



BIRNS Millennium miniature high-density metal shell connectors are rigorously qualified and tested, as follows:

- **Qualification Testing.** BIRNS Millennium connectors are qualification-tested to:
 - MIL-STD-1344A, "Test Methods for Electrical Connectors", Test Method 3001.1, "Dielectric Withstanding Voltage"
 - NAVMAT P-9290, "System Certification Procedures and Criteria Manual for Deep Submergence Systems", Appendix C, "Design Parameters for Implodable Items".A bulkhead-penetrating connector (FR, BR, OR) is part of a pressure boundary and its insert is the final pressure barrier, so we qualify bulkhead-penetrating connectors to NAVMAT P-9290 as a "Category 3" item.

The net result: Millennium connectors reliably withstand open-face pressure (Class A).
[A leading competitor states regarding its own connectors: "Open face pressure resistance is available on most bulkhead connectors (except those with coax contacts) and must be specified when ordering."]
- **Performance Testing.** BIRNS Millennium connectors are performance-tested to:
 - MIL-STD-1344A, "Test Methods for Electrical Connectors", Test Method 3003.1, "Insulation Resistance", Test Condition 'I'
 - MIL-STD-1344A, "Test Methods for Electrical Connectors", Test Method 1006.1, "Hydrostatic Pressure", Test Condition 'D'
 - MIL-STD-1344A, "Test Methods for Electrical Connectors", Test Method 2017, "Cable Seal Flexing"
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- **Design Standards.** BIRNS Millennium connectors are designed to these standards:
 - MIL-STD-39029D, "Contacts, Electrical Connector", for size, solder pot size, and functional contact engagement (thus, BIRNS Millennium connectors offer 22 AWG, 20 AWG, 16 AWG, 14 AWG, and 10 AWG contacts, without need for cumbersome incompatible "Regular and Long" shell sizes)
 - MAN-4000-001, "Engineering Manual"



- **Production Standards.** BIRNS Millennium connectors are produced to these standards:
 - MIL-G-45204C, "Gold Plating, Electrodeposited", Type II, Grade D, Class 1 (50 microns of nickel under 50 microns of hard gold). Qualification Testing per MIL-G-45204 sections:
 - 4.5.2.1 (Bend Test)
 - 4.5.2.2 (Cutting Test)
 - 4.5.2.3 (Baking Test)

To save money, most connector manufacturers use a thin nickel "flash" under a thin layer of gold (this often leads to gold flaking), but nonetheless claim gold plating "per MIL-G-45204"-- because MIL-G-45204 specifies plating as thin as 20 microns. Always ask for the gold plating "Class" or thickness.

- MIL-S-45743E, "Soldering, Manual Type, High Reliability"
- IPC-A-610C, "Acceptability for Electronic Assemblies"
 - Section 4 ("Mechanical Assembly")
 - Section 6 ("Soldering")

Cable Plugs ("CP's") are terminated to solid cables in straight (0°), 45° , and 90° styles. With an adapter, a CP may be installed onto an oil-filled cable, with a "hose clamp" tubing attachment ("CP-OH") or a double-ferrule hydraulic fitting ("CP-OF").

Sealing caps are available, as is termination (electrical, optical, and/or mechanical, of Aramid/Kevlar and steel), and overmolding.

They reliably transmit huge data streams while minimizing electrical noise.

- Each solder pot is insulated with GRE part way up the solder pot shaft to eliminate electrical interference between circuits.
- Each contact is plated throughout with a thick, 50μ Ni layer, then a full 50μ of hard gold per MIL-G-45204, Type II, Class 1, to obtain a reliable finish that reduces voltage drop.

Most connector manufacturers use a thin Ni "flash" under a thin gold layer; although this can lead to gold flaking, they can nonetheless claim that they plated "per MIL-G-45204", because MIL-G-



45204 permits gold plating as thin as 20 μ . BIRNS provides 250% more gold, AND qualifies the plating by performing adhesion tests per MIL-G-45204 paragraphs 4.5.2.1 (Bend Test), 4.5.2.2 (Cutting Test), and 4.5.2.3 (Baking Test).

- Solder pots accept the largest stranding of any wire gauge IAW MIL-STD-39029D.
- Connector sets have adequate functional contact engagement, per MIL-STD-39029D.

② They're easy to terminate (i.e. attach wires), reducing installation and maintenance costs.

- BIRNS Millennium connectors feature replaceable electrical inserts.
 - You can replace the insert when necessary, instead of discarding a connector when the pigtails get too short.
 - You can terminate the wires outside the shell for greater convenience.
 - You have the option of changing circuitry at a later date by simply replacing the existing insert.