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QUALITY ASSURANCE REQUIREMENTS FOR SERIES III & SERIES II CONNECTORS –AVIONIC SUBSYSTEMS

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QA REQUIREMENTS FOR SERIES III & SERIES II CONNECTORS AVIONIC SUBSYSTEMS

1. Connectors to be procured from QPL (Qualified product list)/ QML (Qualified manufacturer list) sources only.
2. MIL conformance report & QPL report to be submitted along with the connectors.
3. Connectors should undergo Screening tests as per screening specifications given below. Screening reports to be submitted.

REFERENCE STANDARDS

1. MIL-DTL-38999 K: CONNECTORS, ELECTRICAL, CIRCULAR, MINIATURE, HIGH DENSITY, QUICK DISCONNECT (BAYONET, THREADED, AND BREECH COUPLING), ENVIRONMENT RESISTANT, REMOVABLE CRIMP AND HERMETIC SOLDER CONTACTS, GENERAL SPECIFICATION FOR

2. MIL-C-26482 H: CONNECTORS, ELECTRICAL, CIRCULAR, MINIATURE, QUICK DISCONNECT, ENVIRONMENT RESISTING, RECEPTACLES AND PLUGS, GENERAL SPECIFICATION FOR

3. SAE AS 39029: CONTACTS, ELECTRICAL CONNECTOR, GENERAL SPECIFICATION FOR

4. EIA-364: TEST METHODS FOR ELECTRICAL CONNECTORS

5. MIL-STD-1560: INSERT ARRANGEMENTS FOR MIL-DTL-38999, MIL-DTL-27599 AND MIL-C-29600 SERIES A ELECTRICAL CIRCULAR CONNECTORS

6. MIL-STD-1669: INSERT ARRANGEMENTS FOR MIL-DTL-26482 ENVIRONMENT RESISTING, CIRCULAR, ELECTRICAL CONNECTORS

SAMPLING PLAN

In each type of connectors two samples shall be selected randomly from the batch. The screening specifications and requirements are given in Table-1, Table-2.

TABLE-1: SCREENING SPECIFICATIONS FOR SERIES-III CONNECTORS

Inspection / Test	Test Methods, Conditions, and Requirements	Sample size
1.Visual inspection	Each connector and accessory shall be visually examined for completeness, workmanship, and identification requirements. Missing, twisted, buckled, kinked, or damaged gaskets, damaged RFI ring shall be cause for rejection. Marking to be verified on insert for PIN/socket numbers and connector part number. Visual examination with 10X magnification for coarse surface finish, physical damage, corrosion. Key or keyway positions. Registration of grommet and insert markings (Hole pattern between the grommet and the front face of the insert). Physical mating of male with female counterparts. COC certificate for connectors & contacts to be verified as per the above specified standard. Refer Annexure-I	100%
2.Mating and De-mating	2 cycles Must mate and demate with mating connector. The connectors shall show no defects detrimental to the operation of the connector. While mating and de-mating verify damages to the shell, keys, RFI ring and any metal particles falls after mating and demating. Refer annexure -I	2 samples from each type
3.Insulation Resistance (At ambient Temperature)	**Test voltage:** 500V ± 10% a. Measurement shall be made between i) 6 pairs of adjacent contacts ii) 6 contacts adjacent to the shell and connector shell iii) Contacts selected shall be those having the closest spacing between measuring points. If the number of contacts is three or less, all contacts shall be tested. **Requirements:** The insulation resistance between any pair of contacts and between any contact and the shell shall be greater than 5000 megohms.	2 samples from each type

4. **Dielectric Withstanding Voltage (Sea Level)**	**Test method**: Unmated, wired connectors shall be tested in accordance with test procedure EIA-364-20, test method A. a. The magnitude of the test voltage : 1300 Vrms (ac) b. Six dielectric withstanding voltage readings to be taken between ■ 3 pairs of adjacent contacts ■ 3 contacts adjacent to the shell and shell c. Contacts selected shall be those having the closest spacing between measuring points. d. If the number of contacts is three or less, all contacts shall be tested. The test voltage shall be applied between each wired contact, and each adjacent contact, and the shell. e. The test voltage shall be maintained at the specified value for 1 second minimum. f. For conformance testing, simulated contacts and special techniques may be used in performing this test **Requirements:** Maximum leakage current shall be 2 milliamperes and there shall be no evidence of electric breakdown or flashover.	2 samples from each type
5. **Contact Retention**	(a) **No. of Samples:** The test shall be performed on 100 percent of the contacts. (b) **Applied axial load** : 6 pounds. **Axial direction** The applicable forces shall be applied along the longitudinal axis of individual contacts in the direction tending to displace the contacts to the rear. **Requirements:** No damage to contacts or inserts or locking mechanism shall result.	2 samples from each type

Table-2. SCREENING SPECIFICATIONS FOR SERIES II CONNECTORS

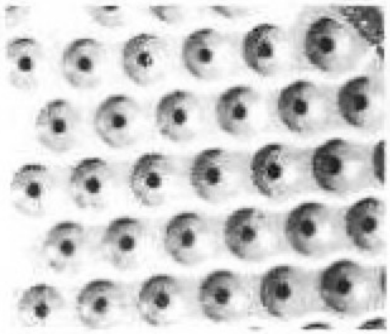
Inspection / Test	Test Methods, Conditions and Requirements	Sample size
1. Examination of product	Each connector and accessory shall be visually examined for completeness, workmanship, and identification requirements. Missing, twisted, buckled, kinked, or damaged gaskets, damaged RFI ring shall be cause for rejection. Marking to be verified on insert for PIN/socket numbers and connector part number. Visual examination with 10X magnification for coarse surface finish, physical damage, corrosion. Key or keyway positions. Registration of grommet and insert markings (Hole pattern between the grommet and the front face of the insert). Physical mating of male with female counterparts. COC certificate for connectors & contacts to be verified as per the above specified standard.	100%
2. Mating and demating	2 cycles Must mate and demate with mating connector. The connectors shall show no defects detrimental to the operation of the connector. • Shell surface is clean, unmarked and undamaged. • Key or keyways are not distorted or damaged or mis-positioned. **Test method**: Unmated, wired connectors shall be tested in accordance with test procedure EIA-364-20, test method A.	2 samples from each type
3. Dielectric Withstanding Voltage (Sea Level)	a. The magnitude of the test voltage : 1500 Vrms (ac) b. Six dielectric withstanding voltage readings to be taken between ■ 3 pairs of adjacent contacts ■ 3 contacts adjacent to the shell and connector shell c. Contacts selected shall be those having the closest spacing between measuring points. d. If the number of contacts is three or less, all contacts shall be tested. The test voltage shall be applied between each wired contact, and each adjacent contact, and the shell.	2 samples from each type

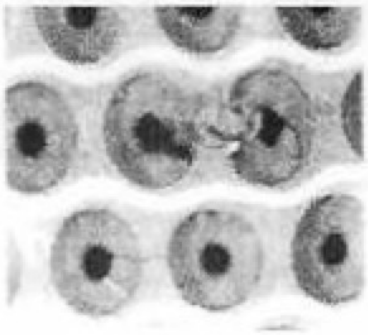
	e. The test voltage shall be maintained at the specified value for 1 second minimum. f. For conformance testing, simulated contacts and special techniques may be used in performing this test **Requirements:** Maximum leakage current shall be 2 milliamperes and there shall be no evidence of electric breakdown or flashover.	
4. Insulation Resistance **(Room Temperature)**	**Test voltage:** 500V ±10%. Measurement shall be made between i) 6 pairs of adjacent contacts ii) 6 contacts adjacent to the shell and shell iii) Contacts selected shall be those having the closest spacing between measuring points. If the number of contacts is three or less, all contacts shall be tested. **Requirements:** The insulation resistance between any pair of contacts and between any contact and the shell shall be greater than 5000 megohms.	2 samples from each type
5. Contact Retention	**Test method:** Connectors shall be tested in accordance with test procedure EIA-364-29. (b) **Applied axial load** **Contact size** — **Axial load, (Pounds)** 20 — 7 12 — 12 (c) **Axial direction** The applicable forces shall be applied along the longitudinal axis of individual contacts in the direction tending to displace the contacts to the rear. **Requirements:** No damage to contacts or inserts or locking mechanism shall result.	2 samples from each type

ANNEXURE-1 : VISUAL EXAMINATION

Some of the visually observed defects were shown below for reference

1. Connector Damage – Limits – Soft Face – Mating Surface or Rear Seal Area

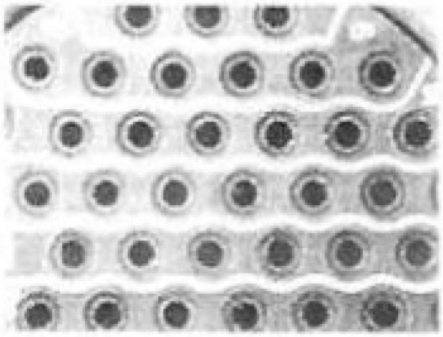


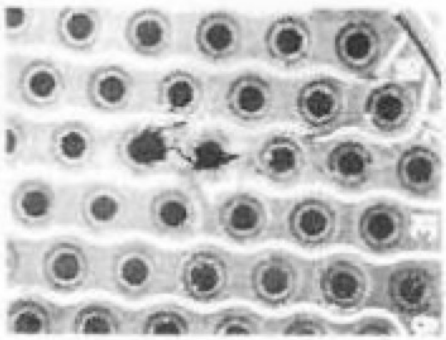


Target: Connector face is intact, with no evidence of cracks, chips, or damage

Defect:
- Cut, fracture or tear in dielectric extends beyond cup diameter
- Cut, fracture or tear that extends from cup through dielectric face or from one cup into another

2. Connector Damage – Limits – Hard Face – Mating Surface

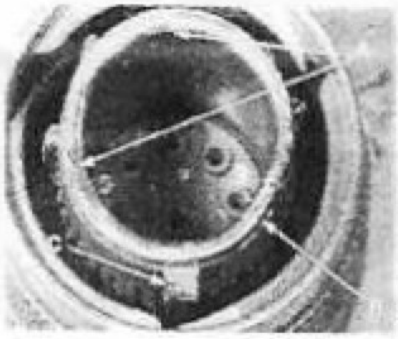




Target: • Connector face is intact with no evidence of chipping, cracks or other damage

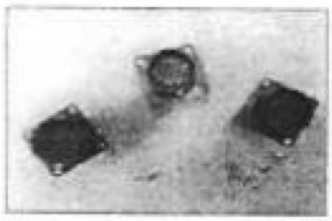
Defect: • Chipping of the dielectric extends from cavity to the outside diameter of any adjacent cavity
• Crack extends from one cavity to another

3 Connector Damage – Criteria after mating and demating

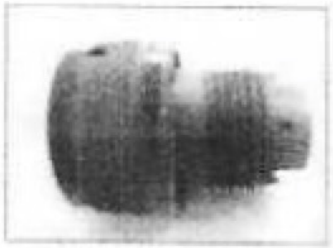


Target -
- Shell surface is clean, unmarked and undamaged.
- Key or keyways are not deforted or damaged or mis-positioned.

Defect:
- Damage such as scratches or burrs (A) that exposes base metal.
- Deformed or distorted inner or outer ring (out-of-round condition) (B)
- Key width or height has been reduced (C).
- Connector shell or body is cracked, fractured or otherwise damaged and the metal pieces were shown in fig above.



Teeth Damage



Grommet Damage