MIL-R-7885D
18 April 1988
SUPERSEDING
MIL-R-007885C(AS)
20 August 1980

MILITARY SPECIFICATION

RIVETS, BLIND, STRUCTURAL, MECHANICALLY LOCKED SPINDLE AND FRICTION LOCKED SPINDLE, GENERAL SPECIFICATION FOR

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers mechanically locked spindle and friction locked spindle blind rivets which can be installed where access to one side of the joint is not accessible for installation of solid fasteners.

1.2 Classification. Rivets shall be of the following types and styles, as specified (see 6.2):

Type I - Mechanically locked spindle rivets

Style A - Nominal diameter series

Class 1 - Universal head rivets

Class 2 - 100° Flush head rivets

Style B - Oversize diameter (1/64 inch) series (For repair use only; see 6.1)

Class 1 - Universal head rivets

Class 2 - 100° Flush head rivets

Class 3 - Flanged dome head rivets

Type II - Friction locked rivets

Class 1 - Protruding head rivets

Class 2 - 100° Flush head rivets

Beneficial comments, (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to the Naval Air Engineering Center, Systems Engineering and Standardization Department (Code 53), Lakehurst, NJ 08733-5100, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5320

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards 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. (See Supplement 1 for list of associated specifications.)

SPECIFICATIONS

FEDERAL

QQ-A-250/5	Aluminum Alloy Alclad 2024, Plate and Sheet
QQ-P-416	Plating, Cadmium (Electrodeposited)
PPP-H-1581	Hardware (Fasteners and Related Items) Packaging of

MILITARY

MIL-S-5059	Steel, Corrosion-Resistant (18-8), Plate, Sheet and Strip
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-H-6088	Heat Treatment of Aluminum Alloys
MIL-H-6875	Heat Treatment of Steel, Process for
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-T-9046	Titanium and Titanium Alloy, Sheet, Strip and Plate
MIL-R-85188	Riveter, Power, Pneumatic Hydraulic or Pneumatic Blind Rivet Installation

STANDARDS

FEDERAL

FED-STD-151	Metals, Test Methods

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes

STANDARDS (Continued)

MILITARY (Continued)

MIL-STD-129	Marking for Shipment and Storage
MIL-STD-1312	Fastener, Test Methods
MS 33522	Rivet for Blind Attachment, Limitations for Design and Usage

(Copies of specifications, standards, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting 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. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DODISS and the supplement thereto, if applicable.

Aerospace Material Specification

AMS 4906	Titanium Alloy Sheet and Strip 6Al-4V, Continuously Rolled, Annealed
AMS 5657	Steel, Corrosion and Moderate Heat Resistant 15Cr-7.1Ni-2.5.Mo-1.1Al
AMS 5731	Steel Bars, Forgings, Tubing, and Rings, Corrosion and Heat Resistant 15Cr-25.5Ni-1.3Mo2.1Ti-0.006B-0.3V, Consumable Electrode Melted, 1800 Deg. F, (980 Deg. C) Solution Heat Treated
AMS 6322	Steel Bars, Forgings and Rings 0.50Cr-0.55-Ni0.25Mo (0.38-0.43C)

(Application for copies of the above publications should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Specification sheets and military standards. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets and military standards. In the event of any conflict between requirements of this specification and the specification sheet (or standard), the latter shall govern.

3.2 Qualification. The rivets furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.4 and 6.3).

3.2.1 Retention of qualification. To maintain status on a qualified products list, certification shall be submitted at two year intervals to indicate continued compliance with the requirements of this specification (see 4.4.1).

3.2.2 Product change. Any change in materials, design or method of manufacture shall require requalification of the product.

3.3 Materials. The rivets shall be fabricated from materials specified in the applicable specification sheet or military standard (see 4.3).

3.4 Discontinuities. Discontinuities are permitted as specified in Table I, but are not acceptable when:

a. They extend more than halfway from the edge of the rivet head to the center of the rivet head.

b. There are two or more discontinuities starting at the periphery of the rivet head which are so positioned that they intersect or may intersect by progression.

3.5 Dimensions. Rivet dimensions and tolerances shall be as specified herein and in accordance with the applicable specification sheet.

3.6 Design and construction, Type I.

3.6.1 Construction. The rivet shall be of multiple-piece construction but shall be an integral assembly, The rivet shall include a means, other than friction, of mechanically locking the spindle to the rivet body. The rivet shall consist of a rivet body (sleeve) and a spindle with additional parts as necessary for locking the spindle to the body. Spindle dimensions shall be within the limits of Figure 1 and Table XX.

3.6.2 Installation. Installation of the rivets shall be accomplished by pulling the spindle into the sleeve, forming a blind head on the back side of the assembly, locking the spindle to the sleeve, and removing the pulling portion of the spindle. During the entire installation cycle, the driving tool shall transmit adequate force to the manufactured head of the rivet sleeve as to provide optimum head seating and minimum head distortion. The spindle protrusion of the driven rivets shall be within limits shown on Figure 2 and Table XXI. The rivets shall be capable of being properly installed within the maximum spindle movement of .469 inch along the spindle's and sleeve's common axis. The rivets shall be capable of being installed by a riveter conforming to MIL-R-85188 (see 6.1.1).

3.6.3 Concentricity of rivet heads. The rivet heads shall be concentric with the shank within the limits specified in Table II (see 4.6.3).

3.6.4 Protective treatment. Protective treatment shall be as specified on the applicable specification sheet.

3.6.4.1 Lubricant. A lubricant may be used on any component to improve installation, provided the lubricant is not detrimental to the corrosion resisting properties of the rivet. The lubricant used shall be subjected to and pass the lubricant test (see 4.6.13). Lubricants used shall be stable and shall not deteriorate under recommended handling and storage conditions.

3.6.5 Heat treatment. Heat treatment of all aluminum alloys shall be in accordance with MIL-H-6088. Deviations from MIL-H-6088 that are necessary to manufacture rivets shall be noted in detail and shall accompany the rivets for qualification inspection.

3.6.6 Installation flushness. The installed spindle (see Figure 2) shall be flush with the top surface of the rivet head and within the limits "A" and "B" shown in Table XXI when tested as specified in 4.6.12. The locking feature, when visible (see Figure 2), shall not protrude above the "A" limit of Table XXI.

3.6.7 Identification of product. The rivets shall have the driving anvils identified by color code, to distinguish between Style A and Style B, in accordance with the applicable specification sheet.

3.7 Design and construction, Type II.

3.7.1 Construction. The rivets shall be constructed in two parts: a rivet body and an integrally assembled spindle.

3.7.2 Installation. Installation of the rivets shall be accomplished by pulling the spindle into the sleeve, forming a blind head on the back side of the assembly and then removing the pulling portion of the spindle.

3.7.3 Roundness and concentricity of heads. Rivet heads shall be round within limits specified in the applicable standard. They shall be concentric with the shank within the limits specified in Table II, when tested as specified in 4.7.3.

3.7.4 Protective treatment. Protective treatment shall be as specified on the applicable specification sheet and military standards.

3.7.4.1 Lubricant. A lubricant may be used on any component to improve installation, provided the lubricant is not detrimental to the corrosion resisting properties of the rivet. The lubricant used shall be subjected to and pass the lubricant test (see 4.7.9). Lubricants used shall be stable and shall not deteriorate under recommended handling and storage conditions.

3.7.4.2 Cadmium plating. Cadmium plating shall not be used as a lubricant; however, it may be used as protective treatment.

3.7.5 Identification of rivets. See applicable specification sheets.

3.7.6 Heat treatment. Heat treatment of aluminum alloys shall be in accordance with MIL-H-6088. Heat treatment of nickel-copper alloy and steel shall be in accordance with MIL-H-6875.

3.7.7 Intergranular corrosion. Except as provided herein, rivets shall show no evidence of excessive intergranular corrosion when tested as specified in 4.7.8. This requirement is not applicable to rivets fabricated from 5056 aluminum (UNS A95056) or nickel-copper alloy (UNS N04405) materials.

3.8 Mechanical properties, Type I.

3.8.1 Shear strength. The ultimate single shear strength of the rivet shall be not less than the value specified in Table III, when tested as specified in 4.6.4.

3.8.2 Tensile strength. The ultimate tensile strength of the rivet shall be not less than the value specified in Table IV, when tested as specified in 4.6.5.

3.8.3 Tensile strength in thin sheet. The rivet shall meet the minimum pull through strength specified in Table V, when tested as specified in 4.6.6.

3.8.4 Spindle retention. The rivet spindle shall withstand the steadily applied axial minimum push-out load specified in Table VI, when tested as specified in 4.6.7.

3.8.5 Sheet take up. The rivet shall be capable of closing the respective gap indicated in Table VII when the total stack up thickness (not including the gap) is equal to maximum grip for the rivet tested. The force resisting closure of the gap shall be not less than that specified in Table VII, when tested as specified in 4.6.8.

3.8.6 Shank expansion. The rivet shall be capable of passing the expansion test specified in 4.6.9.

3.8.7 Fatigue strength. The rivet shall withstand three million stress cycles at the loads specified in Table VIII, when tested as specified in 4.6.10.

3.8.8 Vibration endurance. The rivet shall withstand 20 minutes of vibration, when tested as specified in 4.6.11.

3.8.9 Installation. Installed rivets in the minimum and maximum grip test plates (see Figure 10) shall be in accordance with 4.6.12.

3.9 Mechanical Properties, Type II.

3.9.1 Shear strength. The ultimate single shear strength of the rivet shall not be less than the values specified in Table IX (see 4.7.4).

3.9.2 Tensile strength. The ultimate tensile strength of the rivet shall not be less than the value specified in Table IV (see 4.7.5).

3.9.3 Spindle retention. The rivet spindle shall withstand the steadily applied axial minimum push out load specified in Table VI (see 4.7.6).

3.9.4 Fatigue strength. The rivet shall withstand eight million stress cycles at the load specified in Table X (see 4.7.7).

3.9.5 Expansion. Rivets shall be expanded by mechanical means as specified in 4.7.10; expansion shall be accomplished by action of a spindle being pulled into and expanding the shank and then having the projecting end of the spindle removed.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 supplies and services conform to prescribed requirements.

4.2 Classification of inspections. Inspection requirements specified herein are classified as follows:

a. Materials inspection (see 4.3)

b. Qualification inspection (see 4.4)

c. Quality conformance inspection (see 4.5)

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials used in fabricating the rivets are in accordance with the applicable specifications and standards.

4.4 Qualification inspection. Qualification inspection shall be performed on sample units produced with equipment and procedures normally used in production. Qualification inspection shall consist of sample units conforming to examinations and tests listed in Table XI (Type I) and Table XII (Type II), as applicable.

4.4.1 Retention of qualification. To comply with the requirements specified in 3.2.1, the manufacturer shall forward qualification certification to Naval Air Development Center, Code 6013, Warminster, PA 18974-5000. This certification, signed by a responsible official of management, shall attest that the manufacturer has the capability to produce rivets under conditions equal to those existing at the time of the original approved listing.

4.4.2 Sample size. Qualification inspection shall consist of rivets of each diameter for which qualification is desired. The number of samples submitted shall be three times those quantities specified in Table XI (Type I) and Table XII (Type II).

4.4.2.1 Qualification approval. Qualification approval of flush head rivets constitutes approval of the equivalent size protruding head rivet; except that shear strength, tensile strength and tension-tension fatigue tests shall be performed on all head types. Qualification sample units shall meet the requirements of Section 3 within the acceptable limits of Table XI (Type I) and Table XII (Type II), as applicable.

4.4.3 Grip length. The rivets submitted for qualification inspection shall have a grip length as specified in Table XI (Type I) and Table XII (Type II).

4.4.4 Sample identification. Identification tags shall be attached to the sample rivets. The tags shall contain the following:

Samples for Qualification Inspection
Rivet, Blind, Structural, Type I - Type II (as applicable)
Manufacturer's Name or CAGE Code
Manufacturer's part number
Submitted by (name) (date) for qualification testing in accordance with MIL-R-7885 (revision letter) under authorization (reference letter of authorization)

4.4.4.1 Certified test report. The manufacturer shall furnish three copies of a certified test report with applicable drawing stating that the manufacturer's product conforms to this specification. The test report shall contain, but not be limited to, results of each test specified herein in their order of appearance.

4.5 Quality conformance inspection. Quality conformance inspection shall consist of examinations and tests listed in Tables XIII or XIV, as applicable.

4.5.1 Inspection lot. An assembly inspection lot shall consist of finished assembled components of the same configuration, diameter, and heat of material. The inspection lot assemblies and their components shall be manufactured under the same conditions, heat treated in the same manner in one continuous run, and presented for delivery at the same time.

4.5.1.1 Cadmium plating lot. A cadmium plating lot shall consist of all parts plated in accordance with QQ-P-416 in any one 24-hour period except the alloy steel spindles require only a four hour post bake and there is no requirement for stress durability testing.

4.5.2 Sampling. Samples shall be selected at random in accordance with MIL-STD-105, Inspection Level and Acceptance Quality Level (AQL), as specified in Tables XIII and XIV. Identical sample items may be used for any of the tests, provided selection of random samples is maintained and known characteristics of the samples are not used to influence the integrity of the test results. Reduced sampling level shall be instituted after five consecutive lots have passed the acceptance criteria.

4.5.3 Acceptance criteria. All samples must meet the requirements of section 3 within the acceptance limits of Tables XIII and XIV.

4.5.4 Manufacturer's inspection report. Each inspection lot of rivets shall be accompanied by a copy of the manufacturer's inspection report, signed by an authorized representative of the manufacturer. This report shall state that the rivets are from an assembly lot which was manufactured, inspected, and accepted in accordance with the requirements of this specification. This report shall identify the part number, and assembly lot number. In addition, for Type I rivets only, the report shall include, test values for shear and tension strengths.

4.6 Test methods, Type I.

4.6.1 Material certification. Mill certification on all material shall be kept on file and available to the Government.

4.6.2 Examination. Each of the sample rivets selected at random in accordance with Tables XI and XIII shall be examined for conformance to the requirements for dimensions, locking feature integrity, protective treatment, and marking. These examinations shall be accomplished visually. Optical aids, such as x-ray or special gages are permissible to insure compliance with this specification. The examination for locking feature integrity shall be conducted with the rivet installed at its minimum and maximum grip. The rivets are considered defective if the above characteristics are not met.

4.6.3 Concentricity of head.

4.6.3.1 Class 1, universal head rivets. Concentricity of universal head blind rivets shall be determined by observing the total variation of a dial indicator testing the periphery of the head as the rivet is rotated with its shank as an axis (see Table II).

4.6.3.2 Class 2, flush head rivets. Concentricity of flush head rivets shall be determined by observing the total variation of a dial indicator testing the conical surface of the head (adjacent to the top of the rivet), as the rivet is rotated with its shank as an axis (see Table II).

4.6.4 Shear strength test. Single shear tests shall be performed in accordance with MIL-STD-1312, Test 20, except that test fixture holes shall be in accordance with Table XV. Tested rivets shall meet or exceed loads specified in Table III.

4.6.5 Tensile strength test. Tensile tests shall be performed in accordance with MIL-STD-1312, Test 8. Rivets shall be tested at the rivet's maximum grip. Test fixtures shall be in accordance with MIL-STD-1312, Test 8, except that test fixture holes shall be in accordance with Table XV and test fixtures can be modified, when necessary, in accordance with Figure 3. Tensile tests are not applicable to rivets that will not accommodate the minimum sheet thickness specified in Figure 3. Tested rivets shall meet or exceed loads specified in Table IV.

4.6.6 Tensile strength in thin sheet. Tensile tests shall be performed in accordance with MIL-STD-1312, Test 8. Rivets shall be tested at the rivet's maximum grip. Test fixture shall be in accordance with Figure 4. The rivets installed in the fixture of Figure 4 shall have the blind head bear against the thin sheet. Tested rivets shall meet or exceed loads specified in Table V prior to pull-through of the blind head.

4.6.7 Spindle retention test. Six of the rivets shall be tested in a steel test plate of minimum specified grip thickness. Three of the specimens shall be in the installed condition. The remaining three specimens shall be in the uninstalled condition. To determine spindle retention loads, a test device similar to that shown in Figure 5 shall be used. The load shall be applied at the rate of .05 inch per minute to the spindle from the head of the rivet. The spindle of the installed rivets shall meet or exceed the loads specified in Table VI for Type I (installed condition). The spindle of the uninstalled rivets shall meet or exceed the loads specified in Table VI for Type I (uninstalled condition). A means for accurately determining the force applied to the rivet spindle shall be provided. The push out load shall be applied directly in line with the axis of the rivet spindle.

4.6.8 Sheet take-up. The rivets shall be installed in a test fixture in accordance with Figure 6. The criterion for acceptance is that a .0015 inch thick feeler gage shall not touch the rivet shank at the interface of the test coupon.

4.6.9 Shank expansion. The test rivet shall be installed in 7075-T6 (UNS A97075) coupon and split steel plate fixture in total grips equal to the nominal diameter of the rivet being tested. Coupon thickness and hole size - plate thickness and hole size - shall be as shown in Figure 7 and Table XVII. After installation, plates shall be separated from one another and from the rivet, leaving the rivet and the coupon together. The coupon shall be snug against rotation around the rivet sleeve or axial travel on the rivet sleeve away from the rivet head when subjected to finger pressure while holding the driven rivet sleeve.

4.6.10 Fatigue strength. Fatigue test, test fixtures, procedures and alignment shall be in accordance with MIL-STD-1312, Test 21. The high load transfer specimen in accordance with MIL-STD-1312, Test 21 shall be used for this test. Specimen thickness shall be in accordance with Table VIII and rivet holes in accordance with Table XV. The specimen shall be fabricated from 2024-T3 clad aluminum alloy sheet (UNS A92024) in accordance with QQ-A-250/5 for aluminum sleeve rivets and 6AL - 4V titanium alloy (UNS R56401) in accordance with MIL-T-9046 sheet for nickel-copper alloy rivets. The fatigue loads shall be in accordance with Table VIII and the minimum load shall be 10% of maximum cyclic load. Tested specimens shall meet or exceed 3 x 10^6 cycles. If there is no failure the test may be discontinued.

4.6.11 Vibration endurance. Rivets shall be installed in 2024-T3 aluminum (UNS A92024) test plate as shown in Figure 8. Sixteen rivets shall be tested. Eight rivets shall be tested at the minimum grip and eight at the

maximum grip. Reference lines shall be scribed on the spindle, the rivet head and the test plate, so that any relative motion or loosening can be determined. Mount the test plate in the test fixture as shown in Figure 9. Adjust "Jiffy" 500 riveting gun position for static clearance of 3/32 inch between specimen plate and hammer. Use 1-1/4 inch diameter flat rivet set (hammer). Maintain constant 72 psi(±2 psi) air supply pressure during test. Vibration testing shall be interrupted at intervals of 30 seconds, one minute, two minutes, five minutes, ten minutes, 15 minutes and 20 minutes for examination of the rivets. Rivets shall be examined for assembly rotation, spindle rotation, axial movement and failure of head, sleeve, spindle or locking feature.

4.6.11.1 The rivet shall be considered to have failed the vibration test when:

a. Any structural failure, such as broken spindle, sleeve or locking feature occurs during the test.

b. The rivet assembly can be rotated 360° in the test plate with finger pressure.

4.6.12 Installation. Test rivets shall be installed in alloy steel test plates as shown in Figure 10. Holes shall be in accordance with Table XIX. One half of the rivets shall be tested at minimum grip and the other half at the rivet's maximum grip. After installation, the fastener shall be inspected for defects such as deformed heads, split sleeves, locking feature (when visible) protrusion or spindle flushness outside the limits of Figure 2, Table XXI.

4.6.13 Lubricant test, Type I. Lubricant coated and unlubricated "scratch specimens" made of the same materials as the finished rivet sleeves and having the same protective or other surface finish (if any) shall be scratched through to the basic metal. Specimens may be of any convenient size and shape but the total surface area of each shall not be less than six square inches. These specimens shall be subjected to a 96-hour salt spray test in accordance with Method 811 of FED-STD-151. Scratch length shall not be less than 2-1/2 inches and specimen exposure angle shall be 6° from the vertical. After completion of the test there shall be no significant increase in corrosion found when a comparison is made between lubricated and unlubricated panels.

4.6.13.1 Effect of coating on structural materials in contact with the fasteners. Each corrosion test specimen shall consist of two panels riveted together with four rivets installed in-line. Two of these rivets shall be lubricant coated and two shall be without lubricant coating. Specimens made up of the sheet material and rivet combinations tabulated below shall be subject to a 96-hour salt spray test in accordance with Method 811 of FED-STD-151. Specimen exposure angle shall be 6° from the vertical.

SHEET AND FASTENER COMBINATIONS TO BE TESTED

Sheet Materials	Fastener Sleeve Material	
	5056 Aluminum	Ni-Cu (Monel)
Bare 2024-T3 (UNS A92024)	X	
Clad 2024-T3	X	
Bare 7075-T6 (UNS A97075)	X	
Clad 7075-T6	X	
6Al-4V Titanium Alloy (UNS R56401)		X
300 Series CRES		X
AZ31B-H24 Magnesium (UNS M11311)	X	

After exposure the specimens shall be examined and then disassembled. No significant increase in corrosion due to the presence of the lubricant shall be found on either the fasteners, or the panel faying surfaces when a comparison is made between the condition of the areas associated with the lubricated rivets and the like areas associated with the unlubricated rivets. These tests shall be conducted concurrently or subsequently on a duplicative set of specimens.

4.7 Test Methods, Type II.

4.7.1 Material certification. Mill certification on all material shall be kept on file and available to the Government.

4.7.2 Visual examination. Each of the sample rivets selected at random in accordance with Tables XII or XIV shall be visually examined for conformance to the requirements for dimensions, roundness, protective treatment and marking. Optical aids or special gages shall be used when appropriate to ensure compliance with the requirements of this specification. All dimensional characteristics are defective when out of tolerance.

4.7.3 Concentricity of head. Concentricity of blind rivets shall be determined by observing the total variation of a dial indicator testing the periphery of the head as the rivet is rotated with its shank as an axis. (See Table II).

4.7.4 Shear strength test. Single shear test shall be performed in accordance with MIL-STD-1312, Test 20, except that test fixture holes shall be in accordance with Table XVI. Test rivets shall meet or exceed loads specified in Table IX and need not be carried to destruction.

4.7.5 Tensile strength test. Tensile test shall be performed in accordance with MIL-STD-1312, Test 8 at the rivet's maximum grip condition. Test fixture shall be in accordance with MIL-STD-1312, Test 8, except that test fixture holes shall be in accordance with Table XVI and test fixtures can be modified when necessary in accordance with Figure 3. Tensile tests are not applicable to rivets that will not accommodate the minimum sheet thickness specified in Figure 3. Tested rivets shall meet or exceed loads specified in Table IV.

4.7.6 Spindle retention test. Type II rivet test specimens shall be expanded in a section consisting of two sheets of aluminum alloy conforming to QQ-A-250/5. The sheets shall be of appropriate thickness and drilled in accordance with rivet manufacturer's instructions. In setting the rivets for this test, caution shall be exercised such that the force of the setting device is applied directly in line with the axis of the spindle of the rivet. In determining the spindle retention loads, a test device similar to that shown in Figure 5 shall be used. The load shall be applied to the trimmed spindle from the top of the rivet and shall withstand the minimum axial push-out load values specified in Table VI. A means for accurately determining the force applied to the punch shall be provided. A constant load shall be applied rather than an impact type. Caution shall be exercised that punch force is applied directly in line with the axis of the spindle of the rivet. The test for spindle retention shall be conducted on the rivet in driven condition. Rivets shall be driven at least 24 hours before conducting the test.

4.7.7 Fatigue strength. Fatigue strength shall be determined using the specimen shown in Figure 11. Use aluminum alloy test specimen for aluminum alloy rivets and corrosion resistant steel test specimen for Ni-Cu alloy (Monel rivets). A direct stress-fatigue machine, or other equipment capable of producing an axial load in a test specimen through repeated cycles of tension, shall be used in this test. The test specimen shall be mounted between the load screws and the load varied, in order that the range of stress through each load cycle will be from 25 percent of maximum to the maximum. Extreme care shall be exercised in mounting the specimen. The specimen-holding bolts shall accurately bear against the specimen without binding, and shall be so aligned and tightened as to produce a direct axial loading of the specimen. Fatigue strength shall be determined by one of the following methods:

4.7.7.1 Method I. Specimens shall be vibrated through 8,000,000 stress cycles at a rate of from 500 to 1,500 cycles per minute under the maximum load noted in Table X.

4.7.7.2 Method II. Fatigue test specimens shall be subjected to repeated loading with various maximums so chosen as to produce an even distribution of failures between 50,000 and 8,000,000 cycles. The specimens shall be subjected to cycles of stress at the rate of 500 to 1,500 cycles per minute until failure occurs. The S-N curve shall be prepared with the load per rivet as ordinate and the number of cycles to failure as abcissa. The fatigue strength of the rivets shall be determined at the load which the S-N curve intersects 8,000,000 cycles.

4.7.8 Intergranular corrosion test. Rivets, except those fabricated from 5056 aluminum alloy and nickel-coper alloy (Monel), shall be subjected to the corrosion test specified in MIL-H-6088.

4.7.9 Suitability of lubricant coatings test. Lubricant coated and unlubricated "scratch specimens" made of the same materials as the finished rivet sleeves and having the same protective or other surface finish (if any) shall be scratched through to the basic metal. Specimens may be of any

convenient size and shape but the total surface area of each shall exceed six square inches. These specimens shall be subjected to a 96-hour salt spray test in accordance with Method 811 of FED-STD-151. Scratch length shall not be less than 2-1/2 inches and specimen exposure angle shall be 6° from the vertical. After exposure, no significant increase in corrosion shall be found when a comparison is made between lubricated and unlubricated panels.

4.7.10 Expansion. Type II rivets shall be expanded in sheet specimens of suitable thickness in accordance with Figure 10, hole size in accordance with Table XVI. Splits or cracks resulting from driving, in more than the amount of rivets specified in Tables XII and XIV, shall be cause for rejection.

4.8 Inspection of preparation for delivery. Preservation, packaging, packing, and marking shall be inspected to determine conformance to Section 5.

5. PACKAGING

5.1 Preservation. Preservation shall be level A or C as specified (see 6.2).

5.1.1 Level A. The rivets shall be preserved and packaged in accordance with the applicable level A requirement of PPP-H-1581.

5.1.2 Level C. The rivets shall be preserved and packaged in accordance with the supplier's standard practice.

5.2 Packing. Packing shall be Level A or Level C as specified (see 6.2).

5.2.1 Level A. The rivets shall be packed in accordance with the applicable level A requirements of PPP-H-1581.

5.2.2 Level C. The rivets shall be packed in a manner which will ensure arrival at destination in satisfactory condition and be acceptable to the carrier at lowest rates. Containers and packing shall comply with Uniform Freight Classification rules, or with National Motor Freight Classification rules.

5.3 Marking. In addition to any special marking specified in the contract or order, marking shall be in accordance with MIL-STD-129 (see 6.2).

6. NOTES

6.1 Intended use. Rivets covered by this specification are intended for structural attachments whenever access to one side of the joint is not adequate for the installation of solid fasteners (see MS33522). Style B (Oversize Diameter) rivets are for use in repair only, not for use in design.

6.1.1 The requirement that the Type I rivet shall be capable of being installed by a tool per MIL-R-85188 is intended to control the design of the rivet for standardization purposes, testing and qualifications. Tools other than those per MIL-R-85188, may be used for installation provided the rivet installation requirements of paragraph 3.6.2 are met.

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of this specification.

b. Title, number and date of applicable specification sheet or military standard.

c. Style, class and type of rivet (see 1.2).

d. Part Number (see applicable specification sheet).

e. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).

f. Special marking (see 5.3).

g. Quantity.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the Qualified Products List (QPL-7885) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Systems Command (Naval Air Engineering Center, Code 5311, Lakehurst, NJ 08733-5100). However, information pertaining to qualification of products may be obtained from the Naval Air Development Center, Code 6013, Warminster, Pennsylvania 18974-5000.

6.3.1 Failure. A failure as defined by this specification exists when either the sleeve or spindle of the installed rivet fractures or breaks; or when distortion, permanent set, or wear prevents the rivet from sustaining the applicable test load, or when the spindle and sleeve of an installed rivet assembly loosens or becomes separated; or inability of the locking feature to retain the spindle.

6.4 Subject term listing.

Blind
Friction, locked
Locking, feature
Mechanically, locked
Rivet
Spindle
Structural

6.5 Changes from previous issue. The margins of this specifications are marked with vertical lines to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

TABLE I. Permissible Discontinuities.

Basic Body Diameter (Inch) - .250 and Under	
	Maximum Depth of Discontinuity
Shank	.005
Periphery	.020
Other Surfaces	.010

TABLE II. Tolerances on concentricity of head.

Basic Body Diameter (Inch)	Total Variation in Indicator Reading On Rivet Head	
	Flush Head (Inch)	Protruding and Flanged Dome Head (Inch)
.125	.010	.010
.156	.010	.015
.187	.010	.015
.250	.010	.020

TABLE III. Single shear strength - Type I rivets.

Basic Body Diameter	Class	Rivet Grip 1/	Minimum Shear Strength (Pounds)			
			5056 Aluminum		Ni-Cu Alloy (Monel)	
			Style A	Style B	Style A	Style B
.125	1 (Protruding and Flanged Dome)	-1	2/	2/	2/	2/
		-2	505	592	646	750
		-3	584	692	730	895
		-4	655	771	730	895
		-5	664	814	730	895
	2 (Flush)	-2	411	480	485	570
		-3	531	614	667	785
		-4	651	741	730	895
		-5	664	814	730	895
.156	1 (Protruding and Flanged Dome)	-1	(2)	(2)	(2)	(2)
		-2	699	805	882	1015
		-3	840	982	1134	1290
		-4	929	1080	1134	1353
		-5	1018	1177	1134	1353
		-6	1030	1245	1134	1353
	2 (Flush)	-2	(2)	(2)	(2)	(2)
		-3	714	815	859	1010
		-4	862	977	1080	1270
		-5	1012	1137	1134	1353
		-6	1030	1245	1134	1353
.187	1 (Protruding and Flanged Dome)	-1	(2)	(2)	(2)	(2)
		-2	920	1015	1144	1255
		-3	1131	1240	1438	1575
		-4	1248	1386	1626	1823
		-5	1355	1504	1626	1823
		-6	1462	1617	1626	1823
		-7	1480	1685	1626	1823
	2 (Flush)	-2	(2)	(2)	(2)	(2)
		-3	918	1005	1029	1210
		-4	1095	1200	1284	1510
		-5	1310	1388	1550	1823
		-6	1453	1579	1626	1823
		-7	1480	1685	1626	1823

1/ For rivet grips greater than listed use highest value shown for the diameter, class and type.

2/ Parts too short to be tested.

TABLE IV Minimum tensile strength values (lbs.)

Basic Body Diameter	Type I				Type II
	5056 Aluminum		Ni-Cu Alloy (Monel)		
	Style A	Style B	Style A	Style B	All Materials
.125	285	345	400	490	227
.156	445	530	635	740	375
.187	635	710	890	1000	537
.250	-	-	-	-	985

TABLE V. Minimum thin sheet pull-thru loads (lbs.)

Basic Body Diameter	2024-T3 Aluminum Sheet 5056 Aluminum Rivets			6Al-4V Ti Sheet Ni-Cu Alloy (Monel) Rivets		
	Thickness	Load (Lbs.)		Thickness	Load (Lbs.)	
		Style A	Style B		Style A	Style B
.125	.025	160	180	.020	250	280
.156	.032	220	260	.025	360	430
.187	.040	315	375	.032	570	680

TABLE VI. Spindle retention load.

Basic Body Diameter	Type I						Type II			
	Ni-Cu Alloy			Aluminum						
	.125	.156	.187	.125	.156	.187	.125	.156	.187	.250
Min. Axial Push-Out (Lbs.) Installed Condition	150	250	450	125	200	290	15	25	35	50
Min. Axial Push-Out (Lbs). Uninstalled Condition	10	10	10	10	10	10	-	-	-	-

TABLE VII. Sheet take up - Type I.

Basic Body Diameter	Gap (Inch)	Force Resisting Closure (Lbs. Minimum)	
		Aluminum	Ni-Cu Alloy
.125	.010	15	20
.156	.015	30	35
.187	.020	50	60

TABLE VIII. Fatigue strength loads Type I.

Basic Body Diameter	Rivet Grip Dash No.	Sheet Thickness "T" (Inches) ± .002	Maximum Cyclic Load Per Specimen (Lbs.) to Achieve 3,000,000 Cycles Min. Life for Flush or Protruding Rivets	
			Aluminum	Ni-Cu Alloy (Monel)
			Style A & Style B	Style A & Style B
.125	-2	.063	440	610
.156	-3	.080	700	970
.187	-3	.090	945	1310

TABLE IX. Shear test loads (lbs.) - Type II rivets.

Basic Body Diameter	Class	Total Grip (Inch)	Minimum Shear Strength (Lbs)		
			2017 and 2117 Aluminum Alloy	5056 Aluminum Alloy	Ni-Cu Alloy (Monel)
.125	1 (Protruding)	.064	270	260	490
		.125	350	340	640
		.250 and greater	370	360	670
	2 (Flush)	.125	240	230	440
		.250	350	340	640
		.375	360	350	650
		.500 and greater	370	360	670
.156	1 (Protruding)	.064	360	350	660
		.125	500	490	910
		.250	570	550	1,030
		.375 and greater	580	560	1,050
	2 (Flush)	.125	300	290	550
		.250	540	520	970
		.375 and greater	580	560	1,050
187	1 (Protruding)	.064	480	460	860
		.125	720	690	1,290
		.250	800	770	1,440
		.375	830	800	1,490
		.500	840	810	1,510
		.750 and greater	840	810	1,520
	2 (Flush)	.250	700	680	1,270
		.375	790	760	1,430
		.500	800	770	1,450
		.750 and greater	840	810	1,520
.250	1 (Protruding)	.125	1,150	1,110	2,070
		.250	1,380	1,330	2,490
		.375	1,470	1,410	2,640
		.500	1,500	1,450	2,700
		.750 and greater	1,510	1,450	2,710
	2 (Flush)	.250	910	870	1,630
		.375	1,390	1,340	2,500
		.500	1,440	1,380	2,610
		.750 and greater	1,510	1,450	2,710

TABLE X. Fatigue strength loads - Type II.

Basic Body Diameter	Sheet Thickness	Maximum Cyclic Load per rivet or load at which the S-N curve intersects 8,000,000 cycles (Minimum Lbs.) 1/
.125	0.032 0.040 0.051 0.064	110 120 130 135
.156	0.032 0.040 0.051 0.064	120 130 140 155
.187	0.040 0.051 0.064 0.072	145 150 155 160
.250	0.051 0.064 0.072 0.081	155 160 165 175

1/ These values are for plain joints using universal head rivets. Increase load per rivet by 20 percent where sheets are double dimpled. Decrease values 30 percent where one sheet is machined countersunk.

TABLE XI. Qualification tests - Type I.

Test	Requirement Para.	Method Para.	Grip Required	No. of Samples	No. of Defects Allowed
Examination	1/ Note #1	2/ Note #2	-	All Qualification samples	0
Shear Strength	3.8.1	4.6.4	.188 to .250	5	0
Tensile Strength	3.8.2	4.6.5	.188 to .250	5	0
Tensile Strength in Thin Sheet	3.8.3	4.6.6	.188 to .250	3	0
Spindle Retention	3.8.4	4.6.7	.188 to .250	6	0
Sheet Take up	3.8.5	4.6.8	.188 to .250	3	0
Shank Expansion	3.8.6	4.6.9	Per Table XVII	3	0
Fatigue Strength	3.8.7	4.6.10	See Table VIII	3 Fatigue Specimens	0
Vibration Endurance	3.8.8	4.6.11	.126 to .187 for size .125 .188 to .250 for sizes .156 and .187	16	0
Installation	3.8.9	4.6.12	.188 to .250	20	1

1/ Includes paragraphs 3.6.1, 3.6.2, 3.3, 3.4, 3.5, 3.6.3 and 3.6.4.
2/ Includes paragraphs 4.6.2, 4.6.3.1 and 4.6.3.2

TABLE XII. Qualification tests - Type II.

Test	Requirement Para. 1/	Method Para. 2/	Grip Required	No. of Samples	No. of Defects Allowed
Examination	Note #1	Note #2	-	All Qualification samples	0
Shear Strength	3.9.1	4.7.4	.188 to .250	5	0
Tensile Strength	3.9.2	4.7.5	.188 to .250	5	0
Spindle Retention	3.9.3	4.7.6	.188 to .250	3	0
Fatigue Strength	3.9.4	4.7.7	.188 to .250	3 Fatigue Specimens	0
Intergranular Corrosion	3.7.7	4.7.8	-	5	0

1/ Includes 3.7.1, 3.7.2, 3.3, 3.4, 3.5, 3.7.3, 3.7.4, 3.7.4.1 and 3.7.5.
2/ Includes 4.7.2, 4.7.3.1 and 4.7.3.2

TABLE XIII. Quality conformance tests - Type I.

Test	Reqm't Para.	Method Para.	Sample Size (MIL-STD-105)		Acceptance Limits (% AQL)
			Normal	Reduced	
Examination	3.3 through 3.6.4	4.6.2	S-3	S-2	4.0
Installation (a) Split Sleeve (b) Spindle Protrusion	3.6.6	4.6.12	S-3	S-2	2.5 5.0 2.5
Shear Strength	3.8.1	4.6.4	S-2	S-1	0 (defective)
Tensile Strength	3.8.2	4.6.5	S-2	S-1	0 (defective)
Spindle Retention	3.8.4	4.6.7	S-2	S-1	2.5

TABLE XIV. Quality conformance tests - Type II.

Test	Requirement Paragraph	Method Paragraph	Sample Size (MIL-STD-105) Normal	Acceptance Limits (% AQL)
Examination	3.3 thru 3.5 and 3.7.1 thru 3.7.5	4.7.2 and 4.7.3	S-3	6.5
Shear Strength	3.9.1	4.7.4	S-2	4.0
Spindle Retention	3.9.3	4.7.6	S-2	4.0
Expansion	3.9.5	4.7.10	S-2	4.0

TABLE XV. Hole dimensions - Type I.

Basic Body Diameter	Hole Limits Inches ±.0005	Countersink Diameter Inches ±.003
.125 (Style A)	.130	.225
.156 (Style A)	.162	.285
.187 (Style A)	.194	.353
.125 (Style B)	.145	.225
.156 (Style B)	.178	.286
.187 (Style B)	.207	.353

TABLE XVI. Hole dimensions - Type II.

Basic Body Diameter	Hole Limits Inches ±.0005	Countersink Diameter Inches ±.003
.125 (Nominal)	.130	.225
.156 (Nominal)	.162	.285
.187 (Nominal)	.194	.353
.250 (Nominal)	.258	.475

TABLE XVII. Shank expansion test dimensions.

Basic Body Diameter	Rivet Grip (Inches)	Headside Coupon		Split Plate	
		Thickness ±.002	Hole Size ±.0005	Thickness ±.001	Hole Size +.001 -.000
.125 (Style A)	.063-.125	.063	.1315	.062	.132
.156 (Style A)	.126-.187	.080	.1635	.078	.164
.187 (Style A)	.126-.187	.090	.1955	.094	.196
.125 (Style B)	.063-.125	.063	.1455	.062	.146
.156 (Style B)	.126-.187	.080	.1795	.078	.180
.187 (Style B)	.126-.187	.090	.2085	.094	.209

TABLE XVIII. Vibration "T" test plate thickness.

Basic Body Diameter Style A & Style B	Rivet Grip (Inches)	"T" Test Plates Thickness	
		Min Grip (Inches)	Max Grip (Inches)
.125	.126 - .187	.126 - .129	.184 - .187
.156	.188 - .250	.188 - .191	.247 - .250
.187	.188 - .250	.188 - .191	.247 - .250

TABLE XIX. Installation hole dimensions.

Basic Body Dia. Style A and Style B	Min. Grip Test Plate Hole Dia. +.0000 - .0005		Max. Grip Test Plate Hole Dia. +.0005 - .0000	
	Type I Rivets		Type I Rivets	
	Style A	Style B	Style A	Style B
.125	.132	.146	.129	.143
.156	.164	.180	.160	.176
.187	.196	.209	.192	.205

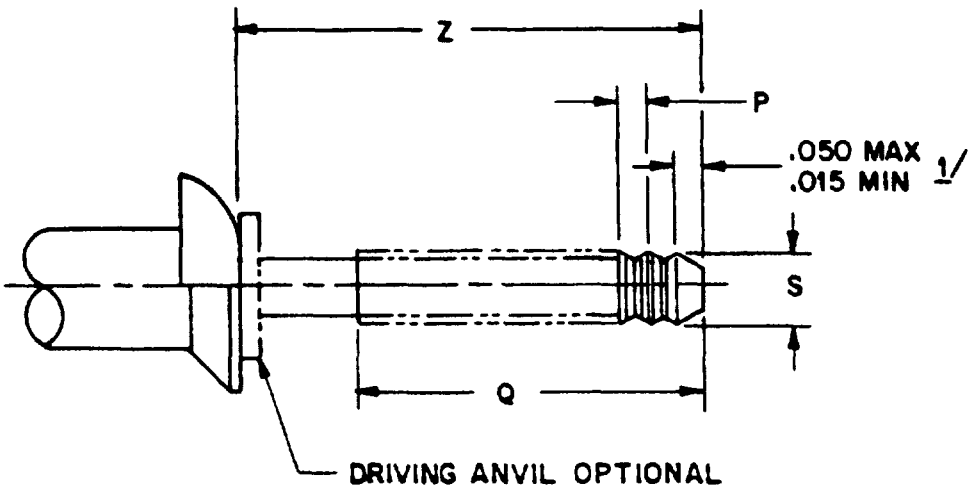


FIGURE 1. Rivet spindle.

1/ Shape of lead is optional within .050 - .015 limit.

Table XX. Spindle dimensions.

Diameter "S" 1/		Serration Pitch "P"		Serration Length "Q"	Spindle Length "Z"	
Max	Min	Max	Min	Minimum	Max	Min
.119	.069	.032	.030	.625	1.00	.87

1/ Serration depth shall be 0.003 to 0.005 inches.

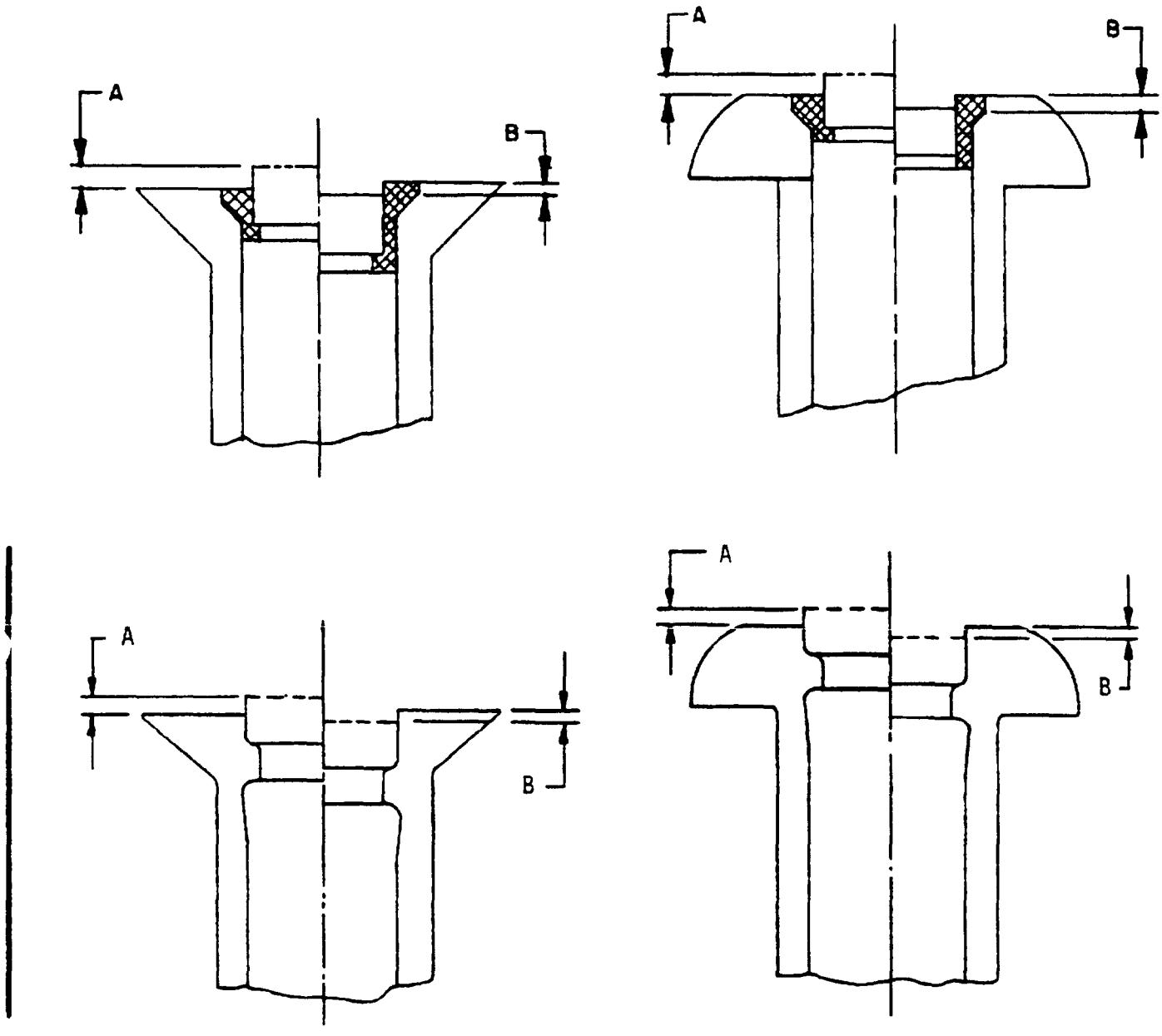


FIGURE 2. Rivet head.

TABLE XXI. Spindle flushness limits (inch) and locking feature protrusion limit (inch).

Nominal Size	Basic Body Diameter	A Max. (Above)	B Max. (Below)
4	.125	.010	.015
5	.156	.010	.020
6	.187	.010	.020

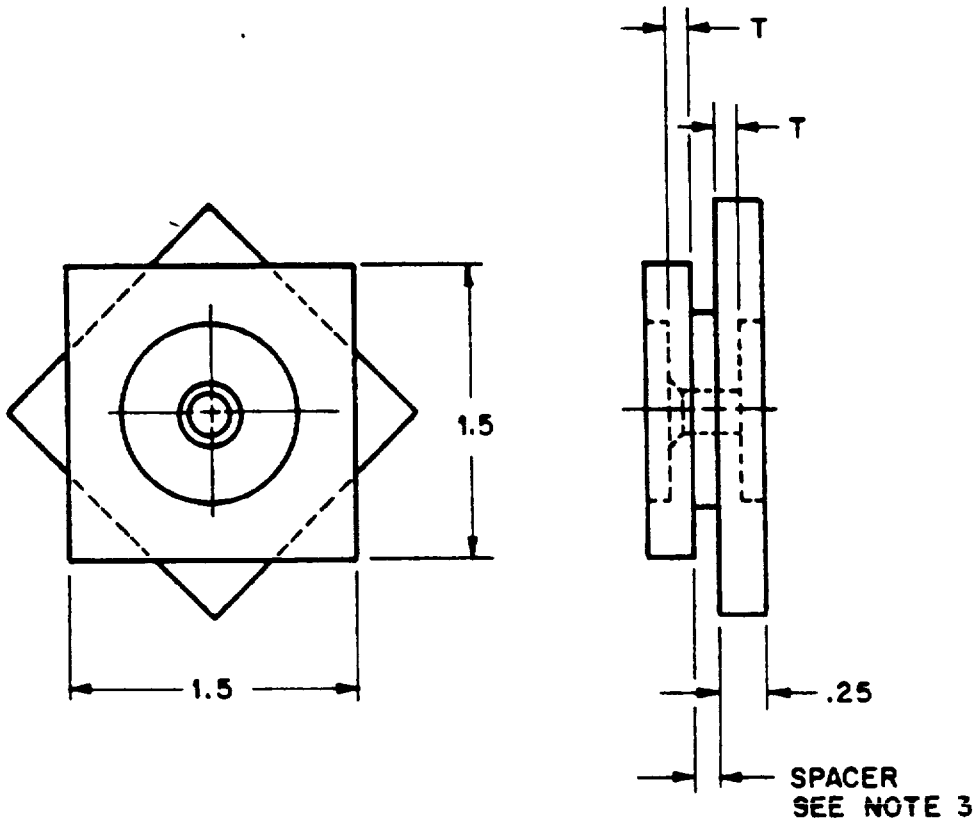


FIGURE 3. Tension specimen.

Nominal Size	Basic Body Diameter	T MIN
4	.125	.063
5	.156	.078
6	.187	.094

NOTES:
1. Material: Alloy Steel, HRC 46
2. Hole Preparation in accordance with Table XV or XVI
3. Spacer Thickness as necessary to obtain maximum grip for rivet tested.
4. Dimensions in inches.

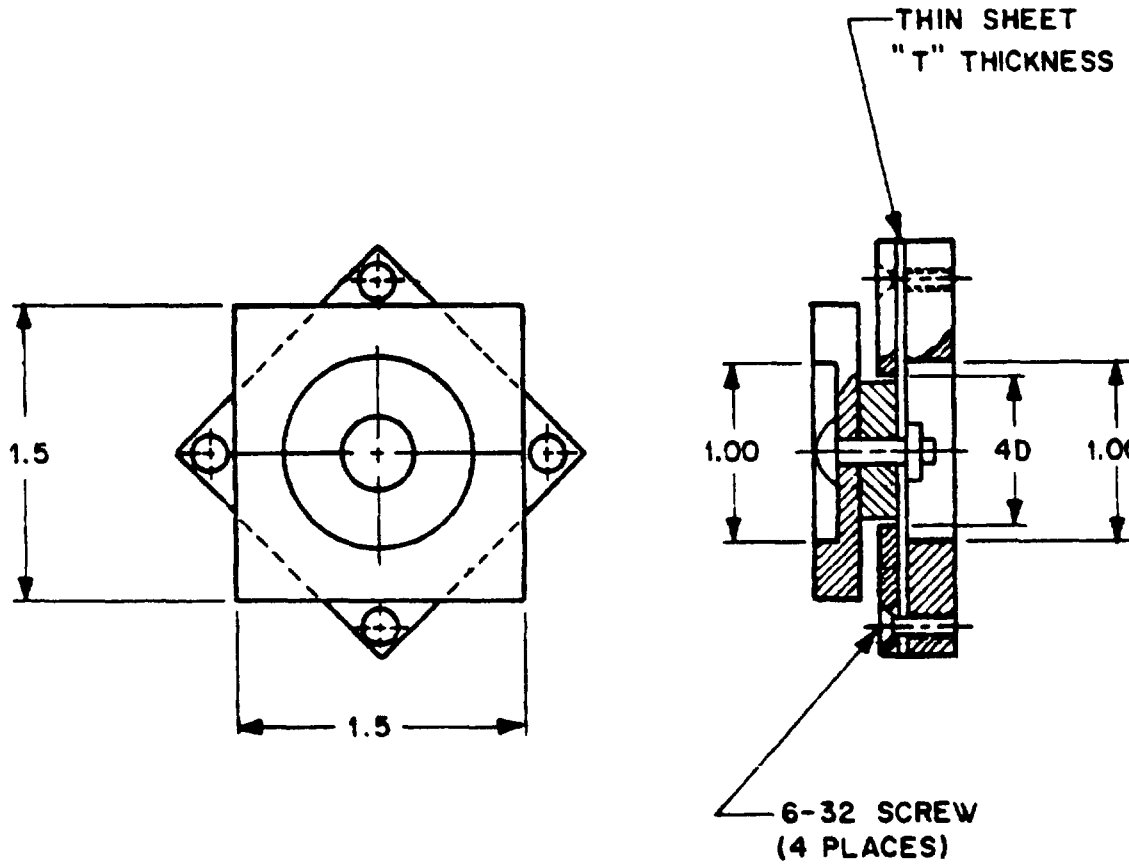
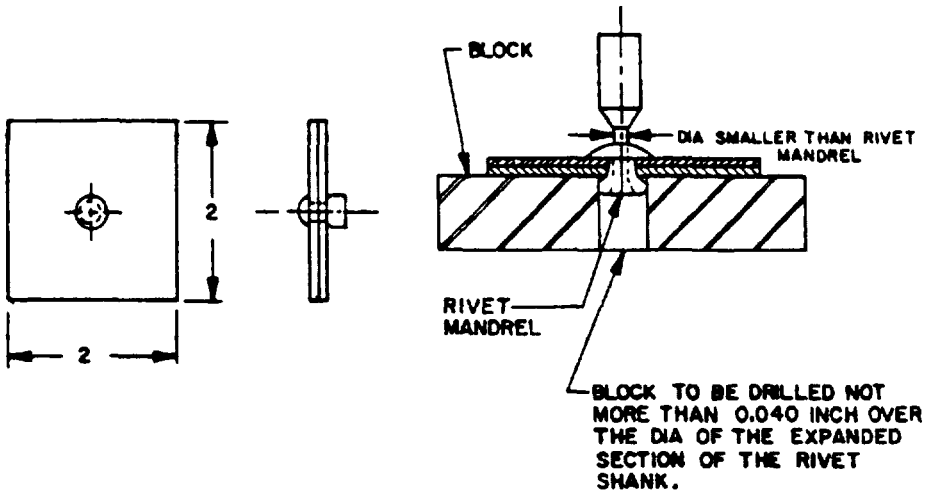


FIGURE 4. Thin sheet pull through specimen.

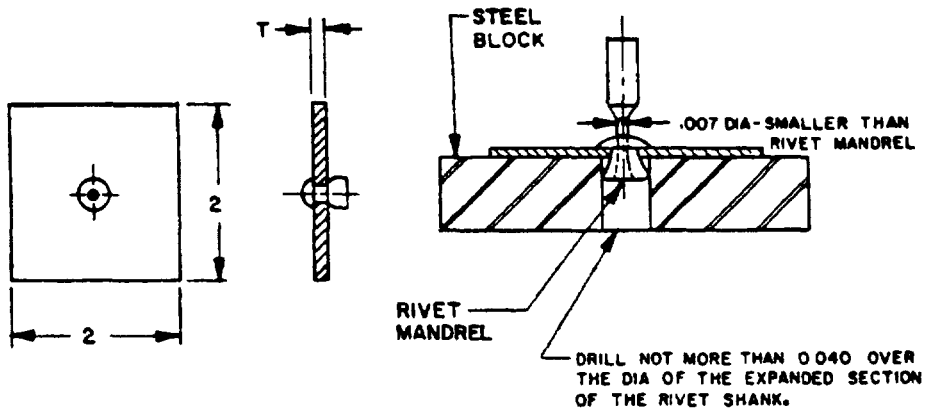
NOTES:
1. Thin Sheet Material in accordance with Table V as applicable.
2. Hole Preparation in accordance with Table XV.
3. "T" Thickness (see Table V).
4. Dimensions in Inches.



TYPE I Rivets

BASIC BODY DIA	HOLE DIA. (STYLE A) ±.0005	HOLE DIA. (STYLE B) ±.0005
.125	.132	.146
.156	.164	.180
.187	.196	.209

NOTES: 1. Dimensions in inches.
2. Countersink dimensions when required in accordance with Table XV.
3. "T" equals rivet minimum grip.
4. Material: Alloy steel HRC 46 Min.



TYPE II Rivets

NOTES: 1. Dimensions in inches.
2. Countersink dimensions when required in accordance with Table XVI.

FIGURE 5. Spindle retention test.

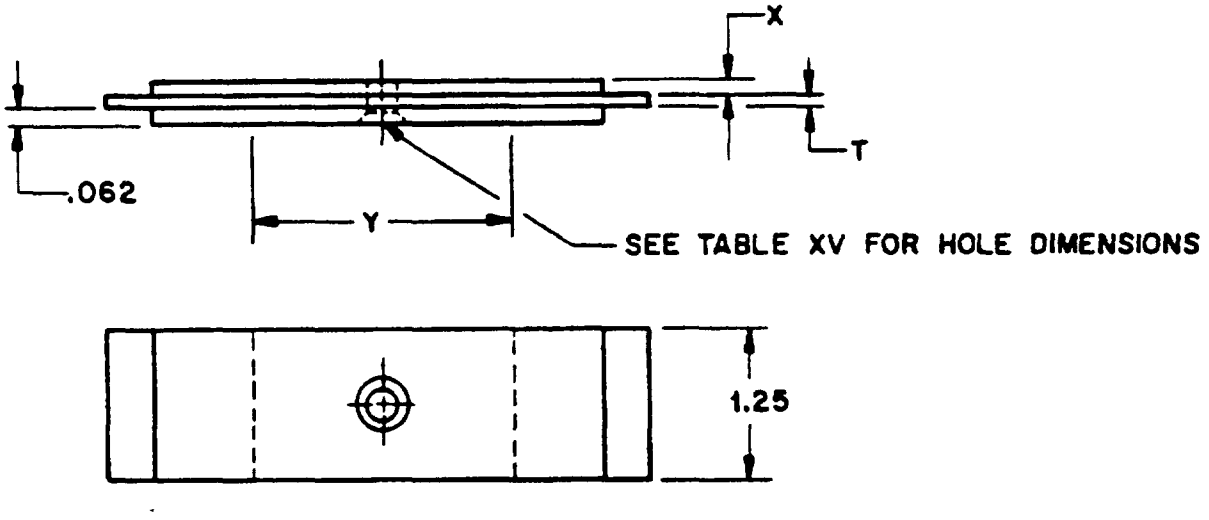


FIGURE 6. Sheet take-up specimen.

NOTES:
1. Sheet Material: Shall be 2024-T3 Aluminum Alloy for all rivet materials.
2. Y Dimension to be adjusted to produce closure resisting force values shown on Table VII.
3. X Sheet thickness + .062 inch shall be equivalent to maximum grip of test specimen.
4. Fastener hole in specimen shall not be deburred.
5. Fastener holes in accordance with Table XV.
6. Fastener manufactured head shall be against .062 inch thick sheet.
7. During Calibration, use a .003 inch thick feeler gage at hole.
8. Force shall not be measured after the sheets are closed.

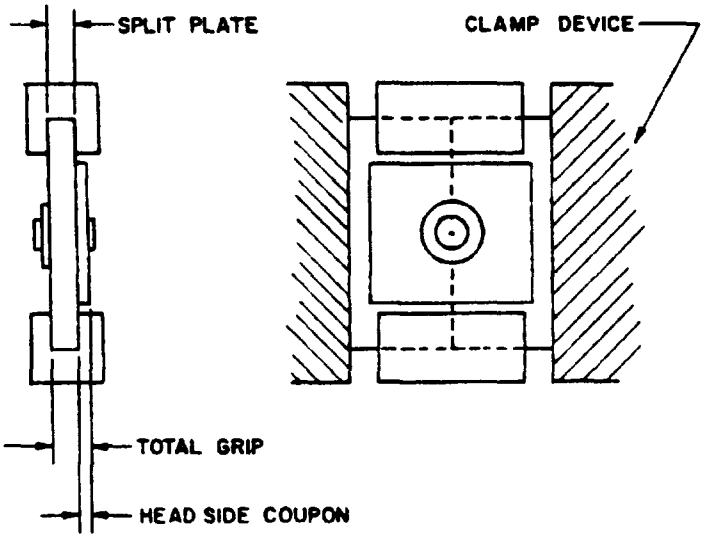
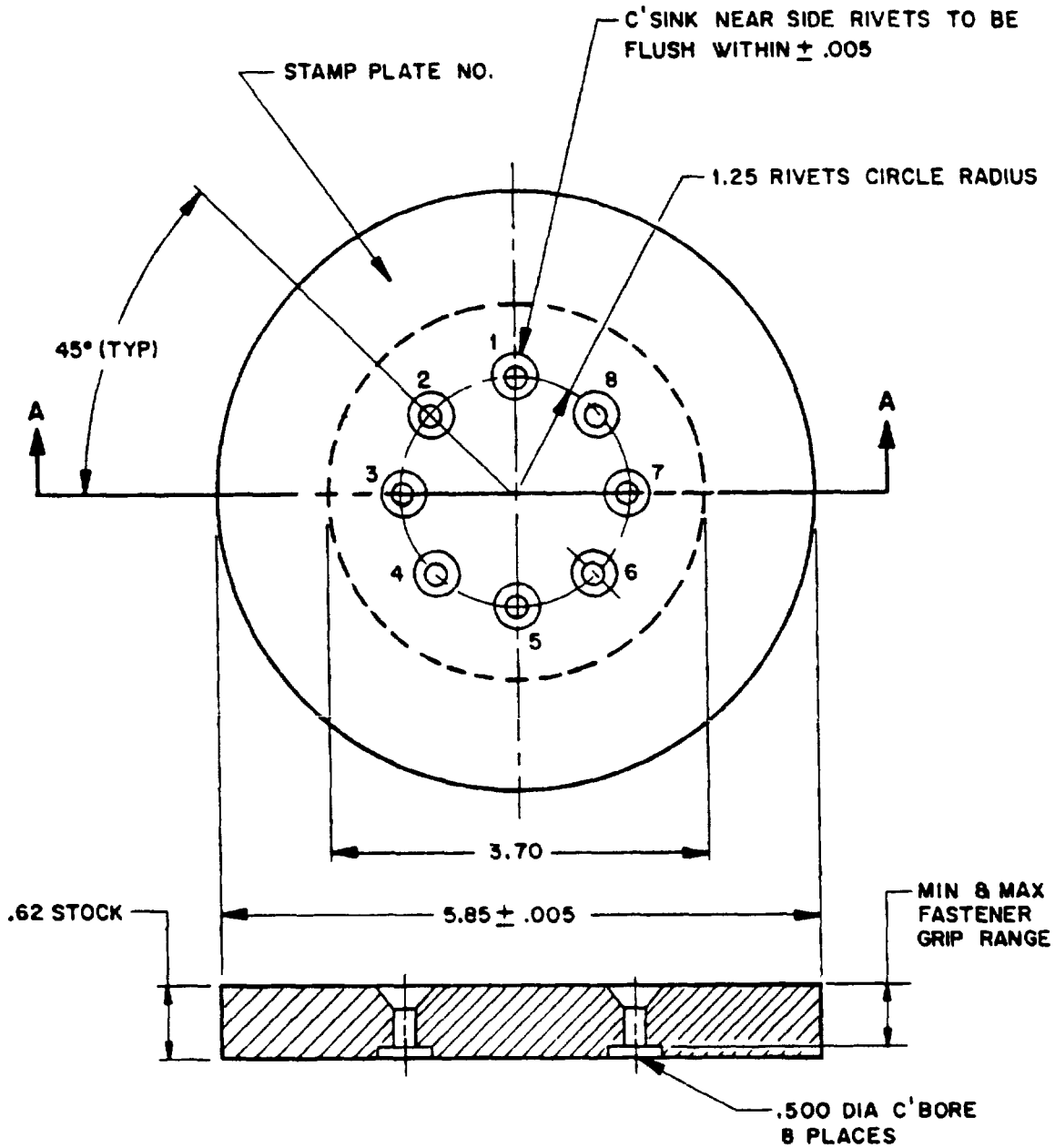


FIGURE 7. Shank expansion coupon.



SECTION A-A

FIGURE 8. Vibration test plate.

Notes:
1. Test plate material: 2024-T3 Aluminum Alloy.
2. Rivet holes in accordance with Table XV.
3. Countersink when needed in accordance with Table XV.
4. T dimension in accordance with Table XVIII.

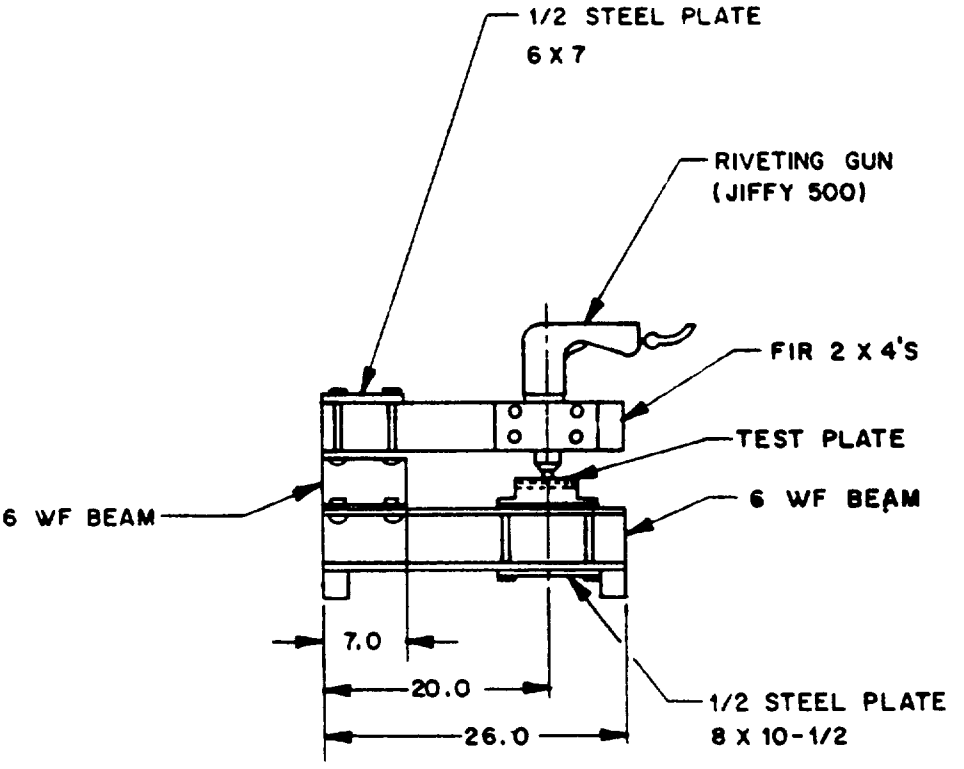
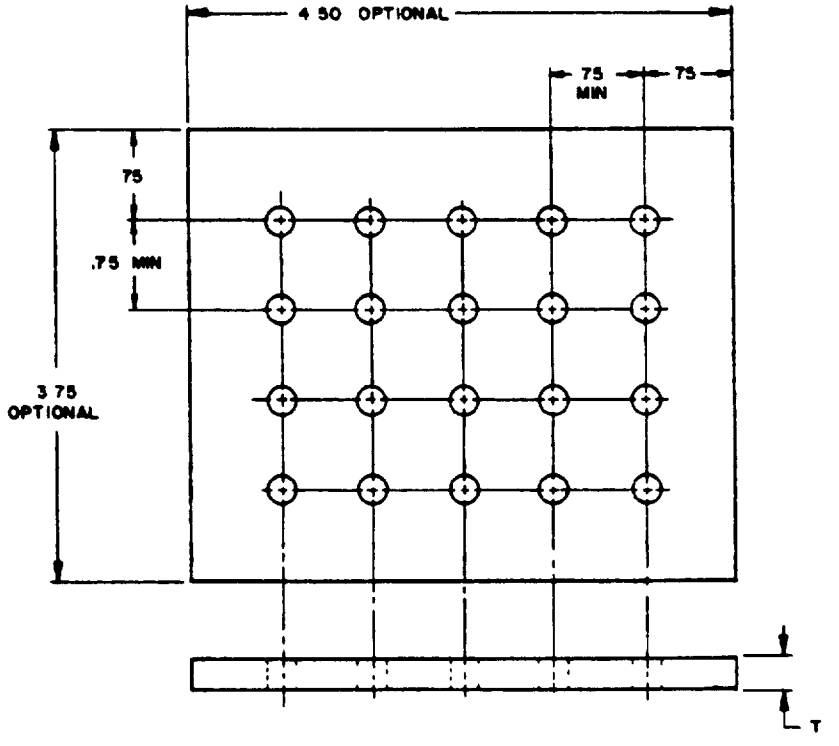


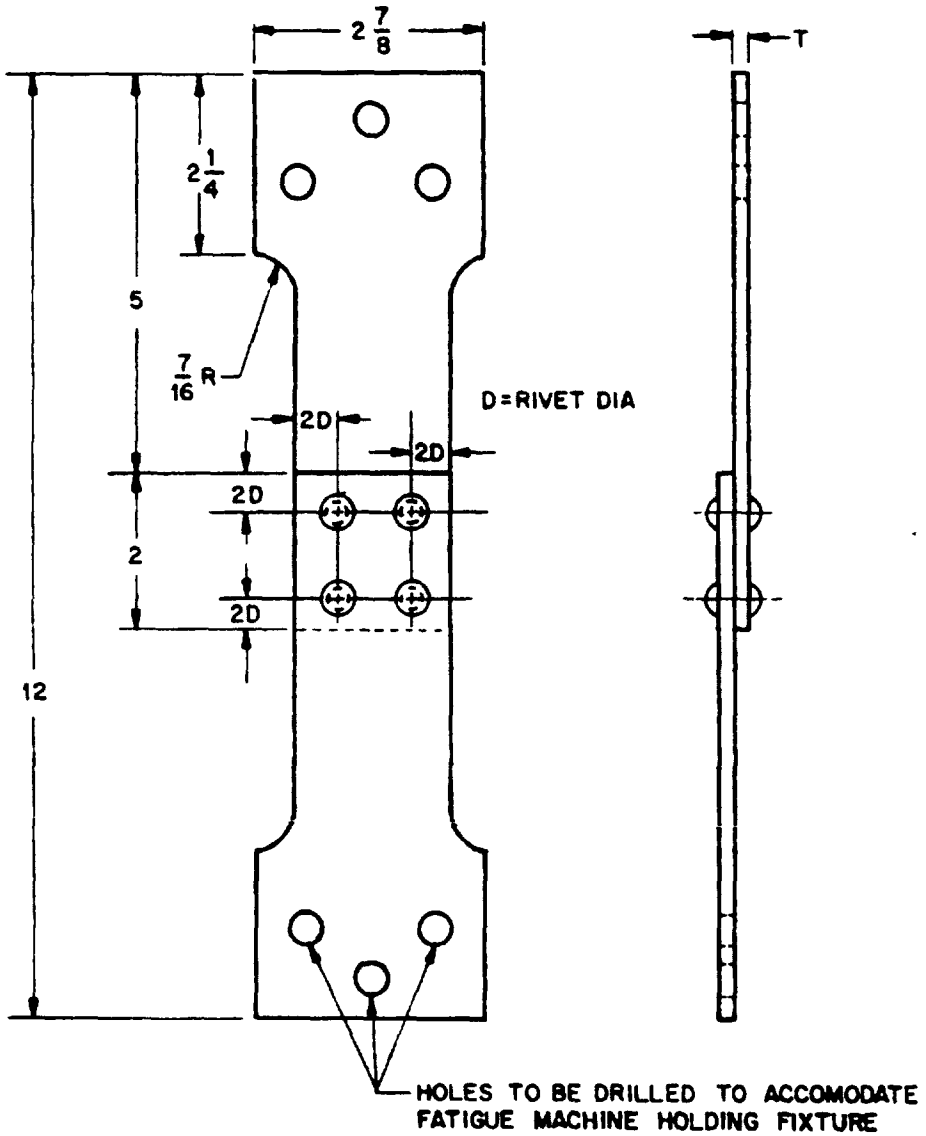
FIGURE 9. Vibration test set-up.



NOTE:

1/ Material: Alloy steel RHN C46 min.

FIGURE 10. Installation test fixture.



NOTES:
1. Material: Aluminum-alloy sheet in accordance with QQ-A-250/5 or corrosion resistant steel sheet in accordance with MIL-S-5059 (1/2 hard).
2. "T" shall be 1/2 of total grip and be in accordance with values listed in Table X for appropriate size rivet under test.
3. Dimensions in inches.

FIGURE 11. Fatigue test specimen - Type II.

Custodians:
Army - AR
Navy - AS
Air Force - 99

Review Activities:
Army - AV
Air Force - 82
DLA - IS

User Activities:
Navy - MC

Preparing Activity:
Navy-AS
(Project No. 5320-0433)

INSTRUCTIONS: In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge *(DO NOT STAPLE)*, and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

NOTE This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

(Fold along this line)

(Fold along this line)

DEPARTMENT OF THE NAVY

Commanding Officer
Naval Air Engineering Center
Systems Engineering and Standardization Department
(SESD), Code 53
Lakehurst, NJ 08733-5100

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE $300

NO POSTAGE NECESSARY IF MAILED IN THE UNITED STATES

BUSINESS REPLY MAIL
FIRST CLASS PERMIT NO 12503 WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commanding Officer
Naval Air Engineering Center
Systems Engineering and Standardization Department
(SESD), Code 53
Lakehurst, NJ 08733-5100

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-R-7885 Rev D	RIVETS, BLIND, STRUCTURAL, MECHANICALLY LOCKED SPINDLE AND FRICTION LOCKED SPINDLE, GENERAL SPECIFICATION FOR

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR ☐ USER ☐ MANUFACTURER ☐ OTHER *(Specify)* ____
b. ADDRESS *(Street, City, State, ZIP Code)*	

5 PROBLEM AREAS

a. Paragraph Number and Wording.

b. Recommended Wording

c. Reason/Rationale for Recommendation

6 REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE