



SERIES 89 NANOMINIATURE CONNECTORS
Circular and Rectangular Connectors
Nanominiature Connector Specifications



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1 SCOPE

1.1 **Scope.** This specification covers performance requirements for Glenair nanominiature connectors manufactured in accordance with MIL-DTL-32139.

1.2 **Description.** Metal shell nanominiature connectors on .025 inch (0.64 mm) centers, with TwistPin contacts.

2 ORDER OF PRECEDENCE

2.1 **Order of Precedence.** In the event of a conflict between the requirements of this specification and the references cited herein, this document takes precedence. The requirements set forth in customer specifications and Glenair detail drawings shall take precedence over this document.

3.1 ELECTRICAL REQUIREMENTS

3.1.1 **Insulation Resistance.** 5,000 megohms minimum between any pair of contacts and any contact and the shell when tested in accordance with EIA-364 Procedure 21. Test voltage 100 volts DC.

3.1.2 **Dielectric Withstanding Voltage.**

3.1.2.1 **Dielectric Withstanding Voltage (sea level).** 250 volts ac, rms 60 Hz. Connectors shall show no evidence of breakdown or flashover when subjected to the DWV test of EIA-364 Procedure 20.

3.1.2.2 **Dielectric Withstanding Voltage (70,000 feet).** 100 volts ac, rms 60 Hz. Connectors shall show no evidence of breakdown or flashover when subjected to the DWV test of EIA-364 Procedure 20.

3.1.3 **Contact Resistance**

3.1.3.1 **Contact Resistance.** The voltage drop of a mated pair of contacts attached to wires shall not exceed 71 millivolt drop maximum using a 1 ampere test current, when tested in accordance with EAI-364-06, using M22759/33-30 wire.

3.1.4 **Low Signal Level Contact Resistance.** When tested with a micro-ohmmeter using a test current of 10 milliamperes maximum, the resistance of a mated pair of contacts shall be 71 milliohms maximum using M22759/33-30 wire. Test procedure shall be in accordance with EIA-364-23.

3.1.5 **Contact Current Capability.** Contacts shall be capable of carrying 1.0 ampere in continuous duty operation from -55° C to +125° C when tested in accordance with EIA-364-70.

3.1.6 **Magnetic Permeability.** Magnetic permeability, when tested in accordance with EIA-364-54, shall not exceed 2 mu.

3.2 MECHANICAL REQUIREMENTS

3.2.1 **Contact Engaging and Separation Force.** Maximum engaging force shall be 5.0 ounces when tested in accordance with MIL-DTL-32139 paragraph 4.7.5. Minimum separation force shall be 0.4 ounces.

3.2.2 **Connector Mating and Unmating Force.** The maximum mating and unmating force shall not exceed a value equal to 7 ounces times the number of contacts, when tested per MIL-DTL-32139 paragraph 4.7.6. Mate connectors three times before initial measurements are taken.



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- 3.2.3 **Contact Retention.** Contacts, when tested in accordance with EIA-364-29, shall withstand a 2 pound axial load for a minimum of 5 seconds.
- 3.2.4 **Crimp Tensile Strength.** Wire shall not break or pull out of crimp joints at an applied force of less than 1.0 pound (0.44 kg) for 30 AWG wire, when tested in accordance with EIA-364-08. Wire breakage other than at the crimp shall not constitute failure.
- 3.2.5 **Insert Retention.** Inserts shall not be dislodged or moved from their original position when subjected to an axial load of 50 pounds per square inch when tested in accordance with EIA-364-35.
- 3.2.6 **Resistance to Soldering Heat.** There shall be no degradation of the plastic, bonding adhesives, or sealing elastomers. Connector insulators shall also be capable of withstanding solder heat without evidence of deteriorating, deforming, or change of physical dimensions in accordance with EIA-364-56.
- 3.2.7 **Solderability.** Printed circuit terminals shall meet the solderability requirements of MIL-STD-202 Method 208.
- 3.2.8 **Durability.** 200 mating and unmating cycles in accordance with test procedure EIA-364-09. Engaging and separation force and mating forces shall not exceed the requirements of 3.2.1 and 3.2.2. Connectors shall withstand shock, vibration and DWV tests following durability.

3.3 **ENVIRONMENTAL REQUIREMENTS**

- 3.3.1 **Salt Spray (corrosion).** Nickel-plated aluminum connectors shall show no exposure of base metal due to corrosion when subjected to the salt spray test of EIA-364-26, condition B, with a 48 hour duration. Stainless and titanium shell connectors shall withstand 500 hour salt spray without corrosion detrimental to the operation of the connector. In addition, connectors shall meet contact resistance, low circuit level contact resistance and mating force requirements.
- 3.3.2 **Fluid Immersion.** Connectors shall meet mating force requirements following 20 hours immersion in synthetic lubricating oil, 2 hours in Perchloroethylene cleaning solvent, and 1 hour immersion in coolanol 25, when tested in accordance with MIL-DTL-32139 paragraph 4.7.17. There shall be no degradation of the plastic, bonding adhesives, or elastomers.
- 3.3.3 **Thermal Vacuum Outgassing.** Connector shall not exceed 1.0% total mass loss (TML) or 0.1% total volatile condensable materials (VCM) when tested in accordance with ASTM E595.

Outgassing Properties of Nanominiature Components

Component	Material	Brand Name	% Total Mass Loss (TML)	% Collected Volatile Condensable Material (VCM)	Test Report
Thermoplastic Insulators and PCB Trays	Liquid Crystal Polymer	Vectra® C-130	0.03	0.00	NASA Test #GSC17478
Potting Compound	Epoxy	Hysol C9-4215	0.48	0.01	Glenair Test
Wire	Tefzel®	Tefzel®	0.22	0.01	NASA Test #GSC19998



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- 3.3.4 **Thermal Shock.** Unmated connectors shall withstand 5 cycles of thermal shock with a minimum temperature of -55°C and a maximum temperature of 125°C when tested in accordance with EIA-364-32, Condition I. Connectors shall not exhibit any detrimental damage or degradation of electrical performance.
- 3.3.5 **Humidity.** Wired, mated connectors shall be subjected to humidity conditioning in accordance with EIA-364-31, Test Condition A (excluding steps 7a and 7b). On completion of step 6 of the final cycle, connectors shall be removed from the chamber, unmated and surface moisture removed. Connectors shall pass a DWV test of 100 volts (RMS 60 Hertz AC). Within 1 to 2 hours after removal of surface moisture, connectors shall meet 1 megohm insulation resistance. Following 24 hour conditioning, connectors shall meet 1 megohm insulation resistance.
- 3.3.6 **Vibration (sine).** Connectors, when mated, wired in series and fixtured in accordance with MIL-DTL-32139, shall exhibit no change of resistance greater than 10 ohms, which lasts longer than 1 microsecond, in accordance with test procedure EIA-364-28. Connectors shall not be damaged and no loosening of parts shall occur. Peak level 20 g.
- 3.3.7 **Shock.** Connectors, when mated, wired in series and fixtured in accordance with MIL-DTL-32139, shall not exhibit any discontinuity longer than 10 nanoseconds when tested in accordance with EIA-364-87, which specifies a 100 milliamper maximum test current. Connectors shall not be damaged and no loosening of parts shall occur. Peak acceleration 100 g's.
- 3.3.8 **Marking Permanency.** Connector marking shall meet the requirements of MIL-STD-202, Method 215.
- 3.3.9 **Fungus Resistance.** Materials used in the construction of these connectors shall be fungus inert in accordance with ASTM G21.

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