



LIGHTWEIGHT, LOW RESISTANCE

**CODE RED**

## “Mission-Critical” hermetic sealing with $1 \times 10^{-7}$ leak-rate performance

**H**ermetically-sealed interconnects used in vacuum or high-altitude applications prevent moisture and other contaminants from damaging sensitive electronic equipment. Glass-to-metal hermetic sealing has been the gold standard in the aerospace and petrochemical industries for decades due to the strength and long-term durability of the materials used. But glass-to-metal seal hermetics come with a big price tag in both weight and electrical resistance.

CODE RED is an innovative sealing encapsulant and application process—invented by Glenair—that provides durable hermetic sealing in a lightweight aluminum package. CODE RED allows for the use of conventional gold-plated copper alloy contacts, significantly improving electrical performance. CODE RED hermetic connectors are available now in Glenair SuperNine® (D38999 Series III type metal and composite), Series 80 Mighty Mouse, and M24308 D-Sub; and deliver reliable, life-of-system  $1 \times 10^{-7}$  max leak-rate hermetic sealing. Special non-magnetic (zero residual magnetism) versions are also available, consult factory.

- Full hermetic sealing,  $1 \times 10^{-7}$  in a lightweight aluminum shell with low electrical resistance gold-plated copper contacts
- Passed full D38999/23 qualification testing
- Meets NASA outgassing requirements, as well as aerospace temperature and corrosion resistance standards
- Operating temperature  $-65^{\circ}\text{C}$  to  $+200^{\circ}\text{C}$
- Available today in **Mighty Mouse 806 Mil-Aero, M24308/9 D-Sub and D38999/23**
- Significant weight savings—up to +50%
- Order-of-magnitude improvement in current carrying capacity and electrical resistance compared to Kovar/Inconel solutions

# LIGHTWEIGHT, LOW RESISTANCE Code Red Hermetic Connectors



“Mission-Critical” hermetic sealing solution

## CODE RED LIGHTWEIGHT HERMETIC CONNECTOR TESTING AND VALIDATION



Connectors utilizing CODE RED hermetic encapsulant sealing underwent a grueling qualification test and validation process to prove material durability and hermeticity. Validation testing including 100 cycles of thermal shock IAW EIA-364-32 Test Condition A -65°C to +200°C while maintaining hermeticity followed by 1000 hours of thermal aging at 200°C. Additional tests included:

- DWV, DWV at altitude
- IR, IR at temperature
- Highly Accelerated Life Testing (HALT)
- Insert and contact retention
- Mating durability
- Random vibration at temperature IAW MIL-DTL-38999
- Hermetic seal at 30 psi

The entire qualification test cycle was repeated successfully a second time with new parts to validate complete reliability.

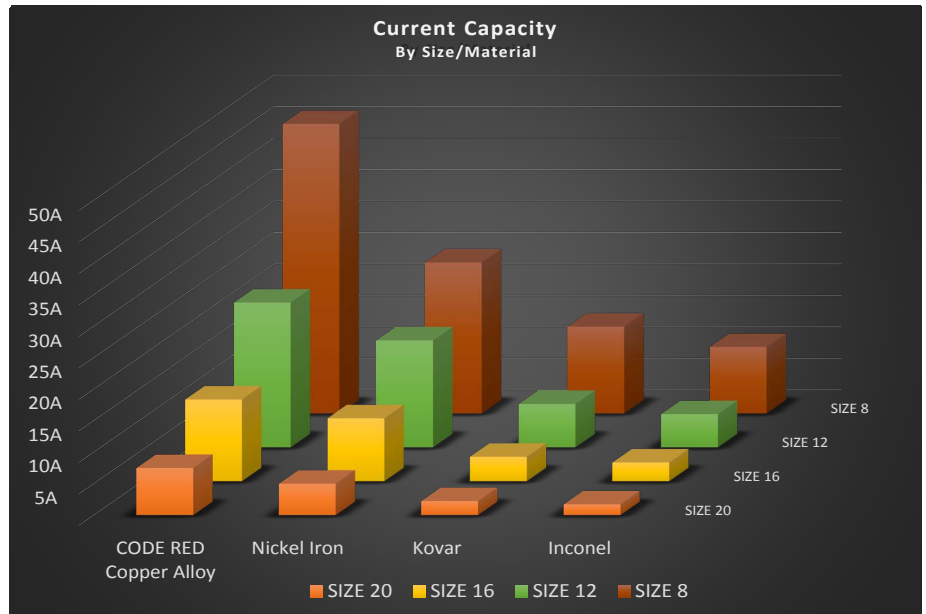
## CODE RED USES PROVEN-PERFORMANCE CONNECTOR AND CONTACT MATERIALS

CODE RED Materials / Finish	
Sealing Adhesive	Proprietary Glenair compound
Contacts*	Gold-plated beryllium copper alloy per ASTM B 197 or equivalent
Insulator	Rigid plastic
Seals	Blended fluorosilicone/silicone elastomer
Receptacle Shell and Jam Nut*	Aluminum alloy 6061-T6 per ASTM B 221
Finish*	Electroless nickel per ASTM B 733

\*zero residual magnetism materials also available

Graph illustrates Current Carrying Capacity of CODE RED copper alloy contacts compared to the Inconel, Kovar, and nickel iron contacts used in conventional glass-to-metal seal hermetics.

Percentage Weight Savings CODE RED vs. Glass-to-Metal MIL-DTL-38999 Sr. III	
Shell Size/Insert Arr.	Weight Reduction
9-35	52%
11-98	47%
13-35	47%
15-97	42%
19-32	40%
21-11	32%
23-21	28%
25-08	43%



**APPLICATION NOTES:** CODE RED is a viable drop-in solution for conventional glass-to-metal seal hermetic connectors with the following exceptions:

- 1. Fuel Cells:** Although CODE RED exhibits outstanding resistance to caustic chemicals and fuels, its use in fuel tanks/fuel cell applications is not recommended.
- 2. Cryogenics:** CODE RED has been tested and qualified to -65°C IAW MIL-DTL-38999
- 3. Sustained High-Operating Temperatures:** CODE RED has been tested and qualified to +200°C IAW MIL-DTL-38999
- 4. High Radiation:** Exposure to no more than 6 Megarads of radiation
- 5. Deep Subsea:** CODE RED is ideally suited for aerospace and downhole applications that do not exceed 2 BAR (30 psi) atmospheric pressure differential.
- 6. Space Life Support Systems:** Requires additional qualification testing not yet performed by Glenair.