

**.025" (.64 mm) Centerline Nano****Bi-Lobe® and MIL-DTL-32139 Specifications**

1. **Scope:** These specifications highlight some of the standard requirements of Omnetics' Bi-Lobe® style nano connectors in both QPL & non-QPL versions. These connectors have contacts densely packed with centerlines of .025" (.64mm) and are commonly used in mission critical applications.
  
2. **Precedence of Requirements:** The specifications herein are a select summary of those called out in MIL-DTL-32139. The complete controlled version of MIL-DTL-32139 from DSCC takes precedence over these pages. For non-QPL parts, requirements of customer specifications and Omnetics' detail drawings will take top priority.
  
3. **Quality & Material**
  - 3.1.**Statistical Process Control (SPC):** Omnetics uses statistical process control (SPC) techniques, when possible, in the manufacturing of Bi-Lobe® nano connectors. The SPC program is maintained in accordance with MIL-STD-790. Where SPC cannot be utilized because of non-continuous production, a lot sampling plan for inspection with C = 0 (accept on zero defects) may be utilized. The SPC and C = 0 programs are documented and maintained as part of our overall reliability assurance program, as specified in MIL-STD-790.
  
  - 3.2.**Pin Contact Finish:** Pin contacts are gold plated in accordance with ASTM B488, Type II, Code C, class 1.27, 50 micro inches minimum thickness, over 50 micro inches of nickel.
  
  - 3.3.**Socket Contact Finish:** Socket contacts are gold plated in accordance with ASTM B488, Type II, Code C, class 1.27, 50 micro inches minimum thickness, over 50 micro inches of nickel.
  
  - 3.4.**Insulator Material:** Insulator material for connectors is LCP in accordance with ASTM D5138.
  
  - 3.5.**Shells:** Shell options include the following materials:
    - 3.5.1.Aluminum, alloy 6061 per SAE-AMS-QQ-A-200/8, plated as follows:
      - 3.5.1.1.Electroless Nickel plated per SAE-AMS-C-26074, class 3 or 4, grade B.
      - 3.5.1.2.Cadmium plated per SAE-AMS-QQ-P-416, type II, class 1, yellow chromate.
  
    - 3.5.2.Stainless Steel, 303 in accordance with ASTM A582, passivated per ASTM A967.
  
    - 3.5.3.Titanium, in accordance with MIL-T-81556 or SAE-AMS-4911.
  
  - 3.6.**Encapsulant:** Epoxy shall be used as a potting material to prevent contact removal. A suitable material shall be used to enable the connector to pass all required mechanical, environmental and electrical testing.
  
  - 3.7.**Pigtail Wire:** Insulated wire shall be in accordance with SAE-AS22759/33,DSCC drawing 04047 or NEMA HP3 for size 30 AWG. (NOTE: Connectors, which are pre-wired with SAE-AS22759/33 and stored in a sealed environment, could experience corrosion. Omnetics takes this into consideration when packaging and storing connectors using this wire.

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#### 4. Mechanical Requirements

**4.1.Contact Wipe:** All contacts have a minimum contact wipe of .015 inch (0.38 mm) prior to the connector halves arriving at their fully mated position.

**4.2.Durability:** MIL-DTL-32139 requires a minimum of 200 mating cycles per test procedure EIA-364-09. Omnetics easily passes this requirement and has conducted and passed internal testing of over 2,000 mating cycles.

**4.3.Contact Retention:** Contacts will withstand a 2 lb. (0.9 kg) axial load for a min. of 5 seconds.

**4.4.Crimp Tensile Strength:** 30 AWG wire will not break or pull from crimp joints with an applied force of less than 1.0 lb. (0.44 kg).

**4.5.Contact Engaging and Separation Force:** Maximum engagement force is 5.0 ounces (141.7 g.) and minimum separation force is 0.4 ounces (11.3 g.) (when using maximum and minimum ID test sleeves.)

**4.6.Connector Mating/unmating Force:** Maximum mating and unmating force will be less than or equal to 7 ounces (198.4 g.) times the number of contacts.

**4.7.Solderability:** Printed circuit tails intended for SMT and Thru-Hole soldering will meet the solderability requirements of MIL-STD-202, Method 208.

#### 5. Electrical Requirements

**5.1.Current Capability:** Contacts can carry 1.0 amp in continuous operation from -55° C to 125° C.

**5.2.Dielectric Withstanding Voltage (sea Level):** Connectors will show no signs of breakdown or flash over at 250 VAC, rms 60 Hz, per the DWV test of EIA-364-20.

**5.3.Dielectric Withstanding Voltage (70,000 Feet):** Connectors will show no signs of breakdown or flash over at 100 VAC, rms 60 Hz, per the DWV test of EIA-364-20.

**5.4.Insulation Resistance:** 5,000 Megohms minimum @ 100 VDC per IAW EIA-364-21

**5.5.Contact Resistance:** 71 mV drop maximum with a 1 ampere test current in accordance with EIA-364-06 using 30 AWG stranded wire.

**5.6.Low Level Contact Resistance:** 71 milliohms with a test current of 10 milliamperes maximum in accordance with EIA-364-06.

**5.7.Magnetic Permeability:** The magnetic permeability will not exceed 2 mu when tested in accordance with EIA-364-54.

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### 6. Environmental Requirements

**6.1.Shock:** 100 g's when tested for mechanical shock, mated connectors shall not be damaged, and there shall be no loosening of parts. There shall be no interruptions in the circuit which lasts longer than 10 nanoseconds.

**6.2.Vibration:** 20 g's when tested for vibration, mated connectors shall not be damaged, and there shall be no loosening of parts. There shall be no interruptions in the circuit which lasts longer than 10 nanoseconds.

**6.3.Salt Spray (Corrosion):** Mated connectors will show no exposure of base metal due to corrosion which will affect performance after be subjected to the salt spray test of EIA-364-26 condition B. Connectors must withstand 48 hours of salt spray. Following the test all connectors shall meet the specified requirements for low-signal level contact resistance and connector mating and unmating forces.

**6.4.Thermal Vacuum Out gassing :** These connector assemblies shall have a maximum total mass loss (TML) of 1.0 percent of the original specimen mass, and shall have a maximum volatile condensable material (VCM) content of 0.1 percent of the original specimen mass.

**6.5.Fluid Immersion:** Connectors will continue to adhere to the mating force requirements set forth by MIL-DTL-32139 after be subjected to a 20 hour immersion in synthetic lubricating oil, 2 hour immersion in Perchloroethylene cleaning solvent and 1 hour immersion in coolant fluid. There will be no degradation of the insulators or encapsulates.

**6.6.Material Fungus Resistance:** Materials used in the construction of these connectors are fungus inert in accordance with ASTM G21.

**6.7.Thermal Shock:** Connectors will withstand 5 cycles of thermal shock from -55° C to 125 ° C per EIA-364-32, condition I. There will be no detrimental damage or degradation of the electrical performance.

**6.8.Humidity:** These connectors will meet all the humidity testing requirements in accordance with EIA-364-31, test condition A (excluding steps 7a & 7b). Post humidity, the connectors will pass a 250 VAC DWV test. Within 1 hour the connectors will pass a 1 megohm insulation resistance test. Following 24 hours, the connectors will pass a 1,000 megohm insulation resistance test.

**6.9.Marking Permanency:** Any marking on the connector shells of these nano connectors shall meet the requirements of MIL-STD-202, Method 215.