



TECHNICAL NOTE

#25

Revised

12/17/01

Trompeter is receiving more requests for connectors that are space rated. This Technical Note will try to address some of the technical issues that govern space applications. NASA uses the specification (SP-R-0022), Vacuum Stability Requirements of Polymeric Material for Space Application, to qualify materials for use in spacecraft. This has also become the standard in the commercial space industry. This specification governs the “Outgassing” of non-metallic materials. Outgassing occurs when a polymeric, or non-metallic material, is placed in a vacuum, subjected to heat, and some of its constituents are volatilized (that is evaporate, or go from the solid state into a gas). The purpose of addressing outgassing is that when polymeric materials are used in a thermal/vacuum environment, they do not contaminate sensitive optical, or thermal control surfaces within an assembly, or effect sensitive surfaces in an adjacent area.

One of the bi-products of outgassing is that the material will lose a portion of its mass. This is referred to as Total Mass Loss, or TML. Under the NASA specification, the material’s TML should not exceed 1.0% of the total specimen mass. This issue is very important because shrinkage may contribute to the failure of a connector, as the connector components will no longer fit properly. In some instances however, the TML may exceed 1.0% if proven that contributions to TML are due to absorbed water vapor.

Another bi-product of outgassing is Collectible Volatile Condensable Material (CVCM). This represents the quantity of outgassed matter that condenses, and collects on a surface. Under the NASA specification, the maximum condensable material allowed is 0.1% of the total specimen mass. This is very critical in a thermal/vacuum environment because it is the condensed material that will contaminate optical and sensory surfaces causing them to possibly fail.

Some polymeric materials meet the requirements of a TML less than 1.0% and CVCM of less than .10% through the normal manufacturing process. Other polymeric materials, while not within limits after their manufacture, can be brought within vacuum stability

limits by vacuum baking for a specific period of time. If a material cannot be vacuum baked and its exposure area is 13cm², or less, and is out of sight of payload, or other critical surfaces, then a TML not greater than 3.0%, and a CVCM not greater than 1.0% is acceptable.

Attached is a list of part numbers that are being developed as space rated. We presently have not performed any tests on the parts listed. They are made up of materials that either meet the TML, or CVCM requirements after manufacture, or after baking. This is established by crossing the material to a NASA database, or data provided by the material manufacturer. Because of the expense involved with testing, any testing required by the customer will have to be paid for by the customer. The customer can also specify through their specification, any additional requirements they deem necessary to meet that specification.

If you need any further amplification, or your customer asks a question which is not addressed, contact Bill Berger at (818) 735-3650, or e-mail at bill.berger@trompeter.com. We look forward to your questions.

TN25
ATTACHMENT 1

1. The following is a list of general space rated part numbers:

<u>Part Number</u>	<u>Model</u>	<u>Designation</u>	<u>Amplification</u>
305-1220	TRS/TTM	150 Series "Family"	M17/176-00002
305-1227	TTM	BJ3157	
305-1228	TTM	BJ3150	
305-1229	TTM	BJ3153	
305-1231	450	BJ450	
305-1232	450	BJ457	
305-1233	450	RFI457	RFI Cap (Female)
305-1234	450	TBJ451	Terminator (Jack)
305-1235	450	BJ459AC	M17/176-00002
305-1236	450	PL455AC	450 "Family"
305-1237	TRB	ADBJ79-A1-PL75	Adapter "Family" (22-06)
305-1238	TRB	BJ76	
305-1239	TRB	BJ76FL	
305-1240	TRB	PL75	
305-1241	TRB	PL75C	
305-1242	TRB	PL75FL	M17/176-00002
305-1272	450	TNG451	Terminator (Plug)
305-1293	TRB RFI	RFI75/FL	70 Series RFI (Polarized)
305-1306	TRB/TRT	ADBJ77-A1-PL75	Adapter "Family" (22-04)
305-1309	TRB	BJ79C	(Polarized)
305-1310	TRS	PL155AC	
305-1311	TRS	BJ159AC	
305-1317	TRB	ADBJ77-A1-PL75	(Polarized)
305-1324	TRB	PL75CFL	
305-1368	450	RFI455/FL/3455	
305-1370	TTM	PL3155AC	
305-1381	TRS	CJ150AC	
305-1445	TRB	TNG1/FL1/TL1	
305-1447	TRS/TTM	PL155AC/3150AC	SSQ cable NDBC-TFE-22-2SJ-75
305-1467	TRB	PL75MC	
305-1468	TRT	TNT1	
305-1469	TTM	TNTM1	
305-1473	TRB	CBBJR79/A	
305-1475	TRS/TTM	RFI155(FL)/RFI3155	
305-1479	TRT	PL375MC	
305-1480	TRT	BJ377	
305-1481	TRT	CJ370MC	
305-1482	TRT	TNTBJ1	
305-1483	TRT	TNT1	
305-1486	TTM	BJ3150HS	
305-1487	TTM	CBJ3157	
305-1496	TRS	TNGBJ1/TNTBJM1/TNGBJMFL1	
305-1497	TTM	CJ3150AC	
305-1507	TTM	PL3155	
305-1512	TRB	PLR75C	
305-1518	TRB	BJ79C	
305-1519	TRB	CJ70	

<u>Part Number</u>	<u>Model</u>	<u>Designation</u>	<u>Amplification</u>
105-2110	BNC	UPL220	
105-2111	BNC	UPLR220	