

Specification information

Space-grade interconnect manufacturing and test capability

Outgassing and Inspection Modification Codes

Glenair space mechanisms and related interconnect solutions are ideally designed for deployment of CubeSat and NanoSat equipment. All HDRMs, and connectors feature materials, finishes, and performance specifications that perform to NASA EEE-INST-002

Outgassing

Space flight equipment requires low-outgassing components in order to prevent degradation to optics and other sensitive instruments. Various Glenair connectors contain nonmetallic materials such as rubber, plastic, adhesives and potting compounds which can give off gasses when subjected to a vacuum or high heat. Unless the connector is specially processed, the TML and CVCM can exceed allowable limits. The space industry has adopted a standardized test procedure, ASTM E595, to evaluate outgassing properties. The MIL-DTL-38999 specification Class G also details specific TVM and CVCM values. In Glenair's 186T process, for example, connectors and connector materials are heated to 175° C at a vacuum of 5×10^{-6} Torr for 48 hours. Items under test are then weighed to calculate the Total Mass Loss (TML), which may not exceed 1.0% of the total initial mass. A collector plate is used to determine the Collected Volatile Condensable Material (CVCM), which may not exceed 0.1% of the total original specimen mass. Glenair is able to offer outgas processing which assures all materials comply with their respective standards.

Note on Connector Material and Finish Options

Some types of metals are prohibited for space flight. "Pure Tin, Cadmium, Zinc shall not be used as a final finish on EEE part (NASA EEE-INST-002 Instructions for EEE Parts Selection, Screening, Qualification, and Derating). NASA recommends electroless nickel or gold finish on connector shells and gold finish for contacts.

Specifying Appropriate NASA Screening

1 Choose a NASA EEE-INST-002 Table 2A screening level. This table contains three screening levels: **Level 1** for missions requiring the highest reliability and lowest level of risk, **Level 2** for low to moderate risk missions, and **Level 3** missions where enhanced screening and inspection is not invoked.

2 Choose outgassing process and/or NASA inspection requirements. 9 options are available for NASA outgassing, see Table I for details. Cross reference Table II for inspections completed by screening level as required by NASA standards.

3 Select the modification code from the table and add it to the part number.
Example: 253-01600ME21-35PNMSA-429.

Table I: Outgassing per NASA Screening Levels and D38999, Class G

Screening Level	No Outgas Processing	48 Hour Oven Bake 175° C 100%	Thermal Vacuum* Outgassing 24 Hour 125° C 100%	Thermal Vacuum* Outgassing 48 Hour 175° C 100%	Mod Code
No Screening			●		186M (ASTM E595)
				●	186T (Class G)
3			●		429L
	●				429
2			●		429A
		●			429K
1	●				429B
			●		429C
		●			429J

*Thermal vacuum of 10^{-6} Torr.

Table II: NASA EEE-INST-02, Table 2A Screening Levels

Inspection	Level 1	Level 2	Level 3
Visual	100%	100%	100%
Mechanical	2	2	
Dielectric Withstanding Voltage	2	2	
Insulation Resistance	2	2	
Contact Engagement & Separation Force	2		
Hermeticity (Sealed Receptacles Only)	100%	100%	100%
Coupling Force	2		

Note: required inspection quantity shown. Zero acceptance of failures allowed for all quantities inspected. Inspection is not performed/required for MIL-DTL-38999, Class G