

Space Grade Mod Codes

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 5×10^{-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 calculated to determine the [Collected Volatile Condensable Material](#) (CVCN). The CVCN 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 testing.

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

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

A detailed explanation of outgassing is on the following pages. The fluorosilicone rubber seals 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 Mod 429 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-**429C**

NASA SCREENING LEVELS AND MODIFICATION CODES

NASA Screening Level	Special Screening Only	Special Screening Plus Outgassing Processing	
		8 Hour Oven Bake 400° F.	Thermal Vacuum Outgassing 24 hrs. 125° C.
Level 1 Highest Reliability	Mod 429B	Mod 429J	Mod 429C
Level 2 High Reliability	Mod 429	Mod 429K	Mod 429A
Level 3 Standard Reliability	(Use standard part number)	Mod 186	Mod 186M