROM THE DOD SINGLE STOCK POINT, COMMANDING OFFICER, NAVAL PUBLICATIONS AND FORMS CENTER, 5301 TABOR AVENUE, PHILADELPHIA, PA 19120. COPIES OF INDUSTRY ASSOCIATION DOCUMENTS SHOULD BE OBTAINED FROM THE SPONSOR. COPIES OF ALL OTHER LISTED DOCUMENTS SHOULD BE OBTAINED FROM THE CONTRACTING ACTIVITY OR AS DIRECTED BY THE CONTRACTING OFFICER.)

2.1.2 NON-GOVERNMENTAL

NATIONAL AEROSPACE STANDARD (NAS)

- NAS 380 - NAS DOCUMENTS PREPARATION AND MAINTENANCE IN THE INCH SYSTEM OF UNITS
 NAS 618 - FASTENER - RECOMMENDED SHANK, HOLE AND HEAD-TO-SHANK FILLET RADIUS LIMITS FOR
 NAS 1347 - IDENTIFICATION OF MALE THREADED FASTENERS

(COPIES OF NAS SPECIFICATIONS AND DRAWINGS MAY BE OBTAINED FROM THE NATIONAL STANDARDS ASSOCIATION, INC., 5161 RIVER ROAD, BETHESDA, MD 20816.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

AMS 5667 - ALLOY BARS, FORGINGS, AND RINGS, CORROSION AND HEAT RESISTANT 72Ni - 15.50Cr - 0.95(Cb + Ta) - 2.5Ti - 0.70Al - 7.0Fe

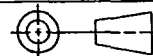
(COPIES OF AMS SPECIFICATIONS MAY BE OBTAINED FROM THE SOCIETY OF AUTOMOTIVE ENGINEERS, INC., 400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096.)

INACTIVE FOR NEW DESIGN
 AFTER 1/30/81. NO SUPER-
 SEDING STANDARD.
 (FOR DESCRIPTION OF STATUS
 NOTE SEE NAS 380.)

② COMPLETELY REVISED

LIST OF CURRENT SHEETS					
NO	REV	NO	REV	NO	REV
1	2	4	2	7	2
2	2	5	2	8	2
3	2	6	2		

CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE

THIRD
ANGLE
PROJECTIONPROCUREMENT
SPECIFICATION

TITLE

CLASSIFICATION
SPECIFICATION

NONE

②

PIN, HI-SHEAR RIVET, 1200° F

NAS 1590

Documents

SHEET 1 OF 8

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC., 1725 DE SALES STREET, N.W., WASHINGTON, D. C. 20036

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AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI B 45.1 - SURFACE TEXTURE - SURFACE ROUGHNESS, WAVINESS AND LAY

(COPIES OF ANSI SPECIFICATIONS MAY BE OBTAINED FROM THE AMERICAN NATIONAL STANDARDS INSTITUTE, INCORPORATED, 1430 BROADWAY, NEW YORK, NY 10018.)

3. REQUIREMENTS

3.1 MATERIAL. THE FASTENERS SHALL BE MADE FROM CORROSION AND HEAT RESISTANT ALLOY, IN ACCORDANCE WITH THE CHEMICAL COMPOSITION OF AMS 5667 (INCONEL X).

3.1.1 MATERIAL PROPERTIES. THE MATERIAL SHALL HAVE THE FOLLOWING PROPERTIES AT ROOM TEMPERATURE:

160,000 UTS

110,000 (0.2 PERCENT OFFSET) MINIMUM YIELD STRENGTH WITH A MINIMUM OF 10 PERCENT ELONGATION IN TWO (2) INCHES.

3.1.2 SMOOTH BAR PROPERTIES. AT 1200°F, THE MATERIAL SHALL HAVE THE FOLLOWING SMOOTH BAR PROPERTIES:

SHORT TIME (ONE HOUR) TENSILE OF (ASTME 21) 110,000 psi UTS AND 80,000 psi (0.2 PERCENT OFFSET) YIELD STRENGTH.

THE ABOVE VALUES AT A STRAIN RATE OF 0.007 MAXIMUM.

3.1.3 HI-SHEAR RIVET PINS. THE HI-SHEAR RIVET PINS SHALL BE AGED OR EQUALIZED AND AGED, THE PROCESS IS OPTIONAL, IN ORDER TO MEET THE REQUIREMENTS HEREIN.

3.2 DESIGN AND CONSTRUCTION.

3.2.1 DIMENSIONS. THE DIMENSIONS OF THE FINISHED FASTENERS SHALL CONFORM TO APPLICABLE STANDARD DRAWINGS.

3.2.2 HEAD AND SHANK. THE HI-SHEAR RIVET HEADS SHALL BE FORGED. FASTENERS SHALL ONLY BE FABRICATED FROM HOT FINISHED MATERIAL. WHERE HOT FINISHED MATERIAL IS NOT AVAILABLE FOR SMALL DIAMETER RIVETS, IT IS PERMISSIBLE TO MACHINE LARGER DIAMETER MATERIAL TO THE SIZE REQUIRED FOR FORGING.

3.2.2.1 BEARING SURFACE.

3.2.2.1.1 PROTRUDING TYPE. THE BEARING SURFACE SHALL BE AT RIGHT ANGLES TO THE SHANK WITHIN TOLERANCES SHOWN IN FIGURE 1. THE ANGULAR ERROR OF THE UNDERSIDE OF THE HEAD MUST BE UNIFORM AROUND THE SHANK WITHIN A TOLERANCE OF ± 10 MINUTES, AS MEASURED FROM THE FACE OF THE HEAD AT A LENGTH APPROXIMATELY EQUAL TO THE DIAMETER OF THE RIVET SHANK. CONCENTRICITY OF THE HEAD TO SHANK SHALL BE WITHIN .010 FIM. THROAT AND PEAKS OF PIN GROOVE SHALL BE CONCENTRIC TO EACH OTHER WITHIN .005 FIM.

3.2.2.1.2 FLUSH TYPE. THE TOP SURFACE OF THE HEAD SHALL BE AT RIGHT ANGLES TO THE SHANK WITHIN THE TOLERANCES SHOWN IN FIGURE 1. THE CONICAL SURFACE OF THE HEAD TO THE SHANK SHALL BE CONCENTRIC WITHIN .005 FIM. THROAT AND PEAKS OF PIN GROOVE SHALL BE CONCENTRIC TO EACH OTHER WITHIN .005 FIM.

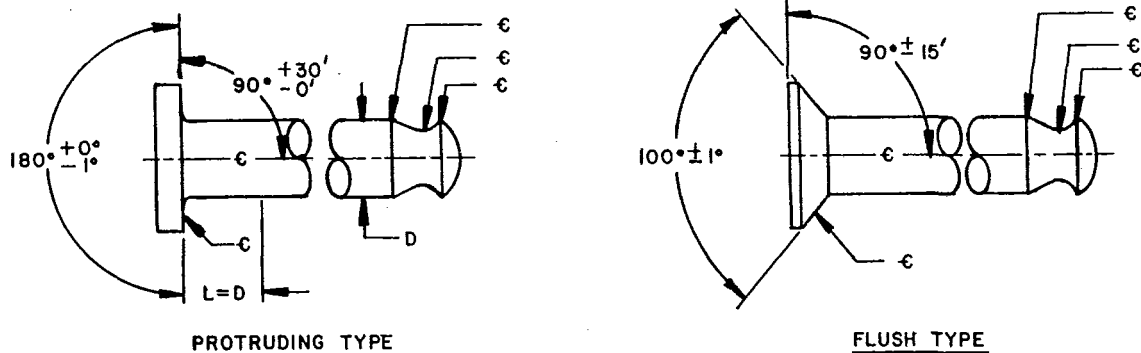


FIGURE 1

INACTIVE FOR NEW DESIGN
AFTER 1/30/81. NO SUPER-
SEEDING STANDARD.
(FOR DESCRIPTION OF STATUS
NOTE SEE NAS 380.)

② COMPLETELY REVISED

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

APPROVAL DATE FEB 1963 REVISION ① 31 JULY 1981 ② 3 JULY 1984

NAS 1590 Documents

SHEET 2

NATIONAL AEROSPACE STANDARD

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- 3.2.2.2 HEAD STRUCTURE AND GRAIN FLOW. A SECTION OF THE HEAD, WHEN EXAMINED AS SPECIFIED (SEE 4) SHALL SHOW NO DEPRIMENTAL EFFECTS. FLOW LINES IN THE FILLET AREA IMMEDIATELY BELOW THE SURFACE SHALL CONFORM SUBSTANTIALLY TO THE FILLET CONTOUR AS SHOWN IN FIGURE 2. THE GRAIN FLOW LINES MAY BE SLIGHTLY BROKEN BY THE FINISH MACHINING OR GRINDING.



FIGURE 2

- 3.3 HEAT TREATMENT. THE HI-SHEAR RIVET PINS SHALL BE AGED OR EQUALIZED AND AGED, THE PROCESS IS OPTIONAL, IN ORDER TO MEET THE REQUIRED STRENGTH PROPERTIES ESTABLISHED IN TABLE III AND THE REQUIREMENTS OF 3.5.4.
- 3.4 CLEANING. RIVET PINS FABRICATED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE PASSIVATED PRIOR TO DELIVERY.
- 3.5 MECHANICAL PROPERTIES
- 3.5.1 SURFACE ROUGHNESS. THE SURFACE ROUGHNESS OF THE RIVET PIN SHALL NOT EXCEED THE VALUES SHOWN IN TABLE I. THE SURFACE ROUGHNESS SHALL BE MEASURED IN ACCORDANCE WITH ANSI B46.1.

TABLE I. ROUGHNESS HEIGHT RATING.

AREA	RHR (MAX)
SHANK AND UNDERSIDE OF HEAD	32
HEAD-TO-SHANK FILLET	32
OTHER SURFACES	125

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- 3.5.2 STRAIGHTNESS. THE STRAIGHTNESS OF THE SHANK SHALL BE WITHIN THE VALUES SPECIFIED IN TABLE II WHEN THE RIVET IS ROLLED ON A SURFACE PLATE AND THE POINT OF GREATEST DEVIATION IS MEASURED WITH A FEELER GAGE.

TABLE II. STRAIGHTNESS OF SHANK

SIZE	DEVIATION OF SHANK FROM PLATE (INCH PER INCH OF LENGTH) (MAX)
UP TO 5/16	.0030
5/16 AND 3/8	.0025

- 3.5.3 SHEAR STRENGTH. THE SHEAR STRENGTH OF THESE HI-SHEAR PINS SHALL BE EQUAL TO OR GREATER THAN THE VALUES SPECIFIED IN TABLE III.

TABLE III. DOUBLE SHEAR BREAKING STRENGTH, MINIMUM (POUNDS). 1/

SIZE	ROOM TEMP	1200°F
1/8	2,230	1,620
5/32	4,530	3,440
3/16	5,380	4,180
1/4	9,350	7,020
5/16	14,620	10,950
3/8	18,160	13,620

- 1/ SHEAR STRENGTH FIGURES ARE CALCULATED ON THE BASIS OF 60 PERCENT OF THE TENSILE STRENGTH OF THE MATERIAL. SHEAR AREA IS BASED UPON THE UNPLATED MINIMUM SHANK DIAMETER AS SPECIFIED IN NAS 618-COL.A.

② COMPLETELY REVISED