OMNETICS CONNECTOR CORPORATION

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A NANO DESIGNED & TESTED FOR SPACE

To make life easier for the design engineer, Omnetics Connector Corporation has released its own set of standard space grade Bi-Lobes®. These MIL-DTL-32139 Nano-miniature connectors are approved for space programs and inspected per EEE-INST-002.

These Bi-Lobe® connectors, at .025" pitch, are the smallest "Space Grade" connectors on the market. Compared to larger Micro-D and D-Subminiature configurations, Omnetics has reduced size and weight by as much as 4x that of standard Micro-D connectors and 8x that of previous D-Sub footprints. These connectors like all of Omnetics connectors use our unique flex-pin gold plated contacts that are polarized and shrouded by a unique liquid crystal polymer insulator and "lobed" housing making these connectors capable of over 2,000 mating cycles. Omnetics space grade connectors are available in a number of tail terminations. Standard pre-wired connectors come in 18" and 36" lengths with 80 micro inches of silver plated 30 AWG (7-38) PTFE insulated wire. Board mount options include both surface mount as well as thru-hole. If you are using a flex circuit, flex tails are also available.

Omnetics space grade Bi-Lobes® are available in three shell materials. The standard is a Nickel plated Aluminum; however, both Stainless Steel and Titanium are also available upon request. Omnetics chose these 3 material types as each shell finish is suitable for use in vacuum environments, whereas, materials like Cadmium are prohibited for space. Built and engineered to withstand the high shock and vibrational elements often associated with deep space exploration, these Bi-Lobes® connectors come to you launch ready.

Pre-Wired/Cable
Pin counts: 9-85
80 Micro inches of Silver Plated – 30 AWG

Surface Mount
Pin counts: 9-85
Avail. Horiz & Vertical

Thru-Hole
Pin counts: 9-85 pos.
Available: Straight, V4, H4

Flex
Pin counts: 9-85 pos.

WHAT ABOUT OUTGASSING?

As we have come to learn both plastic as well as rubber materials give off gaseous molecules. In fact, the physical environment to which these components are used within, play an even bigger role in terms of the immediate effect. Environments such as deep space feature both heat and vacuum elements all of which increase the rate to which these gasses diffuse. In a spacecraft, these gases can become a legitimate problem, as these gases coming off polymers can actually contaminate certain optical surfaces and instruments. The results can severely degrade the equipment's performance.

HOW IS THIS MEASURED?

The space world has adopted a standardized test procedure called ASTM E 595. The purpose of this test is to evaluate the outgassing properties of polymers. Within this test, small samples of materials are heated up to 125° C (257° F) at a vacuum of 5 X 10^{-5} torr for 24 hours. At that point the sample is then weighed to calculate the Total Mass Loss (TML). The TML cannot exceed 1.00% of the total initial mass. During this test, outgassed matter condenses on a cooled collector plate. This quantity of outgassed matter is calculated to determine the Collected Volatile Condensable Material (CVCM). *See table below as it relates to Omnetics materials in question.*

Component	Material	%TML	%CVCM	%WVR
Epoxy	Standard Epoxy	0.98	0.02	0.42
Epoxy	High Temperature Epoxy	0.24	0.02	0.08
Ink	White Epoxy Ink	0.64	0.01	0.42
Ink	Black Epoxy Ink	0.74	0.01	0.54
Insulator	LCP	0.03	0.00	0.01
Wire	30 AWG / 80 Micro in. Silver Plated	0.10	0.03	0.00

TML = Total Mass Loss | **CVCM** = Collected Volatile Condensable Materials | **WVR** = Water Vapor Regained

Space Grade Connectors Continued……

WHAT IS NASA SCREENING?

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

DOES OMNETICS OFFER NASA SCREENING?

Yes, Omnetics offers NASA screening per EEE-INST-002. Table 2J in particular in the NASA spec contains specific inspection instructions for Nano-miniature connectors. These additional screening requirements exceed those set previously by MIL-DTL-32139 in terms of inspection levels.

WHAT LEVEL OF SCREENING DO I NEED?

NASA defines three levels of screening; **Level 1** for the highest level of reliability or for applications deemed "mission critical," Level **2** is for high reliability, and **Level 3** is for standard reliability.

HOW DO I ORDER?

1) **Select your housing type and material**

   - ✓ Nickel-plated aluminum, Titanium and Stainless steel housings are available and are all considered suitable for Space

2) **Select your pin arrangement and insulator type**

   - ✓ Insulator types are available in both dual row per MIL-DTL-32139 or in a single row format. Pin counts range from 5 contacts to 85.

3) **Select your preferred tail termination**

   - ✓ Standard parts are available pre-wired, surface mount, thru-hole and flex.
   - ✓ Standard wire lengths are available 18" and 36" with 30 AWG (80 micro-inches of silver plating)

4) **Select a NASA Screening level**

   - ✓ Level 1 for HIGHEST RELIABILITY
   - ✓ Level 2 for high reliability
   - ✓ Level 3 for standard reliability (comes standard per MIL-DTL-32139)

Inspection/Test	Omnetics Level 1	Omnetics Level 2
Visual Inspection	100%	100%
Mechanical	13 pcs.	13 pcs.
Voltage (DWV)	100%	100%
Insulation Resistance	100%	100%
Temperature Cycling	2 pcs.	N/A
Mating Force	2 pcs.	N/A
Low Level Contact Resistance (LLCR)	2 pcs.	2 pcs.
Solderability/Resistance to Soldering Heat *	2 pcs.	N/A

* *For Surface Mount and Thru-hole connectors ONLY and the test itself, is destructive.*

For more information please go to: www.Omnetics.com/SpaceGrade

"These space grade Bi-Lobes® connectors at .025" pitch, are the smallest Space grade connectors on the market."

NANO 360 CIRCULARS – CHANGING THE RULES

As newer products continue to require circuit miniaturization, each also demands smaller and smaller cable and connector solutions to continue the robust performance that's expected from these high reliability applications.

Omnetics Connector Corporation uses these same key elements from their Bi-Lobe® (MIL-DTL-32139) product to ensure these new nano-miniature circulars are able to meet and exceed harsh environmental conditions, as well as offer IP67 (while mated) and other custom characteristics brought forth. At .025" pitch, these are the smallest mil-aero circular connectors on the market, and compared to larger circular configurations, Omnetics has reduced the overall size and weight by as much as 3x compared to standard .050" pitch circular connectors.

Within this new product family Omnetics has included 5 distinct, yet similar groups of connectors ranging in contacts from 1 to 28 pins/sockets, with the standard shell sizes of: 6, 11, 16 and 28.

The Standard (NCP/NCS) Series:

http://www.omnetics.com/products/circular-nano_plastic/

The Standard Series like all 5 versions utilizes Omnetics' rugged and reliable flex-pin contact system. These extremely small outer diameters range in size from .122" (3.1 mm) to .217" (5.5 mm). With the ability to withstand high shock and vibration while maintaining their electrical integrity, these connectors are ideal for the most demanding applications with an emphasis on "inside-the box".

The Threaded (MNCP/MNCS) Series:

http://www.omnetics.com/products/circular-nano_metal/

Omnetics nano series of circular connectors are also available in threaded metal housings giving them a positive lock and environmental seal. These connectors can be configured with different levels of waterproof sealing up to IP-67. A variety of shell materials and finishes are available including nickel or black chrome plated brass and black oxide stainless steel. Panel mount options (Front, Rear and Protruding) are also available.

The Break Away (BANP/BANS) Series:

http://www.omnetics.com/products/circular-nano_breakaway/

Omnetics nano series of circular connectors are also designed in a break away configuration. Manufactured with an extra retention spring, these connectors are engineered to release or "break-away" at a pre-determined force of roughly 4 lbs. (Each contact adds an additional 2.5 oz. ea.). This line is also available sealed up to IP67 with panel mount options (Front, Rear and Protruding) also available.

The Twist Lock (TNCP/TNCS) Series:

http://www.omnetics.com/products/circular-nano_twistlock/

Similar to the Breakaway (BANP/BANS) Series, Omnetics Twist Lock series too features miniatures quick connect/disconnect characteristics. Omnetics 'Twist Lock" Nano circular features two bayonet lugs on the male housing; enabling mating and de-mating to be achieved with a simple quarter turn of the female coupling nut.

This line too, is also available sealed up to IP67 with panel mount options (Front, Rear and Protruding) also available.

SureCon 360 (ONCP/ONCS) Series:

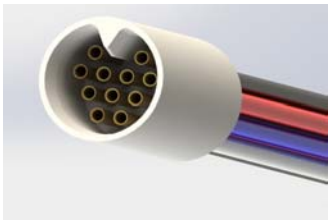
http://www.omnetics.com/uploads/Documents/NanoCircularBreakOut.pdf

Omnetics SureCon 360 Series is a waterproof (IP67) option in a Nano footprint. Three similar versions are available, all sharing the above characteristics, with one exception. Each SureCon 360° version will use a market specific cable and plastic overmold with characteristics known to be vital for usage within that particular field (Standard usage, Medical and Mil/Aero). The SureCon family of plastic housings represent a 2/3 mass savings over the standard metal housing versions available.

All 5 configurations include gold plated contacts which are inserted and polarized by a "pie-shaped" cut-out within the Liquid Crystal Polymer insulator making these connectors capable of over 2,000 mating cycles. Current applications include helmet electronics, surveillance equipment, miniature robotic systems, portable communication systems amongst others.

Omnetics Nano 360™ line offers a number of standard designs and locking methods with pin counts from 1 to 28 positions. Threaded couplings, metal and plastic breakaway shells and twist-lock housings are available for both inline as well as panel mount interconnections. Standard products come pre-wired with 18" of 32 AWG Teflon insulated copper wire that handles nearly one ampere of current per contact.

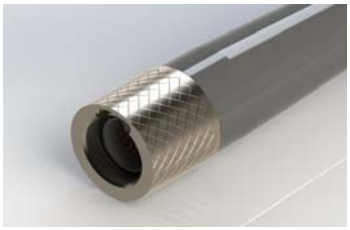
For more info go to: http://www.omnetics.com/products/circular/



The Standard Series

The Threaded Series

The Twist Lock Series



The Breakaway Series

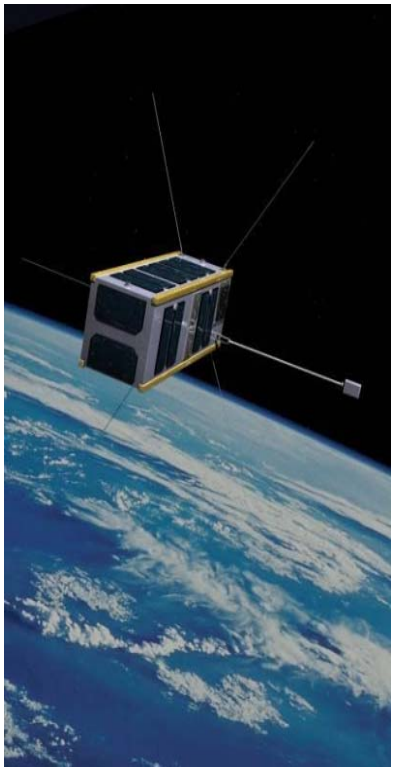
SureCon 360

Custom Overmolds

APPLICATION SPOTLIGHT

MINIATURE CONNECTORS FOR DEEP SPACE

An ideal space connector must be fully capable of standing up to the harsh environmental conditions in which deep space brings. This list of requirements is a long one, but the job of a connector manufacturer is an important one. Nano-miniature space connectors such as Omnetics' Bi-Lobe® are becoming more and more commonly used within a number of electronics related equipment used in outer space such as mini-satellites.



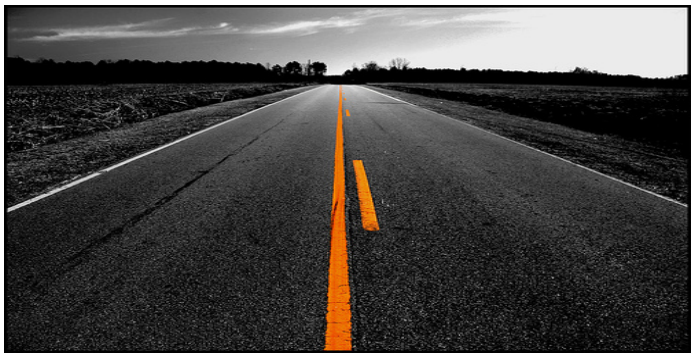
As satellites and space electronics continue to reduce size in an effort to cut cost, heavier satellites requiring larger rockets with greater thrust are becoming a thing of the past. These days, new influxes of smaller and lighter (disposable) satellites are on the rise. These new satellites not only allow for cheaper launch vehicles, they're also opening the door to enable missions that a previous (larger) satellite could not accomplish such as in-orbit inspection of larger satellites as well as a number of University led research programs.

To qualify for a task such as this, companies like Omnetics' must have their connectors tested and accepted by the likes of NASA and ESA (European Space Agency) and must meet stringent testing for outgassing as well as residual magnetism to be sure they are suitable for use in space applications. Now the connectors themselves can't just be small, they also have to be reliable in the face of severe temperature swings as well as high shock and vibrational environments. The material too in which the connector is manufactured from is also extremely important for space connectors because of the emphasis on low levels of residual magnetism and outgassing. Omnetics connectors in particular are currently being used on a number of active space applications anywhere from microwave power modules to Global Positioning Systems. With the goal of many to reduce size in an effort to save money, Omnetics connectors ensure no reliability is lost within the transformation to smaller connectors.

For more information go to: http://www.omnetics.com/capabilities/application-space/

On the Road with Omnetics

May 5-9th:	SPIE Defense & Sensing – Baltimore, MD
May 12-15th:	AUVSI – Orlando, FL
May 20-22nd:	SOFIC – Tampa, FL
June 10-12th:	Global Petroleum – Calgary, Canada
June 17-21st:	Eurosatory – Paris, France



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About Omnetics

Omnetics was founded in 1984 to deliver rugged, reliable interconnect solutions for the most demanding industries. The company has a fully integrated design and manufacturing plant in Minneapolis, Minnesota USA, where it produces micro and nano miniature interconnect products, featuring COTS, Standards and Custom connectors for industries such as Medical, Military, Aerospace, Defense and other technology oriented OEMs.

Twitter Trivia

Question:
What do bulletproof vests, fire escapes, windshield wipers, and laser printers all have in common?

Answer:

Please follow us on Twitter (@Omnetics) for the answer #OmneticsTrivia

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