INCH-POUND

MIL-DTL-32385
14 July 2011
SUPERSEDING
MS90335D
5 January 1996

DETAIL SPECIFICATION

CONNECTOR, RECEPTACLES, PLUGS, ADAPTER, USED ON ELECTROLUMINESCENT, EMBEDDED, AND PRINTED CIRCUIT BOARD LAMP LIGHTING PANELS

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

1. SCOPE

1.1 Scope. This specification covers receptacles, plugs, and an adapter, which are used to supply power to electroluminescent, embedded, and printed circuit board lamp lighting panels. The terms "receptacles", "plugs", and "adapter" will hereinafter be referred to as "connectors".

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 the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications and standards. The following specifications and standards 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.

Comments, suggestions, or questions on this document should be addressed to Defense Logistics Agency Aviation VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616, or e-mailed to STDZNMGT@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at https://assist.daps.dla.mil/.

FEDERAL SPECIFICATION

L-P-380	- Plastic Molding Material Methacrylate

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-7788	- Panels, Information, Integrally Illuminated
MS25082	- Nut, Plain, Hexagon Electrical - Thin
MIL-DTL-45204	- Gold Plating, Electrodeposited

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-202	- Electronic and Electrical Component Parts
MIL-STD-810	- Environmental Engineering Considerations and Laboratory Tests
MIL-STD-31000	- Technical Data Packages

(Copies of these documents are available at https://assist.daps.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other government document. The following other government document forms a part of this document to the extent specified herein. Unless otherwise specified, the issues of this document is that cited in the solicitation or contract.

OTHER GOVERNMENT DOCUMENT

SD-6	- Provisions Governing Qualification

(Copies of this document are available at https://assist.daps.dla.mil/ or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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.

AEROSPACE INDUSTRIES ASSOCIATION (AIA)

NASM35333	- Washer, Lock, Flat, Internal Tooth

(Copies of this document are available at http://www.aia-aerospace.org/ or from Aerospace Industries Association, 1000 Wilson Blvd, Suite 1700, Arlington, VA 22209-3928.)

AMERICAN SOCIETY FOR QUALITY (ASQ)

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

(Copies of this document are available at http://www.asq.org or from the American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53023.)

ASTM INTERNATIONAL

ASTM B16/B16M	- Standard Specification for Free-Cutting Brass Rod, Bar and Shapes for Use in Screw Machines
ASTM B196/B196M	- Standard Specification for Copper-Beryllium Alloy Rod and Bar
ASTM B36/B36M	- Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar
ASTM B545	- Standard Specification for Electrodeposited Coatings of Tin
ASTM D1710	- Standard Specification for Extruded Polytetrafluoroethylene (PTFE) Rod, Heavy Walled Tubing and Basic Shapes
ASTM D3222	- Standard Specification for Unmodified Poly (Vinylidene Fluoride) (PVDF) Molding Extrusion and Coating Materials
ASTM D3935	- Standard Specification for Polycarbonate (PC) Unfilled and Reinforced Material

(Copies of these documents are available at http://www.astm.org or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

SAE INTERNATIONAL

SAE AMS 2418	- Plating, Copper
SAE AMS-QQ-N-290	- Nickel Plating (Electrodeposited)
SAE AMS-H-7199	- Heat Treatment of Wrought Copper-Beryllium Alloys, Process for (Copper Alloys: Numbers C17000, C17200, C17300, C17500, and C17510)

(Copies of these documents are available at http://www.sae.org or from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001.)

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 Qualification. Connectors furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.2.1 Maintenance of qualification. At specified intervals determined by the qualifying activity, the manufacturer shall be able to demonstrate that the company still has the capabilities and facilities necessary to produce the QPL items in accordance with this specification and in accordance with the provisions governing qualification specified in SD-6. The procuring activity or qualifying activity reserves the right to require additional tests and/or a facilities inspection to determine compliance with this specification.

3.3 Materials.

3.3.1 Body (MIL-DTL-32385/1, /2, /3, /4, and /7). Bodies for MIL-DTL-32385/1, /2, /3, /4, and /7 shall be constructed of brass in accordance with ASTM B16, temper H02.

3.3.2 Insulator (MIL-DTL-32385/1, /2, /3, /4, and /7). Insulators for MIL-DTL-32385/1, /2, /3, /4, and /7 shall be constructed of polytetrafluoroethylene in accordance with ASTM D1710.

3.3.3 Base insulator (MIL-DTL-32385/5). Base insulators for MIL-DTL-32385/5 shall be constructed of methacrylate in accordance with L-P-380, clear.

3.3.3.1 Alternate base insulators (MIL-DTL-32385/5). Alternate base insulators for MIL-DTL-32385/5 shall be constructed of polyvinylidene fluoride in accordance with ASTM D3222, type I, grade 1; or polycarbonate in accordance with ASTM D3935, designation PC0110B30740EB140ED030EE150EG010FL012.

3.3.4 Base insulator (MIL-DTL-32385/6). Base insulators for MIL-DTL-32385/6 shall be constructed of polyvinylidene fluoride in accordance with ASTM D3222, type 1, grade 1.

3.3.5 Center contact (MIL-DTL-32385/1, /2, /3, /4, and /7). Center contacts for MIL-DTL-32385/1, /2, /3, /4, and /7 shall be constructed of beryllium copper in accordance with ASTM B196, temper TD04, heat treat in accordance with SAE-AMS-H-7199.

3.3.6 Center pin (MIL-DTL-32385/5 and /6). Center pins for MIL-DTL-32385/5 and /6 shall be constructed of brass in accordance with ASTM B16, temper H02.

3.3.7 Collar (MIL-DTL-32385/5 and /6). Collars for MIL-DTL-32385/5 and /6 shall be constructed of beryllium copper in accordance with ASTM B196, temper TD04; heat treat in accordance with SAE-AMS-H-7199.

3.3.8 Solder lug (MIL-DTL-32385/1 and /2). Solder lugs for MIL-DTL-32385/1 and /2 shall be constructed of brass in accordance with ASTM B36, temper H02.

3.3.9 Ground contact (MIL-DTL-32385/3 and /4). Ground contacts for MIL-DTL-32385/3 and /4 shall be constructed of brass in accordance with ASTM B16, temper H02.

3.4 Finish.

3.4.1 Center and ground contacts (all). Center and ground contacts shall be gold plated in accordance with MIL-G-45204, type II, grade C, class 0 (.000030 minimum thickness). Plating shall be applied over copper strike in accordance with SAE AMS 2418.

3.4.2 Hardware (MIL-DTL-32385/1, /2, /3, and /4). Hardware specified for MIL-DTL-32385/1, /2, /3, and /4 includes MS25082 nuts and associated internal tooth washers, and NASM35333 internal tooth washers and associated machine screws. Hardware shall be plated with electrodeposited nickel in accordance with SAE AMS-QQ-N-290, class 1, grade F (.0004). Plating shall be applied over copper in accordance with SAE AMS 2418.

3.4.3 Outer threaded barrel (MIL-DTL-32385/3 and /4). The outer thread barrels for MIL-DTL-32385/3 and /4 shall be plated with electrodeposited nickel in accordance with SAE AMS-QQ-N-290, class 1, grade F (.0004), over copper in accordance with SAE AMS 2418.

3.4.4 Solder lug (MIL-DTL-32385/1 and /2). Solder lugs for the MIL-DTL-32385/1 and /2 shall be tin plated in accordance with ASTM B545, service condition C, 0.0003 - 0.0005 thick. Tin plating shall be applied over copper flash in accordance with SAE AMS 2418.

3.4.5 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable 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.

3.5 Design.

NOTE: The connectors described by this specification will interface directly with the integrally illuminated information panels that are specified by MIL-DTL-7788. Certain requirements from MIL-DTL-7788 that have not been expressly specified towards the connectors in this specification may apply after the connector has been assembled onto an information panel. One example is vibration testing: Although vibration testing is not a requirement for the connectors described under this specification, they may be subjected to vibration testing under MIL-DTL-7788 after being assembled into an information panel.

3.5.1 Withdrawal force of center contact (MIL-DTL-32385/1, /2, /3, /4, and /7). Female center contact fingers shall close down uniformly and shall have a minimum withdrawal force of 4 ounces of force when using a pin of 0.079 inch diameter. Withdrawal force shall be measured before and after 3 insertions and withdrawals of a 0.082 inch diameter pin have been made.

3.5.2 Withdrawal force of center contact and collar (MIL-DTL-32385/1, /2, /3, /4, and /7). When mated to a MIL-DTL-32385 /5, or /6 plug that has been inserted to a depth of 0.140 ± 0.005 inch, the connector shall have a minimum withdrawal force of 3 pounds of force (lbf) and a maximum withdrawal force of 10 lbf.

3.5.3 Captivation of insulator and center contact (MIL-DTL-32385/1 and /2). Captivation of the insulator and the center contact shall maintain 12 lbf when a withdrawal force is applied from the interface end. (The interface end is the receptacle end of the connector that connects into a MIL-DTL-32385/5 or /6 plug.)

3.5.4 Screw locations (MIL-DTL-32385/4). The locations of the screws are optional provided the connector's maximum length of 0.875 inch is not exceeded.

3.5.5 Collars (MIL-DTL-32385/5 and /6). Collars shall have a minimum of four slots and a maximum of six slots.

3.5.6 Soldering contacts (MIL-DTL-32385/6). All four contacts should be fully soldered to a printed circuit board when MIL-DTL-32385/6 is installed onto a panel. Variations in solder tab size, 0.126 - 0.280 inch, are intended to allow for space limitations. The larger tab shown on the specification sheet is preferred and should be incorporated into new designs when practical.

3.5.7 Soldering contacts optional construction (MIL-DTL-32385/6). An optional construction plug collar that screws into the base may be offered, providing mating interface dimensions are maintained. Final part assembly shall be performed using a conductive cement and shall maintain 0.130 - 0.135 inch insertion depth into the female receptacle.

3.5.8 Adapter (MIL-DTL-32385/7). Adapter MIL-DTL-32385/7 shall allow conversion of type III information panels to type IV, type V, or type VI information panels.

3.5.9 Solder lug (MIL-DTL-32385/1 and /2). A separate solder lug, as depicted in the specification sheets, shall be provided with these connectors.

3.5.10 Manufacturer's identification (MIL-DTL-32385/1, /2, /3, /4, and /7). The manufacturer's identification mark shall be permanently stamped into the metal part of the connectors.

3.5.11 Insulator dimension (MIL-DTL-32385/1 and /2). The insulator depicted in the specification sheets shall not exceed the connector's body diameter.

3.5.12 Angular tolerance of collar interface (MIL-DTL-32385/1, /2, /3, /4, and /7). The angular dimension of the surface that mates with the collar of MIL-DTL-32385/5 and /6 shall be 2.5 degrees nominal.

3.5.13 Current capability (all). The current loading of the connectors described herein is limited to the current-carrying capacity of the wire used in the associated interconnecting cabling.

3.5.14 Interchangeability. All connectors having the same manufacturer's part identification number shall be functionally and dimensionally interchangeable. The drawing number requirements of MIL-STD-31000 shall govern changes in the manufacturer's part number.

3.6 Performance. The connectors shall perform satisfactorily when subjected to the test requirements specified in Section 4.

3.6.1 Salt fog. The connectors shall be subjected to a salt fog test performed in accordance with 4.5.2. Upon completion of the salt fog test, there shall be no evidence of corrosion that would interfere with mating or unmating of the connectors; nor shall there be any exposure of the base metal of plated parts. There shall be no evidence of other deterioration that would affect operation.

3.6.2 Humidity. The connectors shall be subjected to a humidity test performed in accordance with 4.5.3. Upon completion of the humidity test, inspection shall reveal no evidence of cracking or separation of the insulation.

3.6.3 Temperature shock. The connectors shall be subjected to a temperature shock test performed in accordance with 4.5.4. Upon completion of the temperature shock test, there shall be no evidence of cracking, crazing, or other physical damage to the connector. Discoloration of insulation or sealing material shall not constitute failure. The connectors shall be capable of being manually mated and unmated at low temperature.

3.6.4 Insulation resistance. The connector leakage current shall not exceed 50 microamperes (μA) when tested in accordance with 4.5.5.

4. VERIFICATION

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

a. Qualification inspection (see 4.2).
b. Conformance inspection (see 4.3).

4.2 Qualification inspection. Qualification inspections are the group I tests shown in table I.

TABLE I. Qualification and conformance inspection.

Inspections	Requirement paragraph	Test paragraph	Test	
			Group I	Group II
Examination of product:				
Visual, mechanical examination	3.1	4.5.1	X	X
Materials	3.3	4.5.1	X	X
Finish	3.4	4.5.1	X	X
Withdrawal force of center contact	3.5.1	4.5.1	X	X
Withdrawal force of center contact and collar	3.5.2	4.5.1	X	X
Captivation of insulator and center contact	3.5.3	4.5.1	X	X
Environmental:				
Salt fog	3.6.1	4.5.2	X	-
Humidity	3.6.2	4.5.3	X	-
Temperature shock	3.6.3	4.5.4	X	-
Insulation resistance	3.6.4	4.5.5	X	X

4.2.1 Sample size. A sample consisting of six specimens of each connector type shall be submitted for the group I tests of table I.

4.3 Conformance Inspection. The contractor shall perform all of the group II tests as specified in table I. All quality related inspection and test records shall be maintained for a minimum period of 7 years from the date of manufacture. These quality records shall be housed at the manufacturing site and shall be available for review upon request.

4.3.1 Conformance tests. Each connector submitted for acceptance shall be subjected to the group II conformance tests listed in table I. These tests need not be performed in the order listed. These tests will be used to determine compliance with the requirements of design, construction, and workmanship. If a connector fails any of the group II tests listed in table I, the lot represented by the test sample shall be rejected.

4.3.1.1 Inspection lot. An inspection lot shall consist of all connectors of the same type produced under essentially the same manufacturing conditions and submitted for inspection at the same time.

4.3.1.2 Sampling plan. Unless otherwise specified, sampling procedures for conformance inspections and examinations shall be in accordance with ASQ Z1.4, inspection level S-3. Acceptance quality limits (AQL) will be as specified in the contract (see 6.2).

4.3.1.3 Resubmitted inspection lot. For inspections and tests using representative sample connectors, ASQ Z1.4 shall apply except that a resubmitted inspection lot shall be inspected using an increased sample size. An increased sample size represented by the next higher sample size code letter shall be selected. Before resubmission, a detailed description of the cause for the previous rejection and the actions taken to correct the defects found in the inspection lot shall be documented by the contractor. The detailed description shall be available for review by the procuring activity when requested.

4.3.2 Defective connectors. When a defective connector is detected, no items from those still on-hand or produced later shall be released until the extent and cause of failure have been determined and corrected.

4.4 Test conditions.

4.4.1 Atmospheric conditions. Unless otherwise specified in the individual equipment specification, all inspections herein shall be performed at atmospheric pressure of 28 to 32 inches (711.2 to 812.8 millimeters) mercury (Hg) at a temperature of 70 °F ±5 °F (21 °C ±3 °C) and at a relative humidity of 80 percent or less.

4.5 Test methods.

4.5.1 Examination of product. Each sample connector submitted shall be examined to determine conformance with applicable drawings and the requirements of section 3. Workmanship shall be examined thoroughly to insure compliance with the appropriate requirements with respect to materials (see 3.3), finish (see 3.4), withdrawal force of center contact (see 3.5.1), withdrawal force of center contact and collar (see 3.5.2), and captivation of insulator and center contact (see 3.5.3), using appropriate measurement equipment.

4.5.2 Salt fog. The connector shall be tested to salt fog testing in accordance with method 101 of MIL-STD-202 for 26 hours. The connector shall then be examined to verify that it meets all requirements of 3.6.1.

4.5.3 Humidity. The connector shall be subjected to ten cycles of humidity testing in accordance with procedure II of method 507 of MIL-STD-810. The connector shall then be examined to verify that it meets all requirements of 3.6.2.

4.5.4 Temperature shock. The connector shall be placed into a temperature controlled cold chamber maintained at -85 °F (-65 °C) for one hour. The connector shall then be removed from the cold chamber and placed as rapidly as is practicable (within 3 minutes) into an oven whose temperature is maintained at +185 °F (+85 °C) for one hour. This procedure shall be repeated four additional times. During the last transition from the cold chamber to the oven, the connectors shall be mated and unmated to verify proper fit at the low temperature extreme prior

to placement into the oven. Upon completion of the last oven cycle, the connector shall then be allowed to cooled naturally to room ambient temperature and shall be examined to verify that it meets all requirements of 3.6.3

4.5.5 Insulation resistance. The connector shall have previously met the requirements of 3.6.1. A potential of 500 VAC, 60 Hz, shall be applied between the center contact and the ground contact on the connector for 60 seconds. Upon completion, record the leakage current in µA. A potential of 500 volts DC shall then be applied between the center contact and the ground contact on the connector. Upon completion, record the leakage current in µA. The recorded leakage currents shall not exceed the requirements of 3.6.4.

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 connectors covered by this specification are intended for use on control and instrument panels for aircraft, ground, and shipboard applications.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Title, number, and date of the applicable specification sheet and the part number.
c. AQL (see 4.3.1.2).
d. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in QPL-32385 whether or not such products have actually been listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Defense Logistics Agency Aviation VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616 or STDZNMGT@dla.mil.

6.4 Subject term (key word) listing.

Humidity
Insulation resistance
Integrally illuminated
Salt fog
Temperature shock
Withdrawal force

6.5 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.

Custodians:
Army - AV
Navy - AS
Air Force - 85
DLA - GS

Review Activities:
Navy - MC, SH

Preparing Activity:
DLA - GS2

(Project 5935-2011-030)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at https://assist.daps.dla.mil/.