The widest range of mission-critical interconnect technologies in the world

CODE RED

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CODE RED: Lightweight Hermetic Connectors for Mission-Critical Applications

Hermetic Sealing in Mission-Critical Applications

- High performing Electronic boxes rely on preserving controlled environmental conditions of the box to maintain high performance functions of their assemblies.
- Hermetically sealed boxes and I/O connectors is the method used to preserve these environmental conditions.

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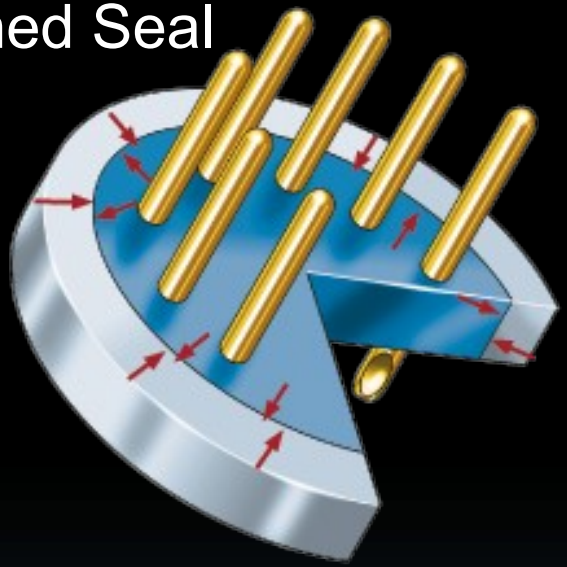
The Traditional “Gold Standard” of Mission-Critical Hermetics: Glass-to-Metal Sealing

Matched Seal



Compression Seal

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The Lightweight Hermetic Challenge

Full hermetic sealing (10^{-7}) in a lightweight connector shell package, with low contact resistance AND mission-critical durability

- Glass-to-metal seal furnace temperatures are too high for lightweight aluminum and low-resistance copper contacts
- Conventional epoxy potting lacks sealing strength and mission-critical durability

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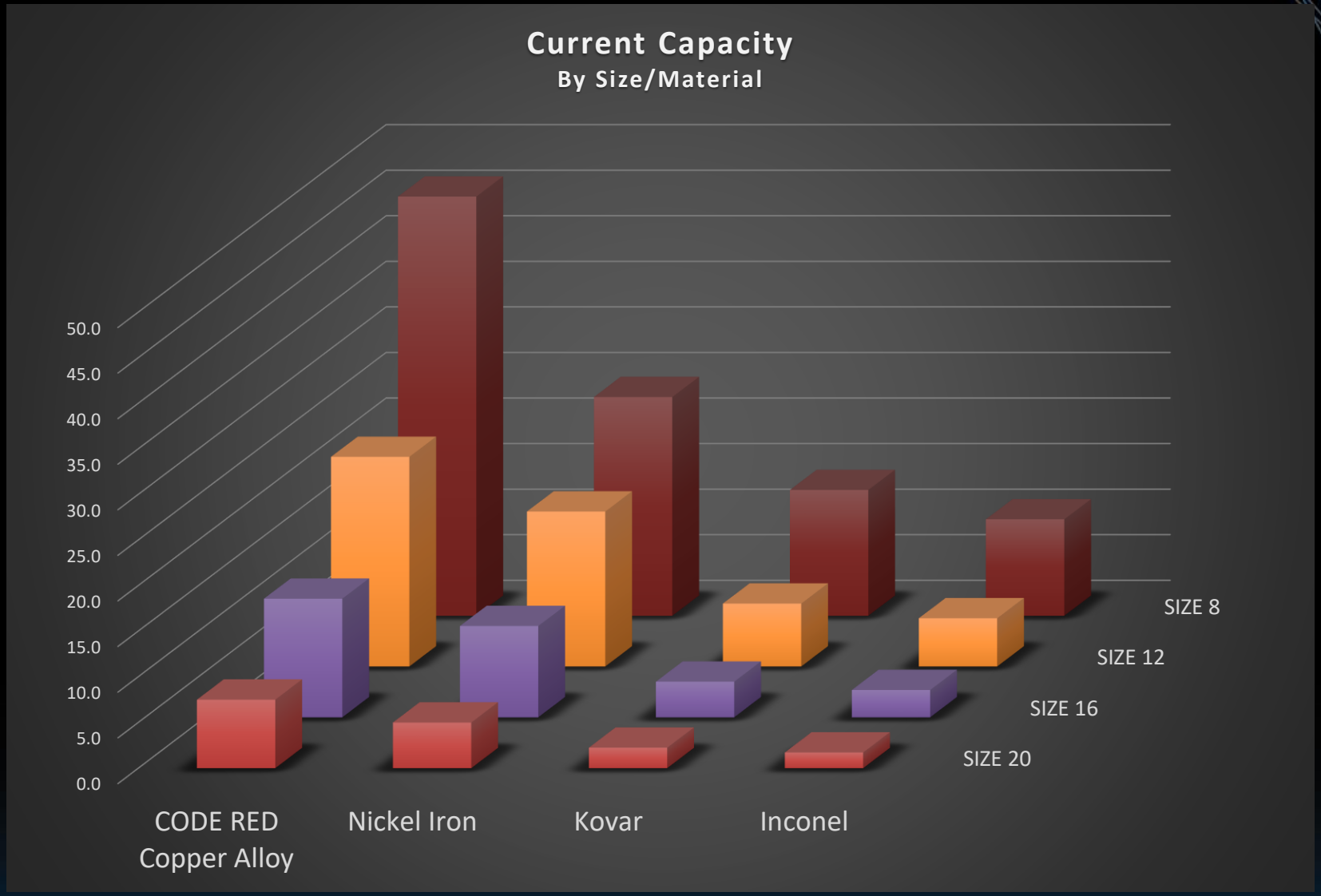
	Current (A)			
	SIZE 20	SIZE 16	SIZE 12	SIZE 8
CODE RED Copper Alloy	7.5	13.0	23.0	46.0
Nickel Iron	5.0	10.0	17.0	24.0
Kovar	2.3	3.9	6.9	13.8
Inconel	1.7	3.0	5.3	10.6



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Glass-Seal Hermetics Drawbacks vs. CODE RED Benefits

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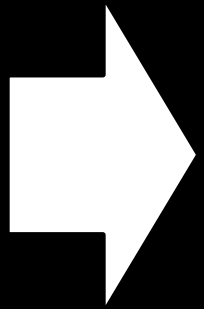
Glass-to-Metal Seal Hermetic Drawbacks

- Excessive weight
- High contact resistance
- Expensive process with high fallout
- Long lead times and expensive tooling



Code Red Benefits

- Light weight
- Low resistance copper Contacts
- High yield
- Value stream: process can make 80 parts in 3 days using standard tooling

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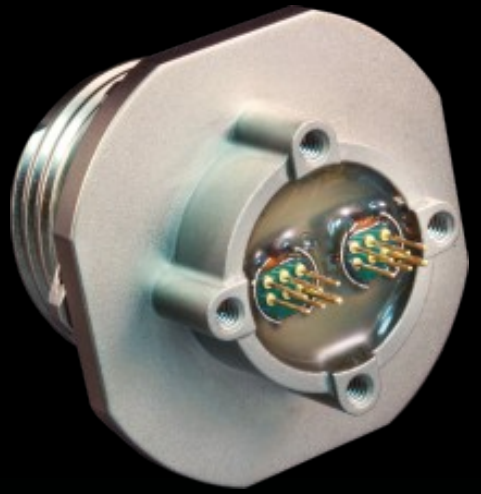
Key to CODE RED Performance

Unlike static epoxy potting, CODE RED sealing encapsulant is a dynamic adhesive material

- Expansion and contraction is matched to metal connector materials
- Virtually immune to thermal aging
- Order of magnitude stronger and more durable than conventional hard epoxy potting



CODE RED Features and Benefits

- Hermetic Seal > 1X10-7
- Light weight, corrosion resistant materials
- Low-resistance copper alloy contacts
- Extreme temperature tolerance
- Available zero residual magnetism designs
- Meets NASA outgassing
- Turnkey, drop-in replacement for glass-seal hermetics
- Can be used in various product families and shell geometries

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CODE RED Weight Savings: MIL-DTL-38999

Shell Size -Confg.	Glass Sealed	CODE RED	Weight Δ	% Weight Reducton
	Weight (grams)			
9-35	28.4	13.6	14.8	52%
11-98	35.2	18.6	16.6	47%
13-35	48.2	25.6	22.6	47%
15-97	56.2	32.6	23.6	42%
19-32	81.4	49.2	32.2	40%
21-11	91.4	62.6	28.8	32%
23-21	95.8	69.0	26.8	28%
25-08	153.7*	88.2	65.5	43%

Material	Specifc Gravity	Density (lb/in^3)	% Heavier than Composite	% Heavier than Aluminum
Composite	1.27-1.51	0.055	-	-
Aluminum	2.55-2.80	0.098	44%	-
Stainless Steel	7.70-7.73	0.284	81%	65%

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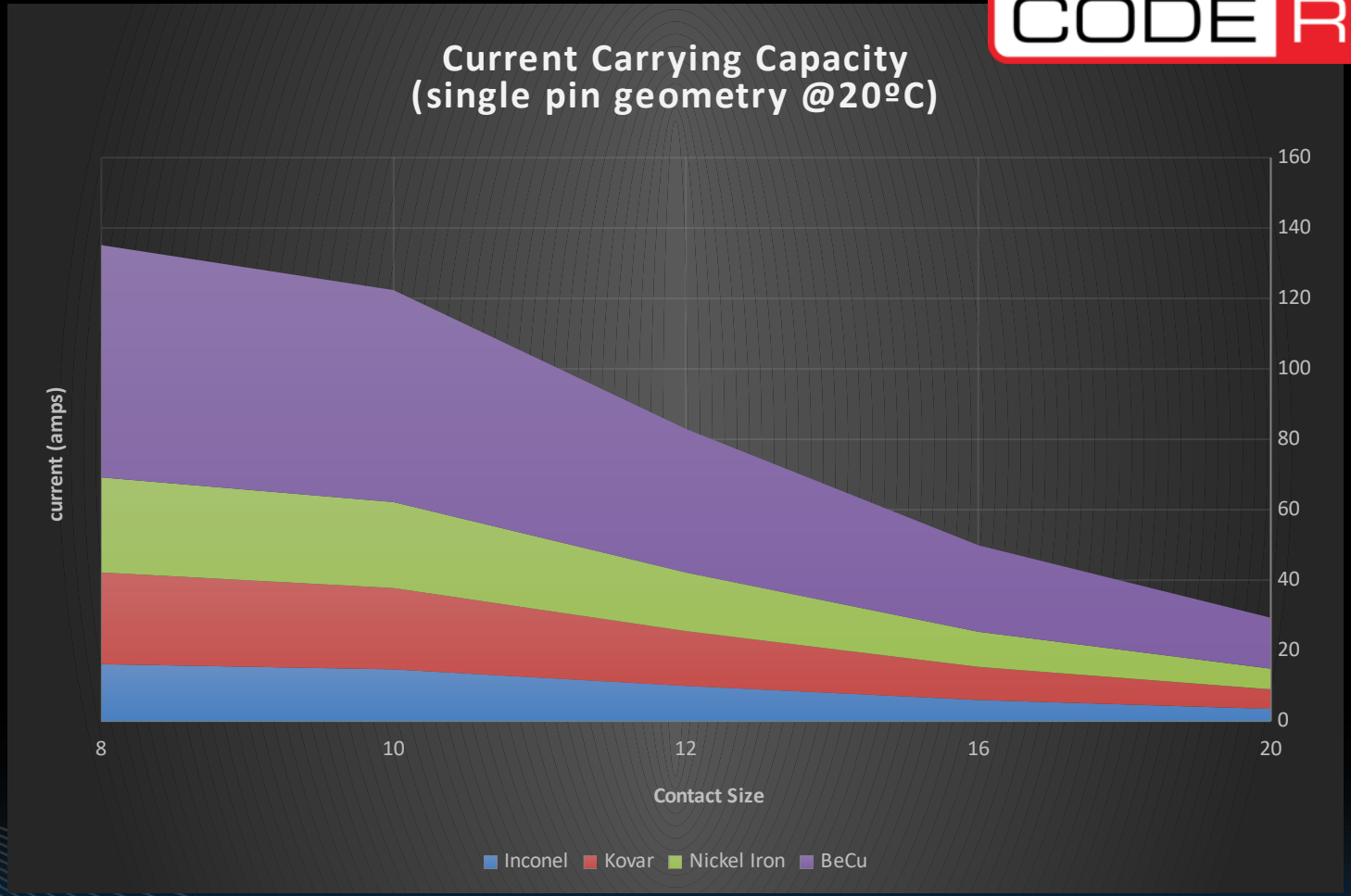

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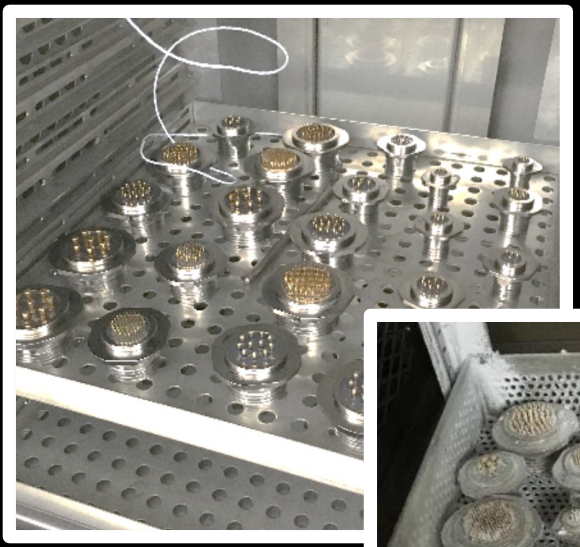
Standard Materials

Component	Material	Finish
CODE RED	Dynamic Glenair Encapsulant Sealing	N.A.
Contacts	Beryllium copper alloy per ASTM B197 or equivalent	50 microinches gold per ASTM B488 Type 3, Code C, Class 1.27 over 50-100 microinches nickel plate per SAE-AMS-QQ-N-290 Class 2
Retaining Ring	300 Series Stainless Steel	Passivated per AMS 2700, method 1, type 2, class 3
Insulator	Epiall 1908 or E484	N.A.
Wire Grommet and Interfacial Seals	Blended fluorosilicone/silicone elastomer 30% silicone per ZZ-R-765, 70% fluorosilicone per MIL-R-25988	N.A.
Shell and Jam Nut	Aluminum alloy 6061-T6 per ASTM B221	Electroless nickel per ASTM B733

CODE RED Testing and Validation

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

CODE RED Testing and Validation



Connectors utilizing Code Red potting have gone through grueling qualification testing to validate the technology including:

- 100 cycles of thermal shock
- 1000 hours of thermal aging
- Extreme temperature exposure to +200°C

CODE RED Testing and Validation

QUALIFICATION TEST REPORT
Code Red, Sealed Light Weight Hermetic Receptacle, D38999/23 Type

No.:	GT-16-223 Abstract
Date:	April 6, 2017
Sheet	1 of 7
Rev.	A

1 INTRODUCTION

1.1 Purpose

Testing was performed on Glenair Code Red, Light Weight Hermetically Sealed receptacle connectors to determine their conformance to the performance requirements of MIL-DTL-38999/23.

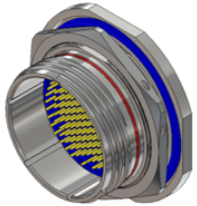
1.2 Scope

This report summarizes electrical, mechanical and environmental performance testing of Glenair Code Red, Light Weight Hermetically sealed receptacle connectors. The information in this report was obtained from tests conducted by Environmental Associates, Santa Ana, California, and Glenair, Glendale, California. These documents are on file at Glenair, Glendale California and are available upon request.

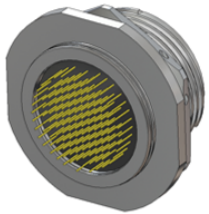
Testing Agency	Location	Date	Test Report Title	Test Report Number
Environment Associates	Santa Ana, CA	February 22, 2017	Environmental Test Report for the Light Weight Hermetic, Receptacle, Jam Nut, D38999/23 Style, PC Tail, Connector	OC26969-1019175
Glenair	Glendale, CA	December 8, 2016	Qualification Test Report for Light Weight Hermetic, Receptacle, Jam Nut, D38999/23 Style, PC Tail, Connector	GT-16-223

1.3 Conclusion

Glenair Code Red, Light Weight Hermetically Sealed connectors have been shown to be capable of meeting performance requirements of MIL-DTL-38999/23, Style C contacts.



Front View
D38999/23, Size 25-35, Pin



Rear View
D38999/23, Size 25-35, Pin

CODE RED Lightweight Hermetic

Material and process summary

- CODE RED is a proprietary encapsulant sealing and application process that delivers hermetic performance on par with glass-sealed solutions
- CODE RED is not old school epoxy potting. CODE RED Sealing solves all the aging, embrittlement, temperature cycling and leak problems inherent to hard epoxy solutions
- CODE RED Hermetics =
  - Dynamic hermetic encapsulant with a coefficient of expansion matched to copper contact and aluminum shell materials
  - Proprietary (internal) connector shell package architecture
  - Proven, quality-controlled application process performed in Glenair's CODE RED Center of Excellence

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