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DETAIL SPECIFCATION

CONNECTORS, ELECTRIC, RAMP POWER, 416/240 VOLTS

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 molded rubber male and female connectors for 416/240 volt ramp power.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

FEDERAL STANDARD

FED-STD-H28	-	Screw-Thread Standards for Federal Services

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-5624	-	Turbine Fuel, Aviation, Grades JP-4, JP-5, and JP-5/JP-8ST
MIL-PRF-6855	-	Rubber, Synthetic, Sheets, Strips, Molded or Extruded Shapes
MIL-PRF-7808	-	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MS27265		Connector, Plug, Electrical - Ramp Power, 416/240 Volts, Male
MS27285		Connector, Plug, Electrical-Ramp Power, 416/240 Volts, Female
MS27567		Dummy Connector, Electrical, Male
MS27568		Dummy Connector, Electrical, Female

Comments, suggestions, or questions on this document should be addressed to DLA Land and Maritime - VAI, P.O. Box 3990, Columbus OH 43218-3990 or emailed to CircularConnectors@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at https://assist.dla.mil.

AMSC N/A. FSC 5935

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DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202	-	Test Method Standard, Electronic and Electrical Component Parts
MIL-STD-810	-	Environmental Engineering Considerations and Laboratory Tests
MIL-STD-889	-	Dissimilar Metals
MIL-STD-1285	-	Marking of Electrical and Electronic Parts

DEPARTMENT OF DEFENSE HANDBOOKS

MIL-HDBK-831	-	Test Reports, Preparation Of

(Copies of these documents are available online at http://quicksearch.dla.mil/)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS

ASME Y14.100	-	Engineering Drawing Practices
ASME Y14.24	-	Types and Applications of Engineering Drawings
ASME Y14.34	-	Associated Lists
ASME Y14.35	-	Revisions of Engineering Drawings and Associated Documents

(Copies of these documents are available online at http://www.asme.org)

ASTM INTERNATIONAL

ASTM B16/B16M	-	Rod, Brass, Free-cutting, Bar and Shapes for Use in Screw Machines
ASTM B301/B301M	-	Copper Rod, Bar, Wire, and Shapes, Free Cutting
ASTM B700	-	Electrodeposited Coatings of Silver for Engineering Use, Standard Specification for
ASTM G21	-	Determining Resistance of Synthetic Polymeric Materials to Fungi

(Copies of these documents are available online at http://www.astm.org)

EIA-364-06	-	Contact Resistance Test Procedures for Electrical Connectors
EIA/ECA-364-21	-	Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts
EIA-364-70	-	Temperature Rise Versus Current Test Procedure for Electrical Connectors and Sockets

(Copies of these documents are available online at http://www.eciaonline.org/)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 10012	-	Measurement Management Systems – Requirements for Measurement Processes and Measuring Equipment

(Copies of these documents are available online at http://www.ncsli.org/)

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NATIONAL CONFERENCE OF STANDARDS LABS (NCSL)

NCSL Z540.3 - Calibration of Measuring and Test Equipment, Requirements for

(Copies of these documents are available online at http://www.ncsli.org)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes 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 the requirements of this specification and the specification sheet, the latter shall govern.

3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.4.

3.3 Materials.

3.3.1 Non-fungus nutrient materials. Elastometric materials shall be non-fungus nutrient in accordance with ASTM G21.

3.3.1.1 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3.2 Metals.

3.3.2.1 Corrosion-resistance. Metals shall be of the corrosion-resistant type or treated to resist corrosion due to fuels, salt spray, or atmospheric conditions likely to be met in storage or normal service.

3.3.2.2 Dissimilar metals. When dissimilar metals are used in intimate contact, suitable protection against galvanic corrosion shall be applied in accordance with MIL-STD-889, or equivalent.

3.3.2.3 Pure tin. The use of pure tin, as an underplate or final finish, is prohibited both internally and externally. Tin content of connectors, their components and solder shall not exceed 97 percent, by mass. Tin shall be alloyed with a minimum of 3 percent lead, by mass (see 6.6).

3.3.4 Connector body and shell material. The body and shell shall be fabricated of a synthetic rubber compound conforming to MIL-PRF-6855 type A, class 2, grade 60, black.

3.3.5 Contacts.

3.3.5.1 Power contacts. Power contacts (see 6.3.4) and associated current-carrying parts shall be constructed of tellurium copper conforming to ASTM B30/B301M1, alloy 145.

3.3.5.2 Control contacts. Control and ground contacts (sec 6.3.4 and 6.3.5) shall be constructed of free-turning brass conforming to ASTM B16/B16M (copper alloy UNS No. C36000).

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3.3.6 Grommets. Grommets shall be made of rubber material conforming to MIL-PRF-6855, type A, class 2, grade 60, black.

3.3.7 Dummy connectors. Dummy connectors shall be made of rubber material conforming to MIL-PRF-6855, type A, class 2, grade 60, black.

3.3.8 Set screws. All setscrews shall be made of 300 series stainless steel. The screw threads shall conform to FED-STD-H28.

3.4 Design and construction. Connectors shall be of the design, construction and physical dimensions specified (see 3.1). The connector shall be designed and constructed so parts will not work loose in service during normal and anticipated usage. It shall be built to withstand the strains, impacts, vibrations, solvents and weather conditions incident to shipping, storage, installation, and service. Connector type and grommet sizes shall be as specified (see 6.2).

3.4.1 Contacts. Contacts shall not be damaged by any twisting or forcing during the process of mating the connectors.

3.4.1.1 Control contacts. All connectors shall be provided with two contacts for use with control circuits. The control circuit contacts shall be arranged so electrical continuity is not made to the mating connector until all other contact pairs have been engaged. The control circuit contacts shall disengage before any other pair of mated contacts disengage.

3.4.2 Maintainability. The connector shall be designed to allow connection to a cable within a 15 minute period and removal within a 10 minute period. This does not include the time required for cable selection and preparation, which is outside the scope of this specification.

3.5 Performance.

3.5.1 Thermal shock. There shall be no evidence of physical damage detrimental to the operation of the connector when tested in accordance with 4.6.2.

3.5.2 Moisture resistance. When tested in accordance with 4.6.3 there shall be no visual evidence of damage. The connector shall meet the dielectric withstanding voltage requirements of 3.5.6.

3.5.3 Salt fog. Unmated connectors shall show no exposure of basis material due to corrosion which will adversely affect performance when tested in accordance with 4.6.4. The temperature rise of the connectors shall not exceed the maximum temperature rise shown in table I by more than 10 percent. At the end of the drying period, the samples shall be tested for contact resistance in accordance with 4.6.15. The voltage drop shall not exceed the maximum value shown in table IV by more than 10 percent.

3.5.4 Immersion. An unmated female connector shall meet the requirements of 3.5.10, condition A when tested in accordance with 4.6.5.

3.5.5 Mechanical shock incident to service. The connector shall not crack or fracture when tested in accordance with 4.6.6. The contact resistance (see 4.6.15) and horizontal engaging and disengaging (see 4.6.11) test shall be repeated and the connector shall not show evidence of damage.

3.5.6 Dielectric withstanding voltage. When tested in accordance with 4.6.7 the connector shall not show any evidence of disruptive discharge or deterioration. Disruptive discharge is evidenced by flashover, spark over, or breakdown.

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3.5.7 Insulation resistance. When tested in accordance with 4.6.8 the insulation resistance of the connector shall not be less than 500 megohms at 500 volts dc.

3.5.8 Temperature rise. The temperature rise of the connector shall not exceed the values shown in table I when tested in accordance with 4.6.10. No current shall be conducted through the ground or neutral contacts.

TABLE I. Temperature limits.

Test current (amps)	Temperature rise °F (max)
7/32 diameter contacts - 25	63
1/2 diameter contacts for #1/0 cable - 120	63
1/2 diameter contacts for #4/0 cable - 200	63

3.5.9 Current overload. Mated connectors shall perform satisfactorily when tested In accordance with 4.6.9 and subjected to the current overload ratings specified in table II (see 4.6.9).

TABLE II. Current overload.

Contact size	1 hour	1/2 hour	3 minutes
1/2 diameter, #1/0	195 Amps	290 amps	520 amps
1/2 diameter, #4/0	300 Amps	450 Amps	800 amps

3.5.10 Horizontal engaging and disengaging forces. The forces required for engaging and disengaging male and female plugs shall be in accordance with table III when tested in accordance with 4.6.11.

TABLE III. Engaging and disengaging forces.

Condition	Connector temperature (°F)		Engaging and disengaging force (pounds)
	Female	Male	
A	+75	+75	80 ± 25
B	+75	-40	100 ± 25
C	-40	+75	100 ± 25

3.5.11 Female connector power contact strength. The female power contacts shall not be damaged by nonaxial engagement and disengagement of the male connector. The horizontal engaging and disengaging forces shall not exceed the limits specified in 3.5.10 by more than 10 percent when tested in accordance with 4.6.12.

3.5.12 Male and female connector contact mounting strength. The male and female connector contacts, when tested in accordance with 4.6.13, shall withstand the following torques in either direction without any angular displacement of the contact exceeding 5 degrees.

a. Power contacts - 14 ft-lb.
b. Control contacts - 3 ft-lb.

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3.5.13 Durability. The male and female connectors shall show no evidence of damage after 575 engaging and disengaging cycles. The contact resistance shall be as specified in table IV (see 4.6.14).

TABLE IV. Contact resistance.

Contact size	Test current (amps)	Voltage drop (mv)
1/2 diameter, #1/0	195	26
1/2 diameter, #4/0	300	40

3.6 Part or Identifying Number (PIN) of interchangeable parts. All parts having the same manufacturer's PIN shall be functionally and dimensionally interchangeable. The item identification and PIN requirements of ASME Y14.100, Y14.24, Y14.34 and Y14.35 shall govern the manufacturer's PIN and changes thereto.

3.7 Dimensions. The dimensions of the connectors shall be as specified on the applicable specification sheet.

3.8 Weight. The maximum weight of the connector shall not exceed the following:

a. Male - 11 pounds.
b. Female - 11 pounds.

3.9 Color. The color of the connector body and shell shall be black

3.10 Finishes and protective coatings (metal parts). All metal contacts shall be silver-plated in accordance with ASTM B700, grades B or C, .0002/.0004 inch coverage.

3.11 Contact identification. Contacts shall be permanently identified by molded markings on both the mating and cable ends of the inserts (see 6.3.5). The markings shall be as shown on the applicable specification sheet.

3.12 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-1285.

3.13 Workmanship. The connector, including all parts and accessories, shall be fabricated in a manner such that the criteria for appearance, fit and adherence to specified tolerances are observed. Particular attention shall be given to neatness and thoroughness of marking parts and assemblies, and removal of foreign material during and after final assembly. The connector shall be free from crazing, cracks, voids, pimples, chips, blisters, pinholes, sharp cutting edges, burrs, and other defects that adversely affect life, serviceability or appearance.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. First article inspection (see 4.4).
b. Conformance inspection (see 4.5).

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4.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be established and maintained by the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment shall be in accordance with ISO 10012, NCSL Z540-3, or comparable standards.

4.3 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the test conditions specified in 4.3.1 and 4.3.2.

4.3.1 Atmospheric conditions.

a. Temperature 77° ± 4°F.
b. Relative humidity 45 to 85 percent.
c. Barometric pressure 30 Inches Hg ± 5 percent.

4.3.2 Apparatus. Special apparatus shall be devised to verify mating capability if male or female connectors are inspected separately.

4.4 First article inspection. First article inspection shall he performed by the contractor after award of contract and prior to production at a location acceptable to the Government. First article inspection shall be performed on sample units which have been produced with equipment and procedures normally used in production. First article approval is valid only on the contract under which it is granted, unless extended by the Government to other contracts.

4.4.1 Sample size. Six sets of male and female connectors shall be subjected to first article inspection.

4.4.2 Inspection routine. The sample shall be subjected to the inspections specified in table V, in the order shown.

4.4.3 Failures. One or more failures shall be cause for refusal to grant first article approval. Failure criteria for specimens shall be as specified in the applicable method paragraph or requirement paragraph.

4.4.4 Identification of first article inspection samples. The samples shall be identified with the manufacturer's part number and any additional information required by acquisition documents.

4.4.5 Test report. After the first article inspection is complete, three complete copies of a test report, acceptable to the procuring activity, shall be provided. (See MIL-HDBK-831 for guidance on test report preparation.)

4.4.5.1 Reliability and maintainability information. The following information shall be included as an attachment accompanying the first article inspection report (same quantity and quality of copies) or shall be included as part of that report:

a. All failures, maintenance, and other events recorded shall be identified by accumulated operating cycles in the test procedure as appropriate. Test conditions during the failures or irregular operations identified shall be recorded.
b. Description of the engineering reasoning and of any test conducted to determine assignable causes for all failures and irregular operations identified.
c. Description of the engineering reasoning verifying corrections made or to be made on production items, or proposed to be made, that substantiate the predicted effectiveness of those corrections.
d. Test activity or contractor comments on item features or requirements that, if modified, should improve the item.

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e. Test activity or contractor comments on field conditions on procedures to be avoided or cultivated to increase the reliability and useful life of the item.
f. Estimates (± 5 percent of actual experienced) of man-hours required for each maintenance and servicing action during the tests. A brief description of the qualifications and experience of the personnel involved shall be included, and shall be adequate to allow comparison to the personnel anticipated in similar fieldwork.

TABLE V. First article inspection.

Inspection	Requirement paragraph	Test paragraph
6 samples		
Visual and mechanical examination	3.1, 3.4, 3.13	4.6.1
Group I - 4 samples		
Horizontal engaging and disengaging	3.5.10	4.6.11
Temperature rise	3.5.8	4.6.10
Current overload	3.5.9	4.6.9
Dielectric withstanding voltage	3.5.6	4.6.7
Insulation resistance	3.5.7	4.6.8
2 samples – on half of group I		
Thermal shock	3.5.1	4.6.2
Salt fog	3.5.3	4.6.4
Mechanical shock	3.5.5	4.6.6
2 samples – on half of group I		
Moisture resistance	3.5.2	4.6.3
Immersion	3.5.4	4.6.5
Durability	3.5.13	4.6.14
Group II - 2 samples		
Female connector power contact strength	3.5.11	4.6.12
Contact mounting strength	3.5.12	4.6.13

4.5 Conformance inspection.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections and shall be performed on a lot-by-lot basis.

4.5.2 Inspection lot. An inspection lot shall consist of all the connectors and associated fittings comprised of identical piece parts produced under essentially the same conditions and offered for inspection at one time.

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4.5.2.1 Group A inspections. Group A Inspection shall consist of the inspections specified in table VI, and shall be made on the same set of sample units in the order shown.

TABLE VI. Group. A inspection.

Inspection	Requirement paragraph	Method paragraph
Visual and mechanical examination		4.6.1
Material	3.3	4.6.1
Finish	3.10	4.6.1
Dissimilar metals	3.3.2.2	4.6.1
Design and construction	3.4	4.6.1
Marking	3.12	4.6.1
Workmanship	3.13	4.6.1
Dielectric withstanding voltage	3.5.6	4.6.7

4.5.2.2 Group B inspection. Group B inspection shall consist of the inspections specified in table VII in the order shown, and shall be made on sample units which have been subjected to and passed the group A inspection. Connectors having identical piece parts may be combined for lot purposes and shall be in proportion to the quantity of each part-numbered connector produced.

TABLE VII. Group B inspection.

Inspection	Requirement paragraph	Method paragraph
Force to disengage	3.5.10	4.6.16

4.5.2.3 Sampling plan. A sample of parts shall be randomly selected in accordance with table VIII. If one or more defects are found, the lot shall be rescreened and defects removed. After screening and removal of defects, a new sample of parts shall be randomly selected in accordance with table VIII. If one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification.

4.5.3 Disposition of sample units. Sample units which have passed all the group B inspections may be delivered on the contract or purchase order if the lot is accepted. Any connector or connector part deformed or otherwise damaged during testing shall not be delivered on the contract or order.

4.6 First article inspection methods.

4.6.1 Examination of product. Connectors shall be examined to verify that dimensions, materials, design, construction, marking and workmanship requirements of this specification and in accordance with the applicable specification sheets. (see 3.1, 3.4 and 3.13).

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TABLE VIII. Sampling plan. 1/

Lot size	Sample size
2 to 8	all
9 to 150	13
151 to 280	20
281 to 500	29
501 to 1,200	34

Lot size	Sample size
1,201 to 3,200	42
3,201 to 1,0000	50
10,001 to 35,000	60
35,001 to 150,000	74
150,001 to 500,000	90
500,001 and over	102

1/ The acceptance number in all cases is zero.

4.6.2 Thermal shock (see 3.5.1). Mated connectors shall be tested in accordance with MIL-STD-202, method 107, and the following requirements, exceptions, and clarifications.

a. The test type shall be air and the test condition shall be A.
b. The exposure time in air at the temperature extremes shall be 4 hours.

4.6.3 Moisture resistance (see 3.5.2). Mated connectors shall be tested in accordance with MIL-STD-202, method 106, and the following requirements and clarifications.

a. The samples shall be conditioned at 122°F for 24 hours prior to starting this test. The humidity shall be uncontrolled during this conditioning period.
b. A male and female connector shall be mated to simulate the normal operating condition.
c. The vibration test portion of the test is not required.
d. Prior to the first cycle, a dielectric withstanding voltage test shall be performed in accordance with 4.6.7.
e. No polarization voltage shall be applied during the test.
f. The dielectric withstanding voltage test required at high humidity shall be performed on unmated connectors. Excess water shall be wiped off the exterior of the mated assembly prior to disengaging the connectors.
g. For safety, electrically insulated rubber gloves or other suitable protection shall be worn by the person performing the dielectric withstanding voltage test at high humidity.

4.6.4 Salt fog (see 3.5.3). Mated connectors shall be tested in accordance with MIL-STD-810, method 509, procedure I, and the following requirements and clarifications.

a. The salt fog exposure shall he a minimum of 48 hours, followed by a 48 hour drying period.
b. Cyclic testing is not required.
c. The salt concentration shall be 5 percent.
d. The salt fog test shall be considered a destructive test. As such, samples used for the salt fog test shall not be used for subsequent tests, except they may be used for the mechanical shock test (see 4.6.6) at the option of the manufacturer.

4.6.5 Immersion (see 3.5.4). Assembled female connectors shall be immersed in each of the following fluids for a period of 20 hours in each fluid:

a. MIL-PRF-7808 and grade JP-4 turbine fuel conforming to MIL-DTL-5624.
b. Upon completion of the required immersion, the connector shall be wiped free of fluids with a dry cloth.
c. Do not use solvents to soak or clean the contacts after immersion and prior to the engaging and disengaging test.

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4.6.6 Mechanical shock (3.5.5). Unmated male and female connector shall be dropped to a hard, level concrete surface. The concrete shall be a 4 inches thick. The connector shall be attached to an insulated cable containing four 4/0 and two 12 AWG conductors 10 feet in length. A rope shall be secured to the cable 24 ± 2 inches from the face of the connector. The rope shall be used to raise the cable until the connector face is a minimum of 6 feet from the concrete surface. The end of the conductors opposite the connector end shall remain in contact with the concrete surface. The rope shall he released allowing the connector to free fall to the concrete. This sequence shall be repeated 15 times.

4.6.7 Dielectric withstanding voltage test (see 3.5.6). Unmated connectors shall be tested in accordance with MIL-STD-202, Method 301 and the following requirements.

a. Testing shall be conducted at the ambient conditions specified in 4.3.1 unless otherwise specified.
b. The test voltage shall be 2500 volts AC.
c. The test voltage shall be applied between all pairs of contacts, and between all contacts and metal non-current carrying parts of the connector.
d. The test voltage shall be raised from zero to the specified value as uniformly as possible, at a rate of approximately 500 volts AC per second. The test voltage shall be gradually reduced to avoid voltage surges.

4.6.8 Insulation resistance (see 3.5.7). Unmated connectors shall be tested in accordance with test procedure EIA-364-21 and the following.

a. No cleaning or special conditioning is required.
b. The minimum insulation resistance shall be 500 megohms.
c. Electrification time of 2 minutes shall be allowed.
d. Insulation resistance readings shall be taken between all pairs of contacts, and between all contacts and metal non-current carrying parts of the connector.

4.6.9 Current overload (see 3.5.9). A continuous current of 300 amps for 1 hour, 450 amps for 1/2 hour, and 800 amps for 3 minutes shall be passed simultaneously through all contacts in a mated pair of connectors except the grounding and control contacts. The test current frequency shall be the rated frequency for the connector being tested. After the test, the connectors shall be visually inspected for damage.

4.6.10 Temperature rise (see 3.5.8). Male and female connectors shall be tested in accordance with test procedure EIA-364-70, method 1, with the following exceptions and clarifications:

a. A continuous current, as specified in table I, shall be passed simultaneously through all mated contacts, except the grounding contact, for a minimum of 4 hours or until the temperature of the connector is constant.
b. The test current shall be applied after the first mating action of the connectors under test.
c. The temperature rise shall not exceed the values listed in table I.
d. The thermocouples are to be attached to the rear of each current carrying contact where the conductor enters the contact.
e. A male and female connector can be mated and tested simultaneously. Thermocouples shall be attached to the male and female connectors.

4.6.11 Horizontal engaging and disengaging forces (see 3.5.10). Male and female connectors shall be tested as follows:

a. Engage and disengage the sample connector pairs twice before performing the test.
b. Engage the connector pair measuring the force required for full engagement.
c. Disengage the connector pair measuring the withdrawal force.

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4.6.12 Female connector power contact strength (see 3.5.11). The female contacts shall be tested by hanging a weight on the rear of the specially constructed contact extension device with a male contact inserted to a depth of 2.250 ± 0.062 inch from the face of the female connector. The weight shall hang free at a distance that will yield a moment of 12 ± 1/2 ft-lb. The moment shall be calculated using a point located at the tip of the inserted male contact as the fulcrum.

4.6.13 Male and female contact mounting strength (see 3.5.12). Torque shall be applied to each contact to assure the contacts are adequately bonded to the connector insert and will not be damaged during normal service. The following details shall apply:

a. Metallic rods (shape optional) shall be procured, one for each contact size being tested. The rods shall have some means to permit the rod to be coupled to a torque wrench (square end, hex stock, socket welded to end, etc.). A flat area may be machined on the rod to provide a seat for the set screws. The circumscribed diameter of the rods shall approximate the conductor diameter of the maximum cable size specified for the contact being tested.
b. Torque wrenches permitting each test range to be read in the upper half of the scale shall be used. For greater ease, the wrench should be capable of reading torque in both clockwise and counter-clockwise directions. Torque wrench accuracy shall be ± 2 percent of the measured value.
c. A clamping or holding fixture for the connector shall be used. This fixture must hold the connector securely when the test torque is applied to the contacts. The clamping or mounting scheme shall not damage the connector or bias the test results. Slight rotation of the connector during the test is permissible if it does not influence the test results.
d. The metallic rod shall be inserted into the contact being tested and secured in the contact with the setscrews used to secure the conductor in the contact.
e. A torque wrench shall be connected to the metallic rod.
f. A clockwise and counterclockwise torque in accordance with 3.5.7 shall be applied to each contact and held for a period of one minute.
g. The torque shall be released and the connector allowed to relax for two minutes

4.6.14 Durability (see 3.5.13). One completely assembled male and mating female connector. A male connector shall be rigidly clasped and mounted in a horizontal attitude to accept a counterpart female connector. The female connector shall be positioned in a test rig to allow engagement with the male connector. The connector shall be dry. The following details shall apply:

a. The connectors shall be alternately engaged and disengaged for 575 cycles under standard atmospheric conditions (see 4.3.1), simulating one engagement and disengagement per day for approximately 3 years.
b. One engagement and disengagement of a connector constitutes one cycle.
c. The durability test shall be considered a destructive test. As such, samples used for the durability test shall not be used for subsequent tests.
d. The cable required for the contact resistance tests (see 4.6.15) may be left attached to the connectors during the durability test.

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4.6.15 Contact resistance test. A connector shall be tested for contact resistance in accordance with EIA-364-06 and the following requirements, exceptions, and clarifications.

a. Individual contacts shall be mated to the connector being tested.
b. The individual contacts shall have a minimum of 3 feet of single conductor cable attached for heat dissipation. The conductor size shall be the minimum allowable conductor size for the connector being tested.
c. The test samples shall not be cleaned by any means prior to the test, nor shall any lubricants or other coatings be applied.
d. A minimum of 3 feet of single conductor cable shall be attached to each of the contacts for heat dissipation.
e. The DPDT reversing switch shown in EIA-364-06 is not required.
f . Reverse current readings are not required.
g. One voltmeter probe shall be connected to the sample at the rear of the connector contact at the point where the conductor enters the contact. The probe shall be in contact with the connector contact. The other voltmeter probe shall be connected to the individual contact at the point where the conductor enters the contact.

4.6.16 Horizontal disengaging forces. Engage and disengage the sample connector pairs twice before making the following test. Engage the plugs, then measure withdrawal force for conformance to table III, using the forces for condition A.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

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 male and female connectors and receptacles covered by this specification are intended for use with ground support and base facility equipment (ramp or wall-mounted outlets) requiring 416/240 VAC.

6.2 Acquisition requirements. Acquisition requirements must specify the following:

a. Title, number, and date of this specification.
b. Nomenclature, MS, and dash number of connectors.
c. When first article inspection is required (see 3.2).
d. Refer to Section 5 of this specification for packaging requirements. This includes any special shipment marking or preservation requirements.

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6.3 Definitions. For the purpose of this specification, the following definitions apply:

6.3.1 Connector. Connector is defined as a male or female plug, receptacle or receptacle insert.

6.3.2 Male connector. Male connector is defined as the connector which has pin contacts.

6.3.3 Female connector. Female connector is defined as the connector which has socket contacts.

6.3.4 Power contacts. Power contacts are defined as pins and sockets on the intermating power current-carrying part of the connector.

6.3.5 Insert. An insert is the insulated part (body) of the connector in which the contacts are arranged.

6.4 Environmentally preferable material. Environmentally preferable materials should be used to the maximum extent possible to meet the requirements of this specification. As of the dating of this document, the U.S. Environmental Protection Agency (EPA) is focusing efforts on reducing 31 priority chemicals. The list of chemicals and additional information is available on their website at http://www.epa.gov/osw/hazard/wastemin/priority.htm. Included in the EPA list of 31 priority chemicals are cadmium, lead and mercury. Use of these materials should be minimized or eliminated unless needed to meet the requirements specified herein (see Section 3).

6.5 Subject term (key word) listing.

Female receptacle
Hazardous
Male receptacle
Non-hazardous
Ramp outlet
Wall-mounted outlet

6.6 Tin whisker growth. The use of alloys with tin content greater than 97 percent, by mass, may exhibit tin whisker growth problems after manufacture. Tin whiskers may occur anytime from a day to years after manufacture and can develop under typical operating conditions, on products that use such materials. Conformal coatings applied over top of a whisker-prone surface will not prevent the formation of tin whiskers. Alloys of 3 percent lead, by mass, have shown to inhibit the growth of tin whiskers. For additional information on this matter, refer to ASTM B545 (Standard Specification for Electrodeposited Coatings of Tin) (see 3.3.2.3).

6.7 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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CONCLUDING MATERIAL

Custodians:
Air Force - 85
DLA - CC

Review activity:
Air Force – 99

Preparing activity:
DLA - CC

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