MIL-DTL-26482 Series 2 Type Environmental

NASA Space-Grade Guidelines

What is outgassing?

Plastic and rubber materials give off gaseous molecules. For example, the smell inside a new car is caused by polymer outgassing. Heat and vacuum increase the rate of diffusion. In a spacecraft the gases coming off polymers can contaminate optical surfaces and instruments. The result is degraded performance.

How is outgassing measured?

The space industry has adopted a standardized test procedure, ***ASTM E 595***, to evaluate out-gassing properties of polymers. Small samples of material are heated to 125° C. at a vacuum of 5 X 10^{-5} torr for 24 hours. Then the sample is weighed to calculate the ***Total Mass Loss*** (TML). The TML cannot exceed 1.00% of the total initial mass. During the test, outgassed matter condenses on a cooled collector plate. The quantity of outgassed matter is caluclated to determine the ***Collected Volatile Condensable Material*** (CVCM). The CVCM cannot exceed 0.10% of the original specimen mass.

What is NASA screening?

NASA specification EEE-INST-002 provides instructions on selecting, screening and qualifying parts for use on NASA GSFC space flight projects.

What screening level is required?

NASA defines three levels of screening: level 1 for highest reliability, level 2 for high reliability, and level 3 for standard reliability. Level 3 equates to standard lot acceptance inspection. Levels 1 and 2 call for additional inspection.

HOW TO ORDER SPACE GRADE CONNECTORS

Step 1: Find a Standard Part Number

Electroless nickel plated shells are preferred for space flight. Cadmium plating is prohibited.

Step 2: Select a NASA Screening Level or 38999 Class G

The term "Screening Level" refers to the final inspection procedure.

Level 1 for mission-critical highest reliability
Level 2 for high reliability
Level 3 for standard reliability

Step 3: Choose Outgassing Processing

Fluorosilicone rubber seals are commonly used on aerospace-grade connectors such as MIL-DTL-38999 and Series 79 connectors; along with certain bonding agents and inks, do not meet NASA outgassing requirements unless the connector is specially processed. Glenair outgassing tests have shown oven baking or thermal vacuum outgassing processing are sufficient to reduce outgassing levels to NASA standards. Oven baking is more economical than thermal vacuum outgassing.

Step 4: Select the Modification Code that Matches the Desired Level of Screening and Outgassing

Use the following table to choose the right modification code. Add the mod code to the connector part number. Example: 790-024PC-13ML-***429J***

SCREENING AND OUTGASSING MODIFICATION CODES

Screening Level	Special Screening Only	48 Hour Oven Bake 175° C	Special Screening and Thermal Vacuum Outgassing	
			24 Hour 125° C	48 Hour 175° C
NASA, Level 1 Highest Reliability	429B	429J	429C	
NASA, Level 2 High Reliability	429	429K	429A	
NASA, Level 3 Standard Reliability	Use Standard Part Number		429L	
38999, Class G (No Screening)				186T

Inspection is not performed/required for MIL-DTL-38999, Class G

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		

Required inspection quantity shown. Zero acceptance of failures allowed for all quantities inspected.