eFlash Spotlight

EPAR | EPAC | ERC

NASA Electronic Parts and Packaging Program
Technology Information for Future NASA Missions

NEWS FLASH JANUARY 2002

FEATURES

IN THE WORKS

SPECIAL EVENTS

Fiber Optic Epoxy Outgassing Study for Space Flight Applications

Matthew Bettencourt and Melanie Ott
Goddard Space Flight Center/NASA

(back to top)

Abstract

Presently there are very few epoxies qualified for space flight and even fewer qualified for space flight optical fiber cable assemblies. Currently, Goddard Space Flight Center uses Tra-Con Bipax, Tra-Bond BA-F113AMP for all fiber optic space flight cable harnesses. During this study two epoxies from AngstromBond were tested for their outgassing characteristics inside and outside of a cable configuration. The two test epoxies used in the experiment were the AngstromBond AB9119 and the AngstromBond 9112 fiber optic epoxies. Our studies found that the AB9119 epoxy passed the tests qualifying it for space flight use. The 9112 epoxy, however, failed. **This discovery will be useful in future missions because it will provide alternatives for optical fiber epoxies beyond the**

single qualified epoxy Tracon BA-F253 that is currently used.

The complete report is available on the TVA website at:

http://misspiggy.gsfc.nasa.gov/tva/meldoc/epoxyoutgas.pdf

View the summary article in PDF.

Characterization of the Twelve Channel 100/140 Micron Optical Fiber, Ribbon Cable and MTP Array Connector Assembly for Space Flight Environments

Melanie Ott, Shawn Macmurphy and Patricia Friedberg
Goddard Space Flight Center/NASA

(back to top)

Abstract
Presented here is the second set of testing conducted by the Technology Validation Laboratory for Photonics at NASA Goddard Space Flight Center on the 12 optical fiber ribbon cable with MTP array connector for space flight environments. In the first set of testing the commercial 62.5/125 cable assembly was characterized using space flight parameters (published in SPIE Vol. 3440). The testing showed that the cable assembly would survive a typical space flight mission with the exception of a vacuum environment. Two enhancements were conducted to the existing technology to better suit the vacuum environment as well as the existing optoelectronics and increase the reliability of the assembly during vibration. The characterization for this enhanced fiber optic cable assembly involved vibration, thermal and radiation testing. **These additional enhancements will now allow space flight use whereas previously the assembly was only suitable for commercial applications.**

The data and results of this characterization study, which include optical in-situ testing are presented in full on the TVA web site at
http://misspiggy.gsfc.nasa.gov/tva/meldoc/mtpcablereport01.pdf

View the summary article in PDF.

Radiation Testing of Commercial Off The Shelf 62.5/125/250 Micron Optical Fiber for Space Flight Environments

Melanie Ott, Shawn Macmurphy and Matthew Dodson
Goddard Space Flight Center/NASA

(back to top)

In the past for space flight applications,100/140 micron optical fiber was used for optical

communication purposes. This fiber has been characterized for space flight environments under various conditions [1-2], referenced in the complete report linked below. For several years, there has been more interest in usage of commercial optical fiber products because of the limited availability of 100/140 micron optical fiber. Over seven years ago, Corning ceased manufacturing the 100/140 fiber and since then Lucent SFT (formerly Spectran Specialty Fiber) has been the only manufacturer of this fiber. NASA has been asked to look into other options for purposes of providing alternatives to the 100/140 micron graded index fiber for space flight environments. Specifically, the question has been asked: how does 62.5/125 perform in a space radiation environment? The dopants used in the 62.5/125 micron optical fiber are different from those used in the radiation hardened 100/140/172 micron fiber being used currently. Therefore, it was expected that there would be a difference in the radiation performance but until now, answering the question about how much of a difference in performance there would be, was based on speculation with no data. **The data provided the expected result that the non-radiation hardened fiber performed with more susceptibility than the radiation hardened fiber. However this fiber can still be used in benign space flight environments.**

The complete report is located on the TVA website at:
http://misspiggy.gsfc.nasa.gov/tva/meldoc/foradreport01.pdf

View the summary article in PDF.

Membership to CALCE Web Resources

(back to top)

The NASA Electronic Parts and Packaging (NEPP) Program and the Computer Aided Life Cycle Engineering (CALCE) Electronic Products and Systems Center partnership will provide research, development strategies and methodologies for selecting and evaluating electronic parts and packaging technologies on future NASA projects and missions.

The CALCE Consortium provides an organizational structure lead by the CALCE Center located at the University of Maryland, through which different sectors of the electronics industry supply chain can participate in research, share information, and influence practices and policies. The CALCE Consortium research is focused on the identification and development of technologies, methodologies, and guidelines for assessing, mitigating, and managing the risk associated with the design, manufacture, and fielding of electronic products and systems. Over fifty industry and government sites participate annually in the CALCE Consortium.

In FY01, NASA's CALCE Consortium membership was limited to GSFC, but will soon expand to be NASA wide. The collaboration between NASA and CALCE will afford NASA engineers the opportunity to interact with CALCE and gain access to CALCE web resources through individual CALCE Web Accounts. CALCE Web Accounts are available to NASA personnel located at sites participating in the NASA-wide CALCE Consortium membership. To obtain a CALCE Web Account, fill out the form found on the link below. Your information will then go through the approval process.

http://www.calce.umd.edu/accountrequest.html

Having a CALCE Web Account provides an individual with access to:

- Current research activities (over 30 research projects are being conducted this year).
- Over 400 articles published by the faculty of CALCE Electronic Products and Systems Center
- Over 20 web resources, generated from CALCE research, that contain guidelines, methods, references, interactive software, and other information in areas such as:
  - Accelerated Testing
  - Supply Chain Management
  - Micro Electro Mechanical Systems (MEMs)
  - Integrated Passives
  - Reliability Assessment
  - Failure Mechanisms
  - High Temperature Electronic Packaging
  - Plastic Encapsulated Microcircuits (PEMs)
  - Electronic Packaging Materials
  - Virtual Qualification
- Software for performing virtual qualification of electronic hardware.

The list of sites participating in the NASA-wide CALCE Consortium Membership along with respective points of contact is provided below:

Dr. Jih-Fen Lei	Glenn Research Center	(216) 433-6328
Mr. Darryl Lakins	Goddard Space Flight Center	(301) 286-6631
Mr. Sammy Kayali	Jet Propulsion Laboratory	(818) 354-6830
Mr. Otis Riggins	Langley Research Center	(757) 864-3807
Mr. David Beverly	Johnson Space Center	(281) 483-0250
Mr. Trent Griffin	Marshall Space Flight Center	(256) 544-6984

View the article in PDF.

(back to top)

THE THIRD ANNUAL NEPP CONFERENCE IS COMING!

(back to top)

Please check the NEPP site often to see our regular updates. Below is our initial

information.

The Third Annual NEPP Conference

April 30 – May 2, 2002

Gilruth Center, Johnson Space Center, Houston, Texas

Participants must have a badge enabling them to enter JSC

Tentative Technical Program

Keynote Speaker:

- Astronaut John (Danny) Olivas, PhD

Session Chairs:

- Reza Ghaffarian (JPL) –Reliability
- Saverio D'Agostino (JPL) – MEMS
- Rajeshuni Ramesham (JPL) – MOEMS
- Stephen Bolin (JPL) – COB
- Michael Newell (JPL) – Extreme Environments
- Henning Leidecker – (GSFC) – Solder Nonconformances
- Kenneth LaBel (GSFC) - Radiation Hardness Assurance
- Kenneth LaBel (GSFC) - Radiation Effects on Technology
- Alice Lee – (JSC) – Sensors
- James Bockman – (LaRC) – MFC Technology

View the article in PDF.

(back to top)