

**Coupling, Fuel, Rigid, Threaded Type**

**RATIONALE**

Revised to specify lower bending stress for sizes -48 and above, relocated strain gages near the holding clamp, clarified o-ring criteria and revised repeated assembly requirements for sizes -06 thru -12.

**1. SCOPE**

This specification defines the requirements for a threaded rigid coupling assembly, which utilizes ferrule type machined tube end fittings, to join tubing and components in aircraft fuel, vent, and other systems. This coupling assembly is designed for use from -65 to 200 °F and at 125 psig operating pressure.

**1.1 Classification**

1.1.1 The coupling assemblies shall be of the following types:

- a. Type I: without wrenching lugs
- b. Type II: with wrenching lugs

**2. APPLICABLE DOCUMENTS**

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of 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.

**2.1 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](http://www.sae.org).

|         |  |
|---------|--|
| AS567   | Safety Cable, Safety Wire, Key Washers, and Cotter Pins for Propulsion Systems, General Practices for Use of |
| AS568   | Aerospace Size Standard for O-rings  |
| ARP1185 | Flexure Testing of Hydraulic Tubing Joints and Fittings  |
| AS1731  | Coupling, Rigid, Fixed Cavity, Threaded Ferrule Type Tube Ends, Envelope Dimensions Design Standard          |

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|                |  |
|----------------|--|
| AS1732         | Body, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type I  |
| AS1733         | Body, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type II |
| AS1734         | Nut, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type I   |
| AS1735         | Nut, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends, Type II  |
| AS1736         | Washer, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends        |
| AS1737         | Ferrule, Coupling, Rigid, Fixed Cavity, Threaded, Ferrule Type Tube Ends       |
| AS4060         | Tube Fitting Swaged Joint, Roller Expander Manual Process, Requirements for    |
| AS7003         | Nadcap Program Requirements  |
| ARP9013        | Statistical Product Acceptance Requirements                                    |
| AMS-WW-T-700/6 | Tube, Aluminum Alloy, Drawn, Seamless, 6061                                    |

## 2.2 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/>.

|               |   |
|---------------|---|
| PPP-B-566     | Boxes, Folding Paperboard   |
| PPP-B-585     | Boxes, Wood, Wirebound  |
| PPP-B-676     | Boxes, Set-Up   |
| VV-P-236      | Petrolatum, Technical   |
| MIL-HDBK-831  | PREPARATION OF TEST REPORTS   |
| MIL-L-10547   | Liners, Case and Sheet, Overwrap: Water-Vaporproof or Waterproof, Flexible                                  |
| MIL-PRF-680   | Performance Specification Degreasing Solvent  |
| MIL-PRF-7024  | Performance Specification Calibration Fluids, Aircraft Fuel System Components                               |
| MIL-R-25988/1 | Rubber, Fluorosilicone Elastomer, Oil and Fuel-Resistant, O-Rings, Class 1, Grade 70                        |
| MIL-STD-129   | Military Marking for Shipment and Storage   |
| MIL-STD-130   | Identification Marking of U.S. Military Property  |
| MIL-STD-810   | Environmental Engineering Considerations and Laboratory Tests   |
| MIL-STD-889   | Dissimilar Metals   |
| FED-STD-H28/2 | Screw Thread Standards for Federal Services Section 2: Unified Inch Screw Threads - UN and UNR Thread Forms |

A-A-669 Box, Shelf, Stationary Storage (Cancelled; no superseding document)

A-A-2807 Box, File (Cancelled; no superseding document)

### 2.3 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](http://www.astm.org).

ASTM B 117 Standard Practice for Operating Salt Spray (Fog) Apparatus

ASTM D 1974 Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes

ASTM D 5118/D 5118M Standard Practice for Fabrication of Fiberboard Shipping Boxes

ASTM D 5486/D 5486M Standard Specification for Pressure Sensitive Tape for Packaging, Box Closure, and Sealing

ASTM D 6210 Standard Specification for Fully-Formulated Propylene Glycol-Base Engine Coolant for Heavy-Duty Engines

ASTM D 6251/D 6251M Standard Specification for Wood Cleated Panelboard Shipping Boxes

### 2.4 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, [www.pri-network.org](http://www.pri-network.org).

AC7112 National Aerospace and Defense Contractors Accreditation Program Requirements for Fluid System Components

AC7112/3 NADCAP Audit Criteria for Couplings and Formed Sheet Metal Products

PD2001 Qualified Product Management Council Procedures for Qualified Products Group

PD2101 Aerospace Quality Assurance, Product Standard, Qualification Procedures, Fluid Systems

### 2.5 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, [www.ansi.org](http://www.ansi.org).

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

## 3. REQUIREMENTS

### 3.1 Qualification

Coupling assemblies supplied in accordance with this procurement specification shall be manufactured by the same processes used to manufacture the couplings which have been subjected to and which have successfully passed the qualification tests specified herein.

#### 3.1.1 Manufacturer Qualification

A manufacturer producing a product in conformance to this procurement specification shall be accredited in accordance with the requirements of PD2101, AS7003, AC7112 and AC7112/3, and shall be listed in a Performance Review Institute (PRI) Qualified Manufacturers List (QML).

### 3.1.2 Product Qualification

All products shall conform to the requirements of this procurement specification and shall be approved in accordance with the requirements of PD2001 and PD2101 for listing in a Performance Review Institute (PRI) Qualified Parts List (QPL).

A responsible agency for the QPL is the Performance Review Institute, 161 Thorn Hill Road, Warrendale PA 15086-7527, phone +1 724-772-1616, Fax +1 724-772-1699. The On-Line QPL is available at [www.eAuditNet.com](http://www.eAuditNet.com). Additional information regarding the QPL Program is located at [www.pri-network.com / Qualified Products / Qualified Products List](http://www.pri-network.com / Qualified Products / Qualified Products List).

### 3.2 Materials and Finishes

Materials and finishes for the components shall be those designated on standards and drawings. All materials and finishes shall be uniform in quality, free from defects, suitable for the purpose intended and consistent with good manufacturing practices.

#### 3.2.1 Dissimilar Materials

Materials shall possess adequate corrosion-resistance characteristics or shall be suitably protected by the use of finishes to resist corrosion which may result from such conditions as dissimilar metal combinations, moisture, salt spray, and high-temperature deterioration. Dissimilar materials are defined by MIL-STD-889.

### 3.3 Design and Construction

The coupling assembly shall be a lightweight rigid connection for fuel, vent, and other system lines using the basic principles of O-ring sealing. It shall be designed for use at 125 psig operating pressure and at temperatures ranging from -65 to 200 °F. Types shall be in accordance with 1.1.1.

#### 3.3.1 Coupling Components

The coupling assembly shall consist of the following components as shown in Table 1.

TABLE 1 - COUPLING ASSEMBLY

| Type I - Without<br>Wrenching Lugs | Type II - With<br>Wrenching Lugs |
|------------------------------------|----------------------------------|
| One Body - AS1732 /1/              | One Body - AS1733 /1/            |
| One Ferrule - AS1737 /1/           | One Ferrule - AS1737 /1/         |
| One Nut - AS1734                   | One Nut - AS1735                 |
| One Washer - AS1736                | One Washer - AS1736              |
| One O-ring Seal /2/                | One O-ring Seal /2/              |

/1/ Components attached to tubing by roller swaging.

/2/ Not part of assembly. Supplied by user.

### 3.3.2 Threads

Threads shall be in accordance with Federal Standard FED-STD-H28/2.

### 3.3.3 Seals

MIL-R-25988/1 O-ring seals with sizes in accordance with AS568 shall be used for all test specimens. O-rings are not considered a part of this specification except for coupling qualification test requirements. O-ring sizes for the couplings are given in Table 2. O-ring failures during qualification testing do not constitute a failure unless the o-ring is damaged by a test part. Any o-ring replacements during testing shall be documented in the test report and failed or damaged o-rings shall be retained as part of the qualification documentation.

TABLE 2 - PHYSICAL REQUIREMENTS

| Coupling Size (Ref) | Tube Size (Ref) inches | Negative Operating Pressure In Hg | Positive Operating Pressure psig | Negative Proof Pressure in Hg | Positive Proof Pressure psig | Minimum Burst Pressure psig | AS568 O-ring Dash No. (Ref) |
|---------------------|------------------------|-----------------------------------|----------------------------------|-------------------------------|------------------------------|-----------------------------|-----------------------------|
| 04                  | .250                   | 24                                | 125                              | 28                            | 250                          | 375                         | -012                        |
| 05                  | .312                   | 24                                | 125                              | 28                            | 250                          | 375                         | -013                        |
| 06                  | .375                   | 24                                | 125                              | 28                            | 250                          | 375                         | -014                        |
| 08                  | .500                   | 24                                | 125                              | 28                            | 250                          | 375                         | -016                        |
| 10                  | .625                   | 24                                | 125                              | 28                            | 250                          | 375                         | -018                        |
| 12                  | .750                   | 24                                | 125                              | 28                            | 250                          | 375                         | -020                        |
| 16                  | 1.000                  | 24                                | 125                              | 28                            | 250                          | 375                         | -024                        |
| 20                  | 1.250                  | 24                                | 125                              | 28                            | 250                          | 375                         | -028                        |
| 24                  | 1.500                  | 24                                | 125                              | 28                            | 250                          | 375                         | -030                        |
| 28                  | 1.750                  | 24                                | 125                              | 28                            | 250                          | 375                         | -032                        |
| 32                  | 2.000                  | 24                                | 125                              | 28                            | 250                          | 375                         | -034                        |
| 36                  | 2.250                  | 10                                | 125                              | 12                            | 250                          | 375                         | -036                        |
| 40                  | 2.500                  | 10                                | 125                              | 12                            | 250                          | 375                         | -038                        |
| 44                  | 2.750                  | 10                                | 125                              | 12                            | 250                          | 375                         | -040                        |
| 48                  | 3.000                  | 10                                | 125                              | 12                            | 250                          | 375                         | -042                        |
| 56                  | 3.500                  | 10                                | 125                              | 12                            | 250                          | 375                         | -044                        |
| 64                  | 4.000                  | 10                                | 125                              | 12                            | 250                          | 375                         | -046                        |
| 72                  | 4.500                  | 10                                | 125                              | 12                            | 250                          | 375                         | -048                        |
| 80                  | 5.000                  | 10                                | 125                              | 12                            | 250                          | 375                         | -050                        |

### 3.4 Dimensions

The coupling assembly envelope dimensions shall be as specified in AS1731. Part dimensions shall be specified in applicable part standards.

#### 3.4.1 Coupling Weight

The coupling assembly and components nominal weights are listed on the applicable standard or drawing.

### 3.5 Performance

The coupling assembly shall meet the following performance requirements.

### 3.5.1 Proof Pressure

The coupling assembly shall meet the negative and positive proof pressures listed in Table 2. A decrease in negative pressure exceeding .5 inches Hg within 5 minutes, any visible leakage when pressurized for a minimum of 5 minutes or evidence of any malfunction or yielding shall be cause for rejection. Testing is specified in 4.6.2.

### 3.5.2 Repeated Assembly

The coupling assemblies shall show no evidence of permanent deformation, damage, or material degradation and shall withstand, without evidence of leaking (sufficient to form a drop), the proof pressure requirements of 3.5.1 after 100 repeated assembly operations. Testing is specified in 4.6.3.

### 3.5.3 Salt Fog

The coupling assembly shall show no evidence of excessive corrosion, peeling, chipping, or blistering of the finish or exposure of base metal and shall meet the electrical resistance requirement of 3.5.6 and the proof pressure requirements of 3.5.1 after being exposed to salt fog for 168 hours. Test method is specified in 4.6.4.

### 3.5.4 Rotary Flexure

The coupling assembly shall meet the electrical resistance requirement of 3.5.6 and proof pressure requirements of 3.5.1 after being subjected to 1 000 000 planar or rotary flexure cycles. Half of the flexure cycles shall be conducted at room temperature. The remaining flexure cycles shall be equally divided between flexure testing at 200 °F and -65 °F. Specimen lengths and deflections shall be in accordance with Tables 3 and 4. Testing is specified in 4.6.5.

### 3.5.5 Burst

The coupling assembly shall not rupture nor show evidence of leakage (sufficient to form a drop) at any pressure up to the Table 2 burst pressures. Testing is specified in 4.6.6.

### 3.5.6 Electrical Bonding

The electrical resistance of the coupling when measured from tube-to-tube shall not exceed 1.0  $\Omega$  at any time. Testing is specified in 4.6.7.

## 3.6 Identification of Product

Coupling assemblies and parts shall be marked for identification in accordance with the applicable standard or drawing and with applicable parts of MIL-STD-130.

## 3.7 Cleaning

The coupling assemblies as supplied shall be free of oil, grease, dirt or any other foreign material both internally and externally.

## 4. QUALITY ASSURANCE PROVISIONS

### 4.1 Responsibility for Inspection

Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection and test requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to PRI for the performance of the inspection and test requirements. PRI reserves the right to witness any of the inspections and tests set forth in the specification, where such inspections and tests are deemed necessary to ensure supplies and services conform to prescribed requirements.

## 4.2 Classification of Inspections

The examining and testing of assemblies shall be classified as:

- a. Qualification inspections (see 4.3)
- b. Quality conformance inspections (see 4.4)

## 4.3 Qualification Inspections

### 4.3.1 Qualification Test Specimens

Test specimens shall be in accordance with Figures 1 or 2 and Table 3. The number of specimens are specified in 4.3.2. Tubing for fabrication of the test specimens shall be 6061-T4 in accordance with AMS-WW-T-700/6 with wall thickness as shown in Table 4. Attachment of ferrule and body to tubing shall be in accordance with AS4060.

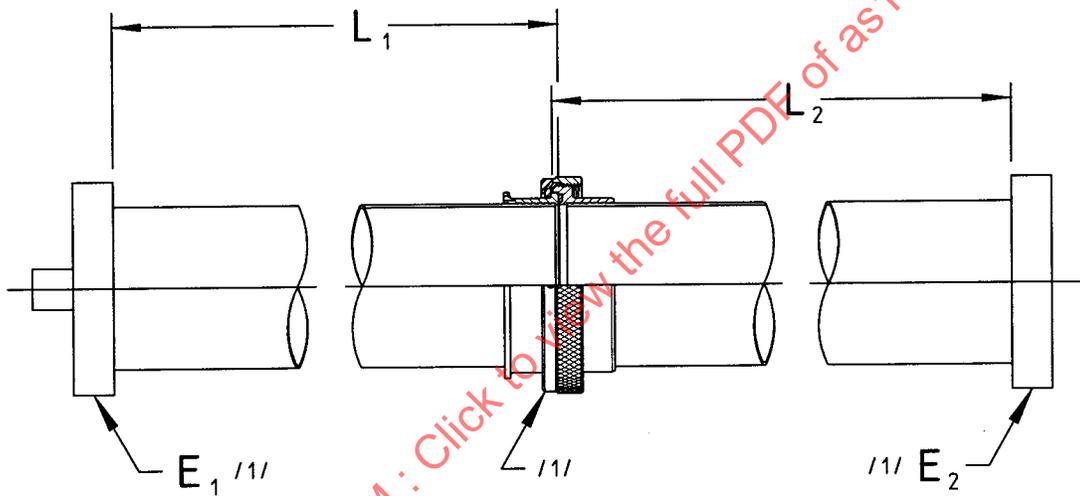


FIGURE 1 - TEST SPECIMEN CONFIGURATION

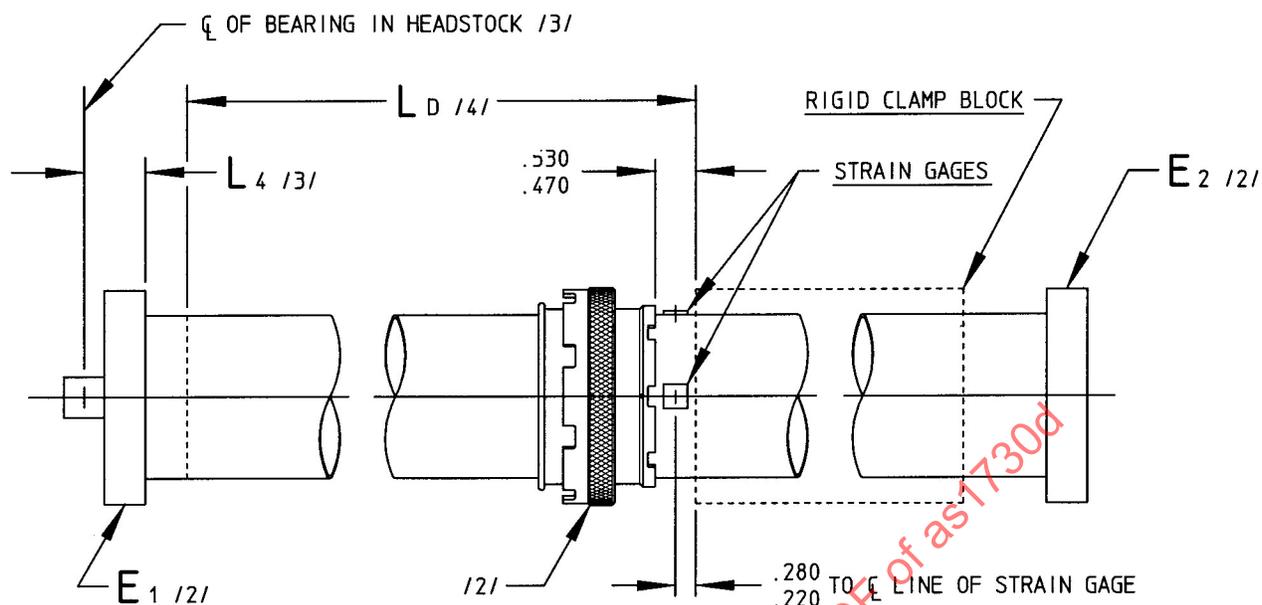


FIGURE 2 - FLEXURE TEST SPECIMEN CONFIGURATION

TABLE 3 - TEST SPECIMEN LENGTHS AND END FITTING CONFIGURATIONS

| Coupling Size | Specimens             |                       |                         |                       |                           |
|---------------|-----------------------|-----------------------|-------------------------|-----------------------|---------------------------|
|               | 1, 2, 5, & 6 /1/      |                       | 3 & 4 /2/               |                       |                           |
|               | L1<br>inches $\pm .2$ | L2<br>inches $\pm .2$ | L1<br>inches $\pm .060$ | L2<br>inches $\pm .2$ | L4 /3/<br>inches $\pm .2$ |
| 04            | 6                     | 6                     |                         |                       |                           |
| 05            | 6                     | 6                     |                         |                       |                           |
| 06            | 6                     | 6                     | 8.0                     | 9                     | 2.3                       |
| 08            | 6                     | 6                     |                         |                       |                           |
| 10            | 6                     | 6                     |                         |                       |                           |
| 12            | 6                     | 6                     | 10.1                    | 9                     | 2.3                       |
| 16            | 6                     | 6                     | 13.2                    | 9                     | 2.3                       |
| 20            | 9                     | 9                     |                         |                       |                           |
| 24            | 9                     | 9                     |                         |                       |                           |
| 28            | 9                     | 9                     |                         |                       |                           |
| 32            | 9                     | 9                     | 16.8                    | 9                     | 2.4                       |
| 36            | 9                     | 9                     |                         |                       |                           |
| 40            | 9                     | 9                     |                         |                       |                           |
| 44            | 9                     | 9                     |                         |                       |                           |
| 48            | 9                     | 9                     | 19.5                    | 9                     | 2.3                       |
| 56            | 12                    | 12                    |                         |                       |                           |
| 64            | 12                    | 12                    | 23.7                    | 9                     | 2.3                       |
| 72            | 12                    | 12                    |                         |                       |                           |
| 80            | 12                    | 12                    | 27.8                    | 9                     | 2.5                       |

- /1/ Specimens 1, 2, 5 and 6 shall use Type I components. E1 and E2 specimen ends shall be compatible with the test requirements and shall otherwise be at the discretion of the supplier.
- /2/ Specimens 3 and 4 shall use Type II components. The E1, and E2 specimen ends shall be compatible with the test requirements and shall otherwise be at the discretion of the supplier.
- /3/ The L4 length of E1 includes the length of an AS1733 type II body and a 1.7 inch adapter that connects the AS1733 end to the Figure 3 headstock. The E1 specimen end shall be compatible with the test requirements and shall otherwise be at the discretion of the supplier.
- /4/ Dimension  $L_D$  is defined on Table 4.

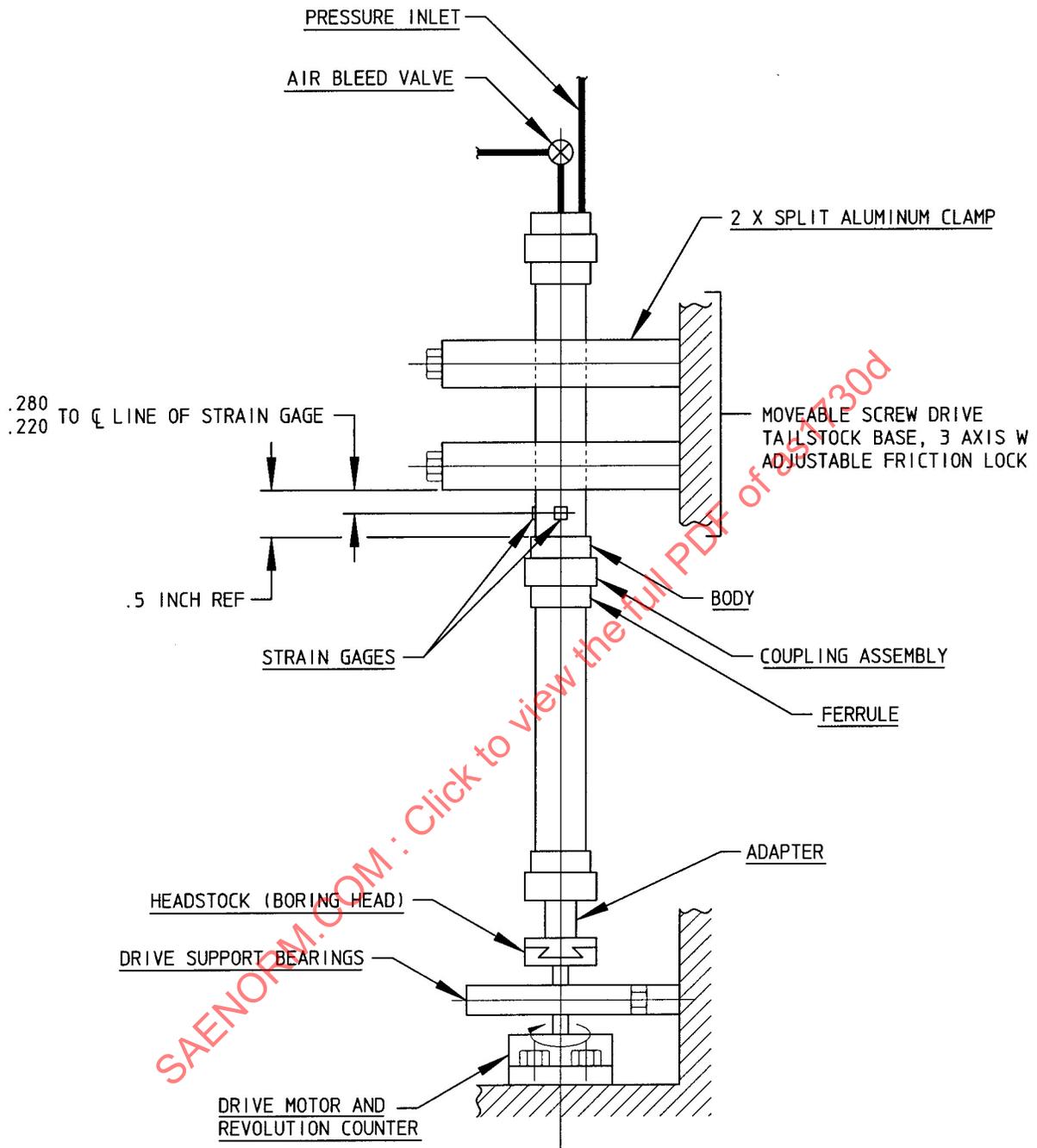


FIGURE 3 - TYPICAL ROTARY FLEXURE TEST SCHEMATIC

TABLE 4 - ASSEMBLY TORQUE AND FLEXURE TEST REQUIREMENTS

| Coupling Size | Tube Diameter | Tube Wall Thickness | Type II Coupling Tightening Torque | L <sub>D</sub> - Distance from the Clamp to the Deflection Measurement | Bending Stress in Tube at Clamp | Combined Stress in Tube at Strain Gage | Bending Strain at Strain Gage Min |
|---------------|---------------|---------------------|------------------------------------|--|---------------------------------|--|-----------------------------------|
| (Ref)         | inches        | /1/ inches          | inch-lb                            | inches REF /2/   | psi MIN                         | psi                                    | μ in/in /4/                       |
| 04            | .250          | .028                | 20- 30                             | -  | -                               | -                                      | -                                 |
| 05            | .312          | .028                | 25- 35                             | -  | -                               | -                                      | -                                 |
| 06            | .375          | .028                | 30- 40                             | 8.0  | 3200                            | 3527                                   | 323.2                             |
| 08            | .500          | .028                | 40- 50                             | -  | -                               | -                                      | -                                 |
| 10            | .625          | .028                | 50- 65                             | -  | -                               | -                                      | -                                 |
| 12            | .750          | .028                | 60- 84                             | 10.0   | 3200                            | 3945                                   | 323.2                             |
| 16            | 1.000         | .035                | 84-120                             | 13.0   | 3200                            | 4000                                   | 323.2                             |
| 20            | 1.250         | .035                | 120-156                            | -  | -                               | -                                      | -                                 |
| 24            | 1.500         | .049                | 180-216                            | -  | -                               | -                                      | -                                 |
| 28            | 1.750         | .049                | 204-240                            | -  | -                               | -                                      | -                                 |
| 32            | 2.000         | .049                | 240-276                            | 16.0   | 3200                            | 4383                                   | 323.2                             |
| 36            | 2.250         | .058 /3/            | 264-300                            | -  | -                               | -                                      | -                                 |
| 40            | 2.500         | .058 /3/            | 288-324                            | -  | -                               | -                                      | -                                 |
| 44            | 2.750         | .058 /3/            | 312-360                            | -  | -                               | -                                      | -                                 |
| 48            | 3.000         | .058 /3/            | 360-396                            | 19.0   | 1495/3/                         | 2844                                   | 151.0                             |
| 56            | 3.500         | .058 /3/            | 432-468                            | -  | -                               | -                                      | -                                 |
| 64            | 4.000         | .065                | 504-540                            | 23.0   | TBD                             | TBD                                    | TBD                               |
| 72            | 4.500         | .065                | 576-612                            | -  | -                               | -                                      | -                                 |
| 80            | 5.000         | .065                | 648-684                            | 27.0   | TBD                             | TBD                                    | TBD                               |

/1/ Aluminum drawn tubing 6061-T4 in accordance with AMS-WW-T-700/6.

/2/ The double deflection measurement at L<sub>D</sub> length upon test setup shall be measured with a dial indicator and recorded. This measurement shall be used as a point of reference throughout the flexure testing to verify the test specimen / setup stability upon completion of the test. The L<sub>D</sub> dimension should be marked using permanent ink or scribed on the tube so that all measurements can be made at the same location.

/3/ Substitution of tubing with .065 wall thickness is acceptable if .058 wall thickness tubing is unavailable. The bending stress shown for size -48 is for .065 wall thickness.

/4/ The setup bending strain is derived using a modulus of elasticity (E) of 9.9 E+06 psi for 6061-T4 Aluminum Alloy tubing at room temperature (REF.: MIL-HDBK-5), with a +10% / 0% tolerance based on the required bending stress at the strain gages.

### 4.3.2 Test Schedule and Sequence

#### 4.3.2.1 Sizes 06, 12, 16, 32, 48, 64, and 80

Four test specimens for each of the coupling sizes 06, 12, 16, 32, 48, 64, and 80 shall be subjected to test sequences as shown in Table 5A. Test specimens 1 and 2 shall be Type I coupling assemblies and specimens 3 and 4 shall be Type II coupling assemblies. MIL-R-25988/1 O-rings shall be used on all test specimens.

TABLE 5A - TEST SCHEDULE AND SEQUENCE

| Order of Tests |                 | TEST SPECIMEN NUMBER |       |       |       |
|----------------|-----------------|----------------------|-------|-------|-------|
|                |                 | 1                    | 2     | 3     | 4     |
| 1              |                 | 4.6.1                | 4.6.1 | 4.6.1 | 4.6.1 |
| 2              |                 | 4.6.7                | 4.6.7 | 4.6.7 | 4.6.7 |
| 3              |                 | 4.6.2                | 4.6.2 | 4.6.2 | 4.6.2 |
| 4              | Test Paragraphs | 4.6.3                | 4.6.3 | 4.6.5 | 4.6.5 |
| 5              |                 | 4.6.4                | 4.6.4 | 4.6.2 | 4.6.2 |
| 6              |                 | 4.6.2                | 4.6.2 | 4.6.7 | 4.6.7 |
| 7              |                 | 4.6.7                | 4.6.7 | 4.6.6 | 4.6.6 |
| 8              |                 | 4.6.6                | 4.6.6 | 4.6.6 | 4.6.6 |

#### 4.3.2.2 Sizes 04, 05, 08, 10, 20, 24, 28, 36, 40, 44, 56, and 72

Two test specimens for each of the coupling sizes 04, 05, 08, 10, 20, 24, 28, 36, 40, 44, 56, and 72 shall be subjected to test sequences as shown in Table 5B. Type I coupling assemblies shall be used. MIL-R-25988/1 O-rings shall be used on all test specimens.

TABLE 5B - TEST SCHEDULE AND SEQUENCE

| Order of Tests |                 | TEST SPECIMEN NUMBER |       |
|----------------|-----------------|----------------------|-------|
|                |                 | 5                    | 6     |
| 1              |                 | 4.6.1                | 4.6.1 |
| 2              | Test Paragraphs | 4.6.7                | 4.6.7 |
| 3              |                 | 4.6.3                | 4.6.3 |
| 4              |                 | 4.6.2                | 4.6.2 |
| 5              |                 | 4.6.6                | 4.6.6 |
| 5              |                 | 4.6.6                | 4.6.6 |

### 4.3.3 Test Report, Test Samples and Data in Support of PRI QPL Listing

The following data shall be furnished to PRI by the supplier:

- a. Test Report: One digital copy or three written copies of a test report in accordance with MIL-HDBK-831, which shall include a report of all tests and an outline description of the tests and conditions. As a minimum, the below information shall be included in the report:
  1. The place of testing.
  2. The date of testing.
  3. The identification of the test technician or engineer responsible for the observing and recording of the measured or observed data.

4. An identification serial number of each test sample with the description of the test samples traceable to design drawings, and revisions, the material and processing records and the production inspection records for the samples.
  5. The identification of the test or measuring equipment and the next date of calibration of instruments or measuring equipment used for determination of quantitative data.
  6. The ambient temperature of the testing location.
  7. The temperature of the test sample or the immediate area around the test sample during testing if other than ambient temperature.
  8. The type of fluid used in testing if applicable.
  9. Actual measured quantitative data shall be recorded. Any revisions or deletions shall be done by crossing out the original data, not erasing it, so that it is still legible. Revisions or deletions should be signed and dated by the person making the changes. Calculated data shall be presented with the formula used for calculation and with the identification of all terms.
  10. Photographs of test equipment and examples of tested samples shall be included if applicable.
  11. The identification of the agency responsible for the test report with the name or title and address of a point of contact person or persons who can provide technical information or answer questions concerning the testing and the report.
- b. Test Samples: Samples subjected to qualification testing shall not be shipped as part of a contract or order and shall be retained for at least 3 years after the manufacturer is listed in PRI QPL.
- c. Drawings: One set of assembly and subassembly drawings shall be provided with each test report. The assembly drawings shall have a cutaway section showing all details in their normal assembly position and shall carry part numbers of all details and subassemblies.

#### 4.3.4 Qualification Inspection Methods

Qualification inspection methods shall consist of all the examinations and tests specified under 4.6.

#### 4.4 Quality Conformance Inspections

Quality conformance inspections shall be in accordance with ARP9013 and applicable slash sheet(s) with an acceptance number zero.

NOTE: ARP9013 allows for the use of a variety of statistical methods for product acceptance, including ANSI/ASQ Z1.4, Squeglia C=0 tables, continuous sampling for lot size = 1 applications, and SPC, each with appropriate controls as documented in the various ARP9013 slash-numbered documents.

#### 4.4.1 Impact Classes

Impact classification and the required Initial Reliability Requirement (IRR) are defined in Table 6.

TABLE 6 - IMPACT CLASSIFICATION AND REQUIRED IRR

| Class   | Minimum IRR | Impact   |
|---------|-------------|--|
| Major   | 98%         | Likely to result in failure or to reduce materially the usability of the part for its intended purpose |
| Minor A | 95%         | May have a slight affect on usability  |
| Minor B | 92%         | Essentially no affect on usability   |

## 4.4.2 Sample Sizes for Isolated Lots

Sample sizes for isolated lots shall be in accordance with Tables 7A, 7B or 7C as required by the aspect classifications of Table 8.

TABLE 7A - 98% IRR SAMPLE SIZES

|                   |     |
|-------------------|-----|
| Lot Size up to 25 | All |
| 26 - 52           | 25  |
| 53 - 57           | 26  |
| 58 - 63           | 27  |
| 64 - 74           | 28  |
| 75 - 104          | 29  |
| 105 - 126         | 30  |
| 127 - 181         | 31  |
| 182 - 303         | 32  |
| 304 - 693         | 33  |
| 694 or Larger     | 34  |

TABLE 7B - 95% IRR SAMPLE SIZES

|                   |     |
|-------------------|-----|
| Lot Size up to 10 | All |
| 11 - 22           | 10  |
| 23 - 33           | 11  |
| 34 - 80           | 12  |
| 81 - 4371         | 13  |
| 4372 or Larger    | 14  |

TABLE 7C - 92% IRR SAMPLE SIZES

|                  |     |
|------------------|-----|
| Lot Size up to 6 | All |
| 7 - 12           | 6   |
| 13 - 32          | 7   |
| 33 or Larger     | 8   |

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## 4.4.3 Classification of Aspects

Classification of dimensional aspects shall be in accordance with Table 8.

TABLE 8 - CLASSIFICATION OF ASPECTS

| Part                           | Class              | Aspects /1/                             |
|--------------------------------|--------------------|---|
|                                | Major<br>98% IRR   | B Dia, H Dim,<br>K Dim, S Dim, T Thread |
| Body<br>AS1732, AS1733         | Minor A<br>95% IRR | D Dia, M Dim,<br>W Depth, X Dim         |
|                                | Minor B<br>92% IRR | Remainder                               |
|                                | Major<br>98% IRR   | D Dia, T Thread                         |
| Nut Assembly<br>AS1734, AS1735 | Minor A<br>95% IRR | C Dia                                   |
|                                | Minor B<br>92% IRR | Remainder                               |
|                                | Major<br>98% IRR   | C Dim                                   |
| Washer<br>AS1736               | Minor A<br>95% IRR | A Dia                                   |
|                                | Minor B<br>92% IRR | B Thickness                             |
|                                | Major<br>98% IRR   | A Dia, K Depth                          |
| Ferrule<br>AS1737              | Minor A<br>95% IRR | E Dia                                   |
|                                | Minor B<br>92% IRR | Remainder                               |

/1/ See applicable standard page for dimensions.

## 4.4.4 Rejection and Retest

Where one or more items selected from a lot fails to meet the specification, all items in the lot shall be inspected.

## 4.4.4.1 Resubmitted Lots

Once a lot (or part of a lot) has been rejected, before it can be resubmitted for tests, full particulars concerning the cause of the rejection and the action taken to correct the defect(s) in the lot shall be submitted, in writing, to PRI.