

Connectors, Receptacle, External Electric Power, Aircraft
General Specification for

FSC 5935

NOTICE

This document has been taken directly from U.S. Military Specification MIL-C-81790A, Amendment 1 and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-C-81790A, Amendment 1. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2008 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

SAE AS81790

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

1. SCOPE:

1.1 Scope:

This specification covers the requirements for aircraft external electric power receptacles.

1.2 Part numbers:

Receptacles, covers and shields shall be identified by the MS part numbers shown on the applicable military standard.

2. APPLICABLE DOCUMENTS:

2.1 Government documents:

- 2.1.1 Specifications and standards: The following specifications and standards form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

Federal

QQ-A-250/8	Aluminum Alloy, 5052, Plate and Sheet
QQ-A-591	Aluminum Alloy Die Castings
QQ-A-596	Aluminum Alloy, Permanent and Semi-Permanent Mold Castings
QQ-S-365	Silver Plating, Electrodeposited, General Requirements for
TT-P-1757	Primer Coating, Zinc Chromate, Low-Moisture Sensitivity

Military

MIL-M-14	Molding Plastics and Molded Plastic Parts, Thermosetting
MIL-P-116	Preservation, Methods of
MIL-C-5541	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-S-7742	Screw Threads, Standard, Optimum Selected Series, General Specification for
MIL-C-7974	Cable Assemblies and Attachable Plugs, External Electric Power, Aircraft
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-P-85582	Primer Coatings, Water Borne

SAE AS81790

2.1.1 (Continued):

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-889	Dissimilar Metals
MIL-STD-1285	Marking of Electrical and Electronic Parts
MIL-STD-45662	Calibration Systems Requirements
MS3505	Cover for use with MS90362 External Power Receptacle
MS3506	Connector, Receptacle, External Electric Power, Aircraft, 28 Volt DC Operating Power
MS17845	Shield for use with MS90362 External Power Receptacle
MS21379	Connector, Receptacle, External Power, Aircraft, 230/400 Volt, 400 Hertz
MS25018	Connector, Receptacle, External Electric Power, Aircraft, 28 Volt DC, Jet Starting
MS35335	Washer, Lock, Flat-External Tooth
MS35650	Nut, Plain, Hexagon, Machine Screw, UNF-28
MS90362	Connector, Receptacle, External Electric Power, Aircraft, 115/200 Volt, 400 Hertz

Air Force-Navy Aeronautical

AN961	Washer, Flat, Electrical
-------	--------------------------

2.1.2 Other Government documents, drawings and publications: The following other Government documents, drawings and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

2.2 Non-Government publications:

The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM B-193-78	Resistivity of Electrical Conductor Materials
---------------	-----------------------------------------------

(Application for copies of ASTM publications should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

SAE AS81790

2.3 Order of precedence:

In the event of a conflict between the text of this specification and the references cited herein (except for associate detail specifications, specification sheets or MS standards), the text of this specification shall take precedence. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS:

3.1 Specification sheets:

The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification:

Power receptacles furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable Qualified Products List (QPL) at the time of award of contract (see 4.4 and 6.7).

3.3 Materials:

Materials shall conform to the applicable specification as specified and shall be suitable for the performance required herein. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be employed in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889. Materials used in the construction of connectors, bases, covers and shields shall be fungus inert in accordance with requirement 4 of MIL-STD-454. All materials shall be certified as specified in 4.6.9.

3.3.1 Bases: Bases shall be fabricated using a fiber filled, impact resistant, polyethylene terephthalate material conforming to MIL-M-14 type SDI-30, an impact resistant fiber filled polyester material, or an impact resistant fiber filled epoxy material. Alternate materials may be used if approved by the qualifying activity (see 6.7). Such materials must be equivalent or superior to type SDI-30 material.

3.3.2 Shields: Cast shields shall be 356-T6 aluminum alloy in accordance with QQ-A-596 or shall be die cast aluminum alloy A380 in accordance with QQ-A-591. Shields made from sheet stock shall be 5052 aluminum alloy in accordance with QQ-A-250/8; minimum thickness .060 inch. Shields shall be anodized in accordance with MIL-A-8625 Types I or II, or chemically surface-treated in accordance with MIL-C-5541, Class 2. Coat with one coat of zinc chromate primer according to TT-P-1757 or with water borne epoxy primer according to MIL-P-85582.

3.3.3 Contacts: The small pin contacts shall be tellurium copper, leaded copper, or brass, with a minimum of 0.0002 inch of silver plate. The large pin contacts shall be tellurium copper, or leaded copper or equivalent materials approved by the qualifying activity with a minimum of 0.0002 inch of silver plate. When tested in accordance with 4.6.11, the conductivity of the material used to make the large gage contacts shall be a minimum of 90% of the International Annealed Copper Standard (IACS).

SAE AS81790

- 3.3.4 Covers: Covers used for protecting the rear of receptacles shall be of a shatterproof synthetic rubber or phenolic compound of 85 to 95 shore hardness and suitable to meet the performance specified herein.
- 3.4 Design and construction:
- Receptacle assemblies and covers shall be designed and constructed in accordance with the applicable military standards and as specified herein.
- 3.4.1 Contacts: Unless approved by the qualifying activity, the contact shall be designed from a one piece alloy material. Contacts must conform to the physical dimensions of this specification and related military standards (see 4.6.2).
- 3.4.1.1 Identification: Contact identification shall be permanently and legibly marked on the front and rear of the base.
- 3.4.1.2 Method of attachment: A positive means shall be provided to anchor contacts in the base.
- 3.4.1.3 Cross-sectional area: The cross-sectional area throughout each contact shall be no less than the root area of the thread at any point.
- 3.4.1.4 Terminal pads: Each terminal shall include an integral or force-fitted pad.
- 3.4.1.5 Threads on terminals: Threads on terminals shall conform to MIL-S-7742. Each large terminal shall be threaded to within 0.125 inch of its pad and each small terminal shall be threaded to within 0.062 inch of its pad.
- 3.4.1.6 Terminal hardware: Each base shall be provided with one nut MS35650-3385T, one lockwasher MS35335-91, and one flat washer AN961-616 for each large terminal; one nut MS35650-305T, one lockwasher MS35335-88, and one flat washer AN961-10 for each small terminal.
- 3.4.1.7 Hardness of contacts: The hardness at all points on the sides of each pin shall be at least 86 to 100 Brinell or Rockwell B 40-56 (see 4.6.16).
- 3.4.2 Shields: Each shield, including all rivets and welds, shall be contained within the maximum dimensions shown on the standard. The inside of each shield shall be smooth and free from protrusions and sharp edges.
- 3.4.3 Dimensions (see 3.1): The dimensions of the receptacle assemblies and associated parts shall be in accordance with the applicable MS sheet.
- 3.4.4 Weight: When tested as specified in 4.6.3, the weight of each item shall not exceed the value specified on the applicable Military Standard.

SAE AS81790

3.5 Performance:

Each item shall perform satisfactorily when subjected to the following conditions applicable to that item.

- 3.5.1 Impact: There shall be no fractures or cracks of the receptacle assembly and no loosening of shields or contacts when items are subjected to impact tests after exposure to -55°C in accordance with 4.6.4.
- 3.5.2 Terminal torque strength: Receptacle assemblies shall be capable of withstanding torque in accordance with 4.6.5. As a result of the application of torque there shall be no cracking, delamination or chipping of the base. The contacts shall not shear, crack or rotate.
- 3.5.3 Flexural strength, receptacle base: Receptacle bases, less center contacts, shields, and other accessories, shall not break when subjected to a minimum force of 1300 pounds for three-pin receptacles, and a minimum 3500 pounds for six-pin receptacles when tested in accordance with 4.6.6.
- 3.5.4 Pin static bending strength: Receptacle assemblies shall be capable of withstanding forces applied to the pins in accordance with 4.6.7. The pins shall not take a permanent set of more than .01 inch at the mating end. There shall be no cracking, delamination or chipping of the base and the contacts shall not come loose in the base.
- 3.5.5 Shield and attachment static strength: Shields shall be capable of withstanding forces applied to the shield in accordance with 4.6.8. The sides of the shield shall not be displaced greater than the amount specified while the forces are applied. After the forces are removed, the shield shall conform to the dimensions shown on the applicable standard. There shall be no cracking, delamination or chipping of the base and the shield shall not come loose from the base.
- ### 3.6 Environmental:
- 3.6.1 Thermal shock: Receptacle assemblies and covers shall not crack, fracture, or delaminate when subjected to temperature extremes in accordance with 4.6.12.
- 3.6.2 Salt spray: The receptacle assemblies, shields and covers shall show no evidence of corrosion when tested in accordance with 4.6.14.
- 3.6.3 Humidity: Receptacle assembly and cover as appropriate shall withstand the humidity exposure as described in 4.6.13 followed by a dielectric withstanding voltage test defined in 4.6.15.
- 3.6.4 Dielectric withstanding: The voltage shall be 60 Hz 2500 ± 100 volt rms with a current leakage of less than 1.0 milliamperes when tested in accordance with 4.6.15.

SAE AS81790

3.7 Identification of product:

Each item shall be marked as follows for identification in accordance with MIL-STD-130:

Specification Part Number

Manufacturer's Part Number

Manufacturer's Name or Trademark

Date Indicator which defines manufacturing dates for periods 3 months or less

3.7.1 Location of markings: Identification markings shall be located as follows:

- a. Three-pin receptacles. Identification markings shall be located on the shield.
- b. Six-pin receptacles. Identification markings shall be located on the pin side of the base a minimum of 5/8" from the perimeter.
- c. Shield, six-pin receptacles. Identification markings shall be located on the shield.
- d. Cover, six-pin receptacles. Identification markings shall be located on the raised center portion of the cover.

3.8 Workmanship:

Items shall be fabricated, constructed and assembled to produce an item free from all defects which would affect proper functioning in service. Particular attention shall be given to freedom from chips, dirt, grit and other foreign material; also to freedom from defects, burrs, sharp edges, corners and points. The cleaning methods used shall not be injurious to any of the parts nor shall any of the parts be contaminated by the cleaning agents employed.

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 (examination and tests) 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 ensure supplies and services conform to prescribed requirements.

- #### 4.1.1 Responsibility for compliance:
- All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements; however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

SAE AS81790

4.2 Classification of inspection:

The inspection requirements specified herein are classified as follows:

- a. Materials and design inspection (See 4.6.9)
- b. Qualification inspection (See 4.5)
- c. Quality conformance inspection (See 4.5)
 - 1. Individual tests (See 4.5.1)
 - 2. Sampling plan tests (See 4.5.2)
- d. Retention of qualification (See 4.5.3)

4.3 Inspection condition:

Unless otherwise specified, all inspections shall be made under the following room conditions:

Temperature	20-30°C (68-86°F)
Relative humidity	30-80%
Air pressure	600-800 millimeters mercury (23.62-31.5 inches mercury)

4.3.1 Mounting: Whenever it is specified that items shall be mounted, receptacles shall be mounted on a suitably fabricated aluminum panel 0.125 ± 0.005 inch thick, with the panel on the back (terminal side) of the receptacle, by means of suitable round-head mounting screws, with the heads of the screws on the front (pin side) of the receptacle; parts being qualified or procured separately shall be assembled with other qualified parts as necessary to form a receptacle which shall then be mounted as described above. The panel shall be secured in such a way that the front and back of the receptacle shall be free of interference.

4.3.2 Test equipment and inspection facilities: Test equipment shall be of sufficient accuracy, quality and quantity to permit performance of the required inspection. The contractor shall establish calibration of inspection equipment to the satisfaction of the Government. Calibration of the standards which control the accuracy of inspection equipment shall comply with the requirements of MIL-STD-45662. The inspection facilities shall be of sufficient size and appropriately staffed to accommodate typical production runs.

4.4 Qualification inspection:

Qualification inspection shall consist of the examinations and tests specified in Table I and applicable specification sheets (see 3.1). The tests performed in Table I shall be performed sequentially on the samples specified in 4.4.2. Failure of any sample shall stop the qualification program. The Qualifying Activity shall be notified of the failure and the proposed correction actions. Testing cannot be resumed until authorized by the Qualifying Activity. The failure mode and corrective action must be documented in the Qualification Test Report or by separate addendum.

SAE AS81790

- 4.4.1 Qualification authorization: The supplier must be authorized to begin qualification inspection. Unauthorized qualification test data is not acceptable. A request for authorization to begin qualification inspection or periodic qualification inspection must be submitted to the Qualifying Activity (see 6.7).
- 4.4.2 Qualification test samples: The test sample size shall be two specimens of each type component being qualified. An additional two specimens may be used for fungus resistance testing if required. The specimens shall be manufactured by the supplier's routine production process, and verified as such by the authorized government inspector. Any untested specimens required by the Qualifying Activity (see 4.4.3) must come from the same lot as the qualification test sample. Individual components (shields or covers) may be qualified separately or jointly with the receptacle assembly.
- 4.4.3 Forwarding of qualification submittal: Untested samples, as required, and the manufacturer's certified test reports shall be forwarded to the Qualifying Activity (see 6.7). The samples must be endorsed by the government inspector as representative samples of the manufacturer's normal production capability. Samples submitted without the endorsement will not be accepted.
- 4.5 Quality conformance inspection:
- Quality conformance inspection shall consist of the following:
- a. Individual inspection
 - b. Sampling inspection
- 4.5.1 Individual inspection: All connectors, shields and covers produced under the contract shall be subjected to the dielectric withstanding test in accordance with paragraph 4.6.15. Any item that fails shall be rejected.
- 4.5.2 Sampling inspection: The samples shall be subjected to the applicable sampling inspections as specified in Table II in the order listed. Sampling shall be in accordance with MIL-STD-105 Inspection Level II, AQL 1% for major defects and 4% for minor defects (see Table III for classification of defects). In-process controls may be substituted for the quality conformance requirements of Table II provided the controls are approved by the qualifying activity.
- 4.5.3 Periodic qualification inspection: It shall be the responsibility of the qualified supplier to periodically provide the government qualification data which demonstrate the suppliers continuing ability to provide products that meet the requirements of this specification. Periodic verification shall be performed at three year intervals per the Qualification Inspection (Table I). However, the environmental testing, namely, humidity exposure, thermal shock and salt spray need only be performed on six-year intervals. It is preferred that the humidity exposure be performed on alternating periodic qualification from the thermal shock and salt spray. On any periodic qualification, the supplier is required to perform the Dielectric Withstanding Voltage Test whether or not the humidity exposure is included. A summary of the Quality Conformance Tests shall also be submitted along with a test record of the periodic qualification testing. This summary shall include the numbers and type of any failures. Failure to furnish the summaries may result in loss of qualification for that product.

SAE AS81790

TABLE I. Applicable qualification inspections

Inspection Title	Test Paragraph Number	Requirement Paragraph Number	Applicability (indicated by X)		
			Receptacle Assemblies	Covers	Shields
Examination of product	4.6.1	3.1, 3.2, 3.3, 3.4, 3.7, 3.8	X	X	X
Material certification	4.6.9	3.3	X	X	X
Dimensions	4.6.2	3.4.3	X	X	X
Weight	4.6.3	3.4.4	X	X	X
Thermal shock	4.6.12	3.6.1	X	X	X
Pin impact strength	4.6.4.1	3.5.1	X		
Shield impact strength	4.6.4.2	3.5.1	X		X
Cover impact strength	4.6.4.3	3.5.1		X	
Humidity resistance	4.6.13	3.6.3	X	X	X
Salt spray	4.6.14	3.6.2	X	X	X
Terminal torque strength	4.6.5	3.5.2	X		
Shield and attachment static strength	4.6.8	3.5.5	X		X
Pin static bending strength	4.6.7	3.5.4	X		
Flexural strength	4.6.6	3.5.3	X		
Contact plating thickness	4.6.10	3.3.3	X		
Hardness of contacts	4.6.16	3.4.1.7	X		

SAE AS81790

TABLE II. Quality conformance sampling plan 1/

Inspection Title	Paragraph Number	Requirement Paragraph Number	Applicability (indicated by X)		
			Receptacle Assemblies	Covers	Shields
Examination of product	4.6.1	3.1, 3.2, 3.3, 3.4, 3.7, 3.8	X	X	X
Dimensions	4.6.2	3.4.3	X	X	X
Terminal torque strength	4.6.5	3.5.2	X		
Dielectric withstanding test	4.6.15	3.6.4	X		

1/ Dielectric Withstanding is performed on all receptacle assemblies (see 4.6.1).

TABLE III. Classification of defects

Major	Minor
Incorrect contact construction	Poor exterior finish, such as connector bases exhibiting cracks or blow holes <u>not</u> adjoining two or more contacts.
Incorrect dimensions which affect mating	Molding flash
Burrs capable of cutting personnel or affecting mating	Incorrect exterior or outline dimensions not preventing engagement or mounting
Non-permanent or illegible marking	
Material incorrect	
Other design and construction not listed minor	
Other workmanship not listed minor	
Failure of any test specified under paragraph 4.6	Part exterior finish
Surface cracks not affecting structural strength	

SAE AS81790

TABLE III. Classification of defects (continued).

Major	Minor
<p>Poor exterior finish, such as connector bases exhibiting cracks or blow holes adjoining two or more contacts</p> <p>*Contacts with a finish (after plating) of more than 32 microinches when checked in accordance with ANSI B46.1.</p> <p>*Contacts with blistering or peeling plating.</p>	

4.5.4 Inspection of packaging: Except when commercial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5. The inspection of marking for shipment and storage shall be in accordance with MIL-STD-129. The inspection of commercial packaging shall be as specified in the contract (see 6.2).

4.6 Methods of inspection:

4.6.1 Examination of product: Receptacle assemblies and covers shall be examined to ensure conformance with all requirements of this specification not covered by performance requirements of 3.6, and with all requirements of the applicable military standard that can be determined visually without measurement.

4.6.2 Dimensions: Receptacle assemblies and covers shall be measured for conformance to the dimensions shown on the applicable military standard.

4.6.2.1 Terminal threads and hardware dimensions: The terminal threads shall be measured for conformance with paragraph 3.4.16, 3.4.1.5, and the applicable military standards.

4.6.3 Weight: Items shall be weighed for conformance to the applicable military standard.

4.6.4 Impact: Receptacle assemblies and covers shall be mounted and placed in a test chamber and subjected to a temperature of $-55 \pm 2^{\circ}\text{C}$ for 24 hours minimum. At the end of this time the items shall be removed from the chamber and subjected to the following applicable impact tests. The tests shall be completed within five (5) minutes of removal from the chamber. The receptacle assemblies shall meet the requirements of 3.5.1.

SAE AS81790

- 4.6.4.1 Pin impact strength: Receptacle assemblies shall be mounted (see 4.3.1) with pins pointed upward as shown in Figure 1. A weight of 10 pounds \pm 0.1 with a flat end shall be dropped downward on the spherical end of each pin from a height of 2 feet for the large pins and 1 foot for the small pin, as shown in Figure 1. A variation of \pm 10% in the height is permitted.
- 4.6.4.2 Shield impact strength: The shield shall be mounted to a qualified receptacle (see 4.3.1) as shown in Figure 2. A weight of 5 pounds \pm 0.1 shall be dropped downward from a height of 1 foot. A variation of \pm 10% in the height is permitted. The weight shall be dropped on the inner edge of each straight side of the open end of the shield, within 0.1 inch of the center of the side, and with each edge horizontal.
- 4.6.4.3 Cover impact strength: The cover shall be mounted to the receptacle assembly and positioned as shown in Figure 3. A weight of 2 pounds \pm .05 shall be dropped downward from a height of 1 foot. A variation of \pm 10% in the height is permitted. The weight shall be dropped 10 consecutive times, at random places, on the cover surface.
- 4.6.5 Terminal torque strength: A receptacle assembly with a cover shall be mounted to a panel (see 4.3.1) which is secured to a fixed non-rotating surface. The flat washer, lockwasher and nut shall be installed on each terminal in accordance with the applicable standard. The nut on each larger terminal shall be tightened to a torque of 10 ± 1 pound-feet. The nut on each smaller terminal shall be tightened to a torque of $1.5 \pm 1/4$ pound-feet. The nuts shall then be loosened. For Qualification (Table I), this procedure shall be repeated nine more times. For Quality Conformance (Table II), this procedure will be performed one time. The receptacle assemblies shall meet the requirements of 3.5.2.
- 4.6.6 Flexural strength: Receptacle bases shall be tested pin side (front face) down with shields removed and the threaded terminals of the center pins sawed flush with the pads to accommodate the center anvil (see Figure 4). If applicable, the barrier between the pins may be removed to facilitate the sawing. The receptacle base shall be placed with its end mounting holes across two adjustable anvils in a suitable compression testing machine. All anvils shall be the full width of the sample or greater and shall have a 1/8-inch radius \pm 1/64 at the point of contact. The top anvil shall apply a force at the center of the receptacle at the rate of 0.05 inch per minute \pm .01. The flexural strength of the receptacle will be considered the maximum force sustained by the receptacle base at the instant of breakage.
- 4.6.7 Pin static bending strength: A receptacle assembly without the shield shall be mounted to a panel (see 4.3.1) which will not flex when the contact bending force is applied as shown in Figure 5. A geometrical reference point shall be established for each contact prior to the force application. A force of 135 ± 1 pound shall be applied to each of the larger pins and a force of 100 ± 1 pound shall be applied to each smaller pin. The force shall be applied for 5 seconds minimum. After the force is removed, the deviation of the contact from the reference position shall be measured. A force shall be applied perpendicular to the pin and parallel to the base in two directions - approximately 90° apart. The receptacle assembly shall meet the requirements of 3.5.4.
- 4.6.8 Shield and attachment static strength: The shield shall be mounted to a qualified receptacle and forces shall be applied in accordance with Figure 6 and as specified below.

SAE AS81790

- 4.6.8.1 Force on one side: A force of 110 ± 10 pounds shall be applied, through a 0.125 ± 0.062 inch spherical radius, to the inner surface of each side of the shield in turn, within 0.1 inch of the centerline of the side and within 0.1 inch of the outer end of the shield, acting outward and perpendicular to the side of the shield. The point on each side of the shield where the force is applied shall not be displaced more than 0.1 inch while the force is applied. The receptacle assemblies shall meet the requirements of 3.5.5.
- 4.6.9 Material certification: In lieu of testing or submission of specific material data, the qualifying activity may accept certification of compliance with the requirements of 3.3. Certification to requirement 4 of MIL-STD-454 is required.
- 4.6.10 Contact plating thickness: Silver plating thickness of finished contacts shall be measured in accordance with QQ-S-365. Measurement shall be taken at a point $.125 \pm .062$ " in back of the end radius of the contact.
- 4.6.11 Contact material conductivity: The conductivity of the alloy material for large pin contacts shall be tested in accordance with ASTM B193-78. Certification from the material supplier will be acceptable for verifying this requirement.
- 4.6.12 Thermal shock: Receptacle assemblies and covers shall be tested in accordance with MIL-STD-202, Method 107. The following details and exceptions shall apply:
- There shall be no special mounting.
 - All other items shall be subjected to Test Condition A except that the high temperature shall be $200^{\circ}\text{C} \pm 5^{\circ}\text{C}$ instead of 85°C .
 - No measurements need be made before or after the test. Items shall meet the requirements of 3.6.1.
- 4.6.13 Humidity: The pad side of the receptacle assembly shall be mounted on a conductive panel (see 4.3.1). If a cover is to be tested the top surface of the cover shall be in solid contact with another panel. The two panels shall be held mechanically and electrically together with the cover between them. The contacts and panels shall be electrically wired as described in 4.6.15 and externally connected to a dielectric tester. The sample assembly shall be tested in accordance with MIL-STD-202, Method 106. After the final cycle, with the chamber maintained at the end-of-cycle condition, the Dielectric Withstanding Test specified in 4.6.15 shall be performed.
- 4.6.14 Salt spray: Receptacles, assemblies, covers and shield shall be subjected to condition B of Method 101 of MIL-STD-202.
- 4.6.15 Dielectric withstanding: The receptacle assembly or assembly with cover shall be mounted to a panel or panels as described in 4.8. Potential shall be applied in accordance with MIL-STD-202, Method 301, as follows:
- A potential shall be applied on each terminal with all the other terminals grounded together.
 - A potential shall be applied between all terminals electrically connected together and all exposed metal parts including panel(s) electrically connected together.

SAE AS81790

4.6.16 Hardness of contacts: Contacts shall be tested for compliance with the requirements of 3.4.1.7 at a minimum of three (3) points on one pin of each size with a 500 kilogram load and a 10 millimeter ball (for Brinell testing). For Rockwell testing use a standard Rockwell B hardness tester.

5. PREPARATION FOR DELIVERY:

5.1 Preservation and packaging:

Packaging shall be Level A or C as specified (see 6.2). Terminal hardware may be separately bagged and packaged with the item or may be supplied attached to the terminals.

5.1.1 Level A:

5.1.1.1 Cleaning and drying: Cleaning and drying shall be in accordance with the applicable procedures of MIL-P-116.

5.1.1.2 Preservation and packaging: Preservation shall be in accordance with MIL-P-116, Method 1A-5 or 1C-1 as specified (see 6.2), except that preservative compounds shall not be used. When Method 1A-5 is specified, the metal containers shall be of the reusable type. The quantity of the unit package shall be as specified (see 6.2). Packaging shall be in accordance with MIL-STD-794.

5.1.2 Level C: Preservation and packaging shall be in accordance with MIL-STD-794. Preservative compounds shall not be used.

5.2 Packing:

Packing shall be Level A, B or C in accordance with MIL-STD-794 as specified (see 6.2). Exterior containers shall have, as far as practical, minimum cube and tare consistent with the protection afforded.

5.3 Marking:

Interior and exterior containers shall be marked in accordance with MIL-STD-129.

6. NOTES:

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use:

The receptacles covered by this specification are intended for installation on aircraft for connecting the aircraft to external sources of electric power by means of flexible cables which are plugged into these receptacles.

SAE AS81790

6.2 Ordering data:

Procurement documents should specify the following:

- a. The number, date and title of this specification.
- b. The amendment number and date of the latest amendment to this specification, if any.
- c. The number(s), including the latest revision letter, if any, the date and the title of the MS standard for the item(s) being ordered.
- d. The MS part number(s) and quantity of the item(s) being ordered.
- e. The method of preservation, the levels of packaging and packing, and the quantity of the unit package desired.

6.3 Supersession data:

This specification supersedes the requirements for receptacles previously contained in MIL-C-7974.

6.4 Abbreviations and acronyms:

The following abbreviations and acronyms apply to this specification.

AMSC	Acquisition Management System Control
AQL	Acceptance Quality Level
ASTM	American Society for Testing and Materials
DOD	Department of Defense
DODISS	Department of Defense Index of Specifications and Standards
FSC	Federal Supply Code
IACS	International Annealed Copper Standard
MS	Military Specification Sheets
NATO	North American Treaty Organization
QPL	Qualified Products List
STANAG	Standard Agreement
STD	Standard

6.5 Subject term (keyword) listing:

Contacts
Cover
Shield
Terminal

6.6 This paragraph was deleted as it did not pertain to the converted SAE document.

SAE AS81790

6.7 Qualifying Activity:

With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved for inclusion in the applicable Qualified Products List (QPL) whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Systems Command, Washington, DC 20360; however, application for qualification of products should be made to the Naval Air Warfare Center Aircraft Division Indianapolis (Code B/444), 6000 East 21st Street, Indianapolis, IN 46219-2189 who has been designated Naval Air Systems Command agent for establishing the Qualified Products List.

6.8 International interest:

Certain provisions of this specification are the subject of international standardization agreements ASCC Air Standards 12/6, 12/7 and NATO STANAG 3302. When amendment, revision, or cancellation of this specification is proposed, which will affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels including departmental standardization offices, if required.

PREPARED UNDER THE JURISDICTION OF SAE SUBCOMMITTEE AE-8C1, CONNECTORS
OF COMMITTEE AE-8, AEROSPACE ELECTRICAL/ELECTRONIC DISTRIBUTION SYSTEMS

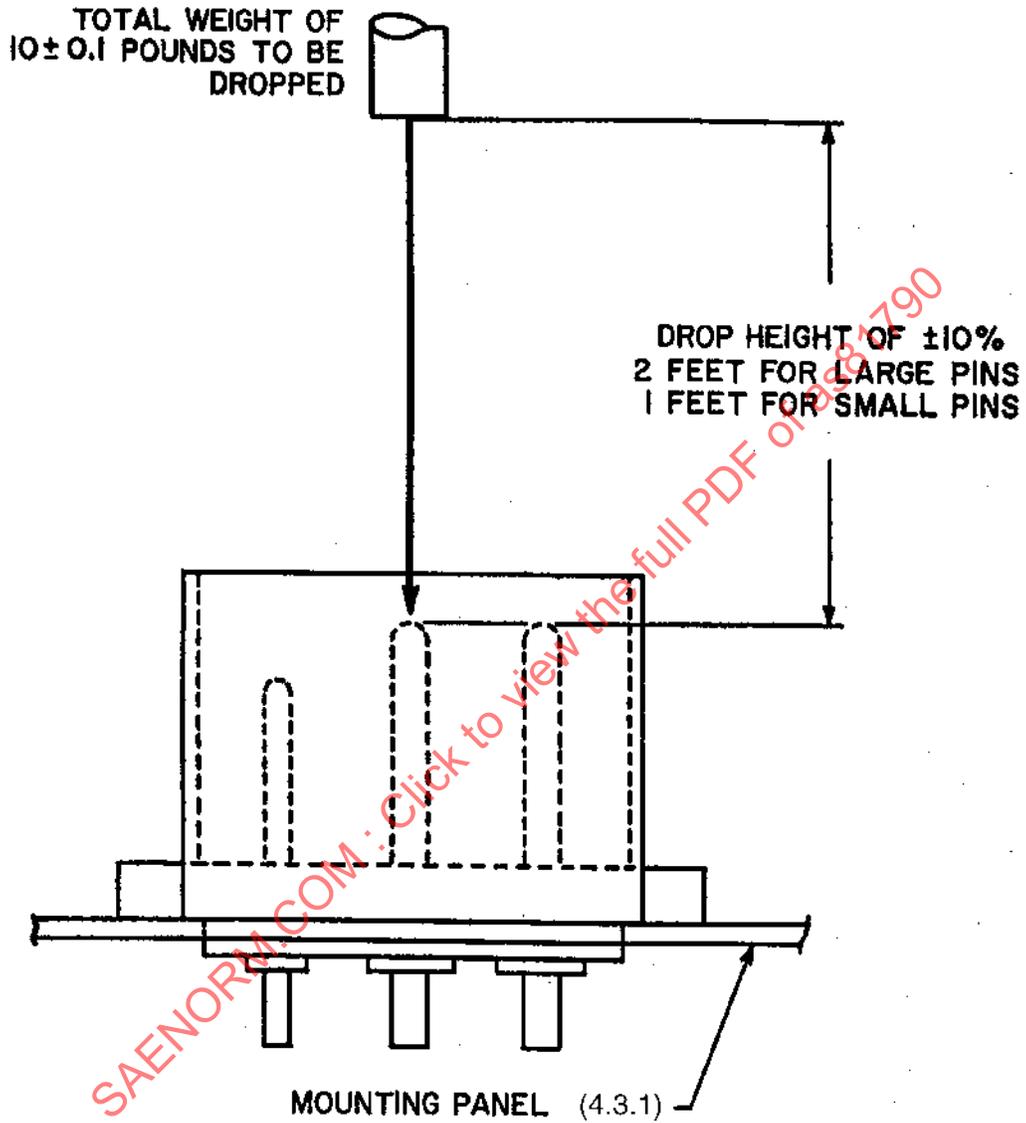


FIGURE 1. Method of performing pin impact strength test.