



AEROSPACE STANDARD

AS5830™**REV. A**Issued 2006-09
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Superseding AS5830

Coupling Assembly, Threadless, Flexible, Fixed Cavity,
Current Carrying, Self-Bonding, Procurement Specification

RATIONALE

This specification provides a conductive, self-bonding, flexible assembled coupling capable of meeting the electrostatic bonding and current carrying requirements of low pressure fluid systems.

1. SCOPE

This aerospace specification defines the requirements for a threadless, flexible, conductive, self-bonding coupling assembly which, when installed on fixed cavity ferrules, provides a flexible, current carrying connection for joining tubing and components in aircraft fuel, vent and other systems. The assembled coupling is designed to provide interchangeability of parts and components between qualified manufacturers for the service life of the aircraft system. The assembled coupling is for use from -65 to +200 °F at nominal operating pressures (125 psig for -08 through -64 and 30 psig for -72 through -88).

This aerospace specification is a departure from prior qualification practices for assembled couplings. Prior practice sought to validate this type of assembled coupling design by conducting a sequence of tests on sets of coupling assemblies. There were multiple test sequences and each was conducted on a different set of coupling assemblies. Each of these test sequences challenged a particular design feature of the coupling assembly. No single coupling assembly was expected to survive all of the required tests.

FAR 23.954, FAR 25.954 and FAR 25.981 certification requirements have identified the need for high-current capable flexible fluid couplings. The coupling assembly does not require inspection and maintenance to remain current capable for the life of the aircraft.

It is important to simulate the in-service wear and damage experienced by the assembled coupling if it is to remain capable of carrying current for the life of the aircraft. The test procedures in this specification simulate a worst case wear and damage condition for the assembled couplings.

Interchangeability of vendor parts must be qualified by design, test and/or analysis.

CAUTION: Although the AS5830 coupling and sleeve will fit on AS1650 ferrules due to the use of common O-rings, the combinations of these parts are not qualified. Using AS5830 parts on AS1650 ferrules may result in leakage and/or premature failure of the joint and does not produce a high current capable joint.

WARNING: The use of AS1650 parts with AS5830 ferrules is not qualified. Assembly of worn AS1650 parts with AS5830 ferrules may be possible but could result in leakage and/or premature failure of the joint and does not produce a high current capable joint.

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1.1 Product Classification

The assembled coupling shall be of the integral electrical bonded type and all components shall be interchangeable with components from other qualified part manufacturers. The assembled coupling shall be capable of handling electrical currents for waveforms of ARP5412 as described in 4.6.5.

1.2 Assembled Coupling Types

The assembled coupling shall be rated for the current carrying capability based on material construction and for up to 30 years of service life.

2. REFERENCES

2.1 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.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS-R-25988	Rubber, Fluorosilicone Elastomer, Oil-and-Fuel-Resistant, Sheets, Strips, Molded Parts, and Extruded Shapes
AMS-WW-T-700	Tube, Aluminum and Aluminum Alloy, Drawn, Seamless, General Specification for
AS478	Identification Marking Methods
AS568	Aerospace Size Standard for O-rings
AS4060	Tube Fitting Swaged Joint, Roller Expander, Manual Process, Requirements for
ARP5412	Aircraft Lightning Environment and Related Test Waveforms
ARP5416	Aircraft Lightning Test Methods
AS5831	Assembled Coupling, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Envelope Dimensions
AS5832	Assembled Coupling Components, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5833	Male Ferrule, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Swaged
AS5834	Sleeve, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5835	Coupling Body, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5836	Fitting End, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Male and Female Design Standard
AS5837	Male Ferrule, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Buttwelded

AS5838	Female Ferrule, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Swaged
AS5839	Female Ferrule, Threadless-Flexible, Fixed Cavity, Current Carrying, Self Bonding, Butt Welded
AS5840	Elbow, Threadless - Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5841	Tee, Threadless - Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5842	Union, Bulkhead, Threadless - Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS5843	Elbow, Bulkhead, Threadless - Flexible, Fixed Cavity, Current Carrying, Self Bonding
AS7003	Nadcap Program Requirements
AS7112	National Aerospace and Defense Contractors Accreditation Program Requirements for Fluid System Components
AS7112/2	National Aerospace and Defense Contractors Accreditation Program Requirements for Fittings and Other Machined Components
AS9103	Aerospace Series - Quality Management Systems - Variation Management of Key Characteristics

2.1.2 U.S. Government Publications

Copies of these documents are available online at www.faa.gov.

14 CFR	Code of Federal Regulations, Aeronautics and Aerospace
AC25.981-1B	Advisory Circular, Fuel Tank Ignition Source Preventive Guidelines

Copies of these documents are available online at <http://quicksearch.dla.mil>.

MIL-HDBK-831	Test Reports, Preparation of
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

2.1.3 Uniform Classification Committee Publications

Available from Uniform Classification Committee, 202 Chicago Union Station, Chicago, IL 60606.

Uniform Freight Classification Rules

2.1.4 PRI Publications

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

PD2001	Tasks & Procedures of the Qualified Product Management Council
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2.1.5 ASTM Publications

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

ASTM D1193 Standard Specification for Reagent Water

ASTM D6210 Standard Specification for Fully-Formulated Propylene Glycol-Base Engine Coolant for Heavy-Duty Engines

2.1.6 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME-Y14.5M-1994 Dimensioning and Tolerancing

2.1.7 ANSI Publications

Copies of these documents are available online at <http://webstore.ansi.org/>

ANSI/NCSL Z540-1 Calibration Laboratories and Measuring and Test Equipment

2.2 Definitions

ASSEMBLED COUPLING: The completed coupled connection, utilizing the assembled coupling components and O-rings to connect two ferrules attached to two tubes.

COMPLETE TEST ASSEMBLY: Shall be utilized for all assembled coupling testing. The complete test assembly shall contain three tube assemblies, two test specimens, and two end plugs. The end plugs shall be removed from the test assembly for lightning testing.

ASSEMBLED COUPLING COMPONENTS (hereafter referred to as the clamshell body and sleeve): The connecting device which constrains the ferrules and provides a pressure seal and electrical continuity path across the ferrules. The assembled coupling components consist of a clamshell body and a sleeve.

COUPLING COMPONENTS: The coupling components are the clamshell body, sleeve, and ferrules.

MANUFACTURER: A PRI approved manufacturer of coupling component(s).

PRI: The Performance Review Institute - the organization that reviews qualification test reports and audits manufacturers for their ability to manufacture certain classes of parts.

QPL: Qualified Product List - a list of part standards and manufacturers who are approved by PRI to manufacture them.

SPECIMEN: The qualification test specimens shall be an Assembled Coupling (AS5831) that contains two swaged male ferrules (AS5833) and an Assembled Coupling Components (AS5832 which is comprised of one sleeve and one clamshell coupling body).

VISUAL/TACTILE LATCH INDICATOR (VTLI): A non-metallic device on the clamshell body that demonstrates the coupling is properly installed and latched, verifiable by sight and touch.

WELDING: The fusion between components of the assembled coupling that is visible to the unaided eye in the form of arc soot or metal deposition.

3. TECHNICAL REQUIREMENTS

3.1 Qualification

Assemblies furnished under this specification shall be products qualified by meeting all of the requirements contained within this document. Manufacturers choosing to produce only a part or parts of the assembled coupling shall qualify the part or parts by complying with the requirements and performing all tests of this specification.

Clamshell bodies, sleeves and ferrules shall meet all the requirements of this document when assembled with AS5830 coupling components from other qualified manufacturers. Intermixing of approved manufacturer's components shall not create an unqualified fluid connection nor compromise fluid system integrity.

3.1.1 Manufacturer Qualification

A manufacturer producing a product in conformance with this procurement specification shall be accredited in accordance with the requirements of PD2101, AS7003, AS7112, and AS7112/2. The accredited manufacturer shall be listed in a Performance Review Institute (PRI) Qualified Manufacturer List (QML).

3.1.2 Product Qualification

There is no Performance Review Institute (PRI) QPL for this standard. Users of this standard are advised to control source approval(s) by standard part supplement sheet or similar means.

3.2 Materials and Finishes

Materials and finishes for the components shall be those designated on the applicable AS standard drawing, and shall be uniform in quality, free from defects, suitable for service, consistent with good manufacturing practice and in conformance with the applicable specifications and requirements stated herein.

The use of cadmium, zinc, or zinc alloy plating is not allowed on parts and assemblies defined by this specification.

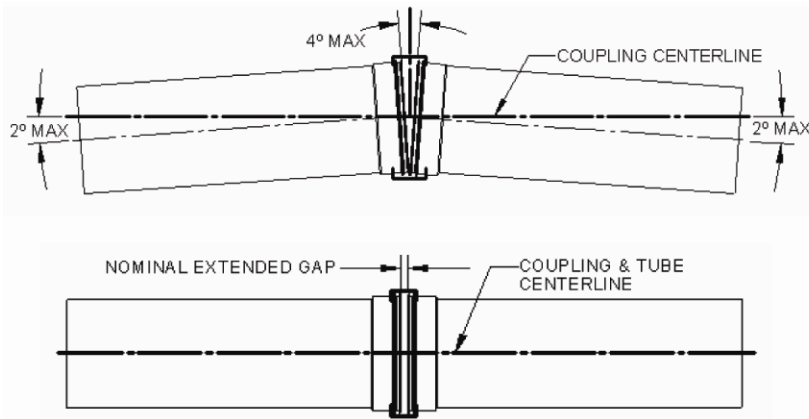
3.2.1 Dissimilar Materials

Materials shall possess adequate corrosion resistance characteristics or shall be suitably protected by the use of finishes or barriers to resist corrosion caused by such conditions as dissimilar metal combinations. Dissimilar materials are defined by MIL-STD-889.

3.3 Design and Fabrication

The assembly shall be a lightweight flexible connection for fuel, vent, drain and other fluid systems using the basic principles of O-ring sealing at temperatures from -65 to +200 °F when used with aluminum alloy components. The assembly shall be designed to function in fluid systems with up to 4 degrees of angular misalignment between the tube centerlines, or nominal extended gap per Table 1 between the ferrules with 0 degree angular misalignment as shown in Figure 1.

If the assembly uses a female ferrule, per AS5838 or AS5839, the allowable angular misalignment between tube centerlines is 2 degrees. The axial gap shall be as defined in Table 1.



4 degrees Maximum installed angular misalignment with a maximum 2 degrees installed angular misalignment for each joining tube assembly

See Table 1 for nominal extended gap between the ferrules with 0.0 centerline offset and 0 degree angular misalignment between tube assemblies.

Figure 1 - Assembled coupling installation limits

For -08 through -64

Assembled couplings shall be capable of a 125 psig nominal operating pressure with associated system pressure variations.

For -72 through -88

Assembled couplings shall be capable of a 30 psig nominal operating pressure with associated system pressure variations for use in vents and drain systems.

Table 1 - Physical requirements

Dash Size Ref.	Tube Size Inches Ref.	Nominal Negative Operating Pressure in-Hg	Nominal Positive Operating Pressure (+) psig	AS568 O-ring Dash Size Ref.	Nominal Extended Gap /1/
-08	0.500	24	125	-015	0.28
-10	0.625	24	125	-017	0.28
-12	0.750	24	125	-117	0.28
-16	1.000	24	125	-215	0.28
-20	1.250	24	125	-218	0.28
-24	1.500	24	125	-222	0.28
-28	1.750	24	125	-224	0.28
-32	2.000	24	125	-226	0.28
-36	2.250	10	125	-228	0.28
-40	2.500	10	125	-230	0.28
-48	3.000	10	125	-234	0.28
-56	3.500	10	125	-238	0.31
-64	4.000	10	125	-242	0.34
-72	4.500	10	30	-246	0.37
-80	5.000	10	30	-250	0.40
-88	5.500	10	30	-254	0.43

/1/ See part detail definitions for actual gap limits and tolerances.

The assembled coupling shall be designed to withstand shear loading conditions that may result from system operational pressures.

3.3.1 Assembled Coupling

The components of the assembled coupling, listed in Table 2, shall consist of ferrules, a sleeve, O-ring seals and a clamshell body as specified in the following standards (Reference AS5831):

Table 2 - Coupling components

Description	AS Standard Number
Fitting End Design	AS5836(config)(size)
Ferrule	AS5833(material)(size) AS5837(material)(size) AS5838(material)(size) AS5839(material)(size)
O-ring Seal	User defined compound, sizes per AS568
Clamshell Coupling Body	AS5835(material)(size)
Sleeve	AS5834(material)(size)

The qualification specimens (assembled coupling) shall contain two ferrules, one sleeve, and one clamshell body and shall be referred to as the specimen in this document.

3.3.2 Ferrule

Ferrules shall conform to AS5836 and applicable part standards. Attachment of the ferrule to the tubing shall be by mechanical roller swaging or welding. Roller swaging shall conform to the AS4060 specification. Ferrule materials shall be compatible with and, if swaged, harder than the tubing to which it is attached. Ferrules shall comply with MIL-STD-889, or shall be isolated to prevent electrolytic corrosion.

3.3.3 Assembled Coupling Components

The Assembled Coupling Components (AS5832) consists of AS5835 clamshell Coupling Body and AS5834 Sleeve. AS5832 is provided to simplify drawing callouts.

3.3.3.1 Sleeve

The sleeve shall conform to AS5834 and is designed to carry shear and hoop loads and to affect sealing. The sleeve shall be capable of providing an electrostatic bond to the Clamshell Coupling Body (AS5835).

The outer surfaces of the sleeve shall be circumferentially grooved or knurled to facilitate gripping by hand for installation or removal. The center groove (0.270 inch wide) shall provide a smooth surface and shall have a chemical film coating applied to provide corrosion protection and facilitate an electrostatic bond with the clamshell body.

3.3.3.2 Coupling

The clamshell body shall conform to AS5835 and shall be structurally capable of withstanding the axial loads and shear loads generated by operating and test pressures at the maximum angular and axial displacements.

The clamshell body shall provide an electrostatic bond path to the Sleeve (AS5834).

The clamshell body shall provide inspection cutouts to allow visual verification of proper sleeve installation.

Coupling sizes -08 through -64 shall be capable of being installed, latched and also un-latched and removed with one hand using reasonable force and without the use of tools. Coupling sizes -72 through -88 may require two hands to perform installation, latching, unlatching, and removal.

The coupling shall include visual/tactile latch indication (VTLI) that confirms a closed and latched condition. The VTLI feature shall be capable of being manipulated, to the indication of latched condition, with one hand.

Lightning current conduction capabilities without coupling induced ignition sources shall be as specified in Table 3. The installed clamshell body shall be capable of being rotated around the ferrules and sleeve without creating coupling induced ignition sources below the currents listed in Table 3.

Table 3 - Assembled coupling maximum allowable current values /2/

Dash Size	Tube Size Inches Ref.	Peak Current Carrying Capability, Amps /1/ /2/
-08	0.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-10	0.625	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-12	0.750	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-16	1.000	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-20	1.250	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-24	1.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-28	1.750	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-32	2.000	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-36	2.250	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-40	2.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-48	3.000	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-56	3.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-64	4.000	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-72	4.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-80	5.000	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)
-88	5.500	Reduced Comp. B - 400 A peak ($\pm 10\%$) Reduced Comp. C - 40 A average ($\pm 10\%$)

/1/ Reduced Current Components B and C of ARP5412. Reduced Current Component B shall be a unipolar waveform with a peak amplitude identified for each specific coupling size ($\pm 10\%$) and a charge transfer of 1 C ($\pm 20\%$) in 5 ms. Reduced Current Component C shall be a unipolar waveform with a current amplitude between 20 and 80 A and a charge transfer of 20 C ($\pm 20\%$) in 0.5 seconds ($\pm 10\%$).

/2/ Lightning testing to be performed per ARP5416.

3.3.4 Seals

O-ring seals are not a part of this specification except for providing a fluid seal during the assembled coupling qualification testing. For the purpose of the qualification testing, O-rings shall conform to AMS-R-25988, Type 1, Class 1, Grade 70 with sizes per Table 1 and AS568. O-ring failures do not necessarily constitute a test failure unless the O-ring is damaged by a test part.

Users shall be notified of O-ring failures and shall make a determination as to the appropriate course of action. If the O-ring was not damaged by a test part, then the user may allow the O-ring to be replaced and testing to be continued. O-ring replacements shall be documented in the test report and retained as part of the qualification process and documentation.

3.3.5 Dimensions

The assembled envelope dimensions shall be as specified in AS5831. Part dimensions shall be as specified in applicable AS part standards.

3.3.6 Weights

The individual components of the coupling shall meet the weight requirements listed on the applicable AS part standards.

3.4 Performance

The assembled coupling shall meet the following performance requirements:

3.4.1 The test specimens shall not exhibit leakage in excess of 3.4.4, or show evidence of any malfunction, during or subsequent to test. In addition, there shall be no evidence of cracking or structural failure. Any crack or structural failure in any component of the assembled coupling is evidence of a failure.

All instances of leakage or specimen failure shall be reported to the users for a determination, in consultation with the manufacturer, of how to proceed. In any event, the test failure shall be photographed and documented. The documentation shall record the failure parameters, the test condition leading to the failure and the manufacturer's explanation of why the part failed.

Any physical alteration of the coupling that results in the assembled coupling malfunctioning is considered a failure and shall be documented.

Typical coupling wear associated with normal fluid system operation or environmental damage accumulated during testing does not constitute a failure. Damage not associated with typical wear to the bonding spring or the bonding mechanism shall be documented.

3.4.2 Electrical Bonding

The electrical bonding resistance verification is specified in 4.6.2.

3.4.3 Proof Pressure

The complete test assembly shall be subjected to 200% nominal positive operating pressure as specified in Table 1. There shall be no leakage of fluid sufficient to form a drop. Testing is specified in 4.6.3.

3.4.4 Pressure Leakage

Specimens shall withstand the applied pressure at all required temperatures without leakage or evidence of other malfunction. Testing is specified in 4.6.4.

3.4.4.1 Negative Pneumatic Leakage

Specimens shall not exhibit a decrease in negative operating pressure exceeding 0.5 in Hg within a period of 5 minutes when subjected to the Table 1 negative operating pressure. Testing is specified in 4.6.4.1.

3.4.4.2 Positive Pneumatic Leakage

Specimens shall withstand the applied pneumatic pressure for 3 minutes at room temperature without any visible bubbles growing or detaching from the test article. The 3 minute test period shall begin after the test article has been mechanically agitated to dislodge attached air bubbles and a further 1 minute dwell allowing for trapped air to escape. Testing is specified in 4.6.4.2.

3.4.4.3 Liquid Leakage

Specimens shall withstand the applied the pressure for 5 minutes at room temperature without leakage of fluid sufficient to form a drop. Testing is specified in 4.6.4.3.

3.4.5 Lightning Testing

Specimens shall pass all lightning test requirements without ignition of a flammable gaseous mixture. All sizes shall complete lightning testing. If any test specimen fails in any test configuration, then that size assembly fails. Testing is specified in 4.6.5.

3.4.6 Vibration

Specimens shall show no evidence of malfunction or structural failure and no leakage in excess of 3.4.4 after exposure to vibration levels in accordance with 4.6.6.

3.4.7 Corrosion Testing

Test specimens shall undergo two corrosion test periods in the qualification test sequence. Each period shall include the immersion of the specimens in a salt solution twice for 72 hours separated by a 2 hour drying period. The assembled coupling shall show no evidence of malfunction or leakage in excess of 3.4.4 when subjected to subsequent testing. The coupling shall show no evidence of excessive corrosion, pitting, peeling, chipping, or blistering of the finish or exposure of the base metal under plated surfaces that could affect functionality. Testing is specified in 4.6.7.

3.4.7.1 Saltwater Immersion

Test specimens shall be immersed in a 5% ± 1% salt solution in accordance with ASTM B117 at 150 °F for the specified time interval.

3.4.7.2 Water Rinse

The test specimens shall be rinsed in water meeting ASTM D1193 Type IV reagent.

3.4.8 High Temperature Aging

Pressurized specimens undergoing testing shall be placed in a suitable closed chamber where ambient and fluid temperatures shall be raised and stabilized to 200 °F. The test shall be continued for a minimum of 8 hours maintaining a fluid and ambient temperature of 200 °F. Testing is specified in 4.6.8.

3.4.9 Pressure Impulse

Specimens shall be subjected to two periods of impulse testing. Each assembled coupling shall withstand a total of 50 000 pressure impulse cycles at 50% nominal operating pressure, 600 pressure impulse cycles at 200% nominal operating pressure, and 50 000 pressure impulse cycles at nominal operating pressure as per Table 1. Each pressure cycle shall load the assembled coupling with axial and shear loads. The assembled coupling shall withstand impulse cycles without evidence of malfunction or leakage in excess of 3.4.4. Testing is specified in 4.6.9.

3.4.10 Low Temperature Aging

Pressurized specimens undergoing testing shall be placed in a suitable closed chamber where ambient and fluid temperatures shall be lowered and stabilized at -65 °F. The test shall be continued for a minimum of 8 hours maintaining a fluid and ambient temperature of -65 °F. Testing is specified in 4.6.10.

3.4.11 Repeated Assembly

There shall be no evidence of deformation, damage or degradation in latching or VTLI performance and the specimens shall show no evidence of leakage when subjected to subsequent testing. Testing is specified in 4.6.11.

3.4.12 Re-Examination of Product

All clamshell bodies and sleeves shall be removed from the test assembly and the specimen components shall show no evidence of deformation, damage or degradation. The re-examination is specified in 4.6.12.

3.4.13 Burst/Rupture

Specimens shall not rupture nor show evidence of leakage in excess of 3.4.4 at any pressure up to 300% nominal operating pressure. Any coupling or ferrule showing permanent deformation at or below 300% nominal operating pressure is a failure. Testing shall test the parts to rupture and is specified in 4.6.13.

3.5 Identification of Product

Clamshell body, sleeves and ferrules shall be marked for identification in accordance with MIL-STD-130 and AS478. The use of both standards is necessary to address commercial and military utilization of the parts defined by this specification. The manufacturer shall provide part marks that designate quarter and year of manufacture as specified on the applicable AS standard or drawing.

3.6 Workmanship

Coupling components shall be manufactured and finished in accordance with commercially accepted practices and processes.

3.7 Cleaning

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