

# Silicon Dioxide Coaxial Cable Assemblies

Phase Stable Cable Assemblies For:

- Extreme Temperature
- High Radiation
- Ultimate in Phase Tracking
- All Phase Sensitive Systems
- Semi-Rigid Style
- All System Platforms



# SiO<sub>2</sub> Specifications:

**SiO<sub>2</sub>** — Times Microwave Systems SiO<sub>2</sub> cable assemblies are a major advancement in Silicon Dioxide coaxial cable technology. Improvements have been made in the areas of cable design, cable manufacturing technology, glass seal technology and the range of connector types available. This makes Times Microwave Systems SiO<sub>2</sub> cable assemblies the most advanced interconnection system available for the toughest interconnect applications.

**Cable Design and Technology** — The use of advanced equipment and materials results in the production of a low loss, high velocity dielectric with consistent properties from run to run. This results in excellent phase versus temperature and loss versus temperature performance and excellent repeatability of these characteristics from lot to lot. Compared to other cable types, SiO<sub>2</sub> cable provides exceptionally low hysteresis, with phase and loss values returning to the same values at a given temperature even after extreme excursions.

**Connectors** — The development of hermetically sealed intermediate sections allows the use of the full range of Times Microwave Systems connectors. Non-replaceable

connectors are also available. All connectors for Times' SiO<sub>2</sub> cable assemblies use a crack-free, fired glass seal to provide the optimum microwave performance and hermetic sealing. Attachment to the cable is via state-of-the-art laser welding.

**Component Integration** — The Times Microwave Systems SiO<sub>2</sub> intermediate sections are completely compatible with our Multiport™ and Minimultiport™ connector systems, Zero dB™ and equalizer products, Blind Mate™ antenna systems, and all of our self-locking, field-replaceable connectors in a wide range of interfaces and configurations. For space applications low PIM and Multipaction-resistant connectors are available.

**Applications Engineering** — With over 50 years of Times Microwave Systems aerospace cable and connector technology experience and unparalleled design expertise, Times Microwave Systems' staff of Field Applications Engineers can help to provide the right solution for your interconnect applications. Call us today and let us show you how SiO<sub>2</sub> from Times Microwave Systems can solve your most difficult technical challenges.

DESIGN & PERFORMANCE SPECIFICATIONS			
Outside Diameter (in) +/- 0.001	0.090	0.141	0.270
Weight (lb/ft)	0.015	0.024	0.075
Minimum Bend Radius* (in)	0.30	0.45	1.00
Characteristic Impedance (ohms)	50		
Capacitance (pF/ft)	25		
Cut-off Frequency (GHz)	64	36	18.5
Insertion Loss at Cut-off Frequency (dB/ft)	2.0	1.0	.37
Maximum Voltage Withstand (kV) RMS	0.9	1.6	3.3
EMI Shielding	> 110 dB		

\*Smaller radius bends can be made in our factory using special tooling.

MATERIALS OF CONSTRUCTION	
Outer Jacket	Stainless Steel, 304 Series
Outer Conductor	Copper per ASTM B-75
Dielectric	Low Density, High Purity Silicon Dioxide
Inner Conductor	Copper per ASTM B-75

ENVIRONMENTAL SPECIFICATIONS	
Operating Temperature Range (Cable)	-273/+1,000° C
Operating Temperature Range (Standard Connectors)	-273/+200° C
Operating Temperature Range (High Temp Connectors)	-273/+600° C
Chemical Resistance	Equivalent to 304 Stainless
Radiation Resistance	Excellent

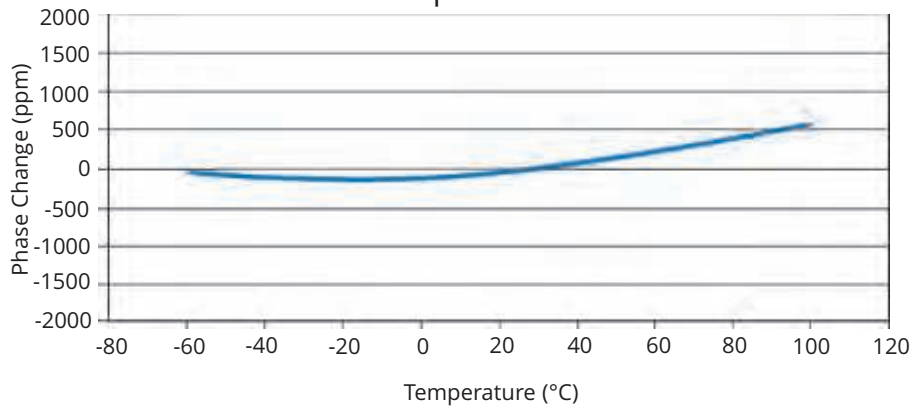
Frequency (GHz)

Frequency (GHz)	0.5	2	4	8	12	18	36	40
0.090 Cable	0.114	0.240	0.355	0.532	0.679	0.875	1.373	1.473
0.141 Cable	0.07	0.15	0.23	0.36	0.47	0.62	1.01	
0.270 Cable	0.04	0.08	0.13	0.20	0.27	0.36		

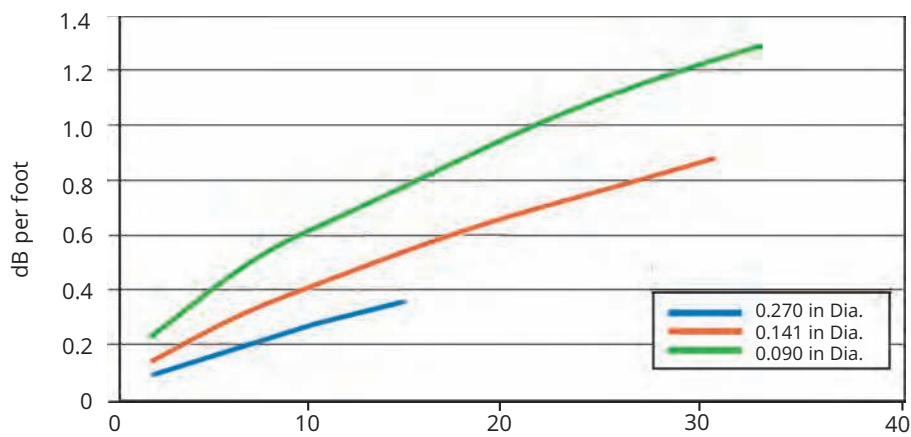
Cable Diameter	K1	K2
25090 Cable	0.5645	0.0011 - (.25 dB/ft @ 2 GHz, .93 dB/ft @ 18 GHz)
25141 Cable	0.2923	0.0011 - (.15 dB/ft @ 2 GHz, .60 dB/ft @ 18 GHz)
25270 Cable	0.1069	0.0011 - (.07 dB/ft @ 2 GHz, .33 dB/ft @ 18 GHz)

Insertion Loss (dB/100ft) = K1\*√ freq (MHz) + K2\*freq (MHz)

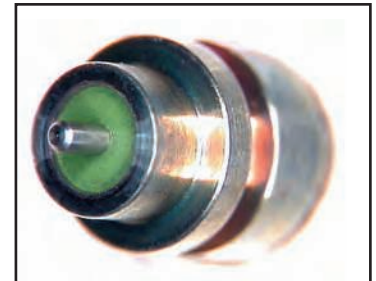
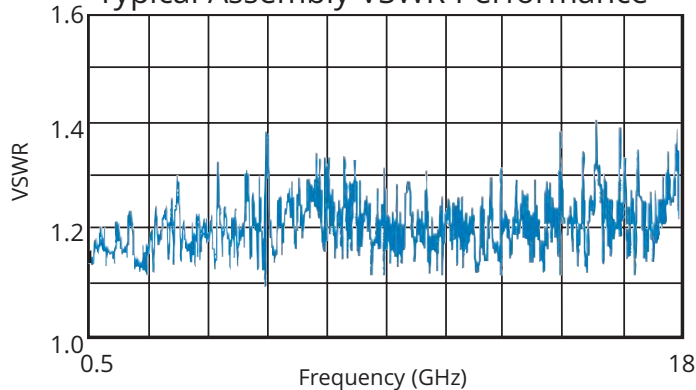
### Phase vs Temperature Performance



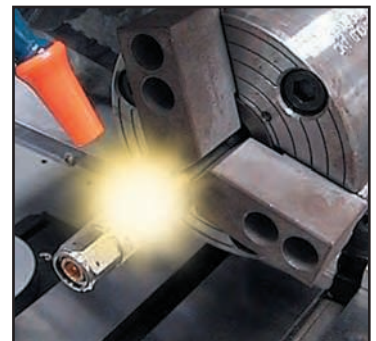
### Insertion Loss vs Frequency



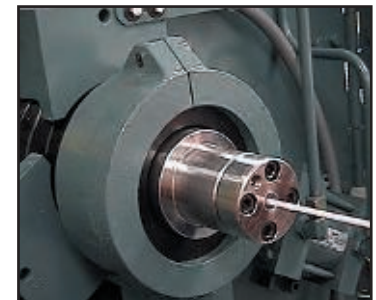
### Typical Assembly VSWR Performance



SMA Male, crack-free, hermetic sub-assembly



Laser welding capability



High purity, high velocity dielectric extrusion

## *About TIMES MICROWAVE SYSTEMS*

Times Microwave Systems, was founded in 1948 as the Times Wire and Cable Company. Today, the company specializes in the design and manufacture of high performance flexible, semi-flexible and semi-rigid coaxial cable, connectors and cable assemblies. With over 60 years of leadership in the design, development, and manufacture of coaxial products for defense microwave systems, Times Microwave Systems is the acknowledged leader, offering high tech solutions for today's most demanding applications.

Cable assemblies from Times Microwave Systems are used as interconnects for microwave transmitters, receivers, and antennas on airframes, missiles, ships, satellites, and ground based communications systems, and as leads for test and instrumentation applications.

As a highly specialized and technically focused company, Times Microwave Systems has been able to continually meet the challenges of specialty engineered transmission lines for both the military and commercial applications, drawing upon our:

- Thousands of unique cable and connector designs
- Exceptional RF and microwave design capability
- Precise material and process controls
- Unique in-house testing capabilities including RF shielding/leakage, vibration, moisture/vapor sealing, phase noise and flammability
- Years of MIL-T-81490, MIL-C-87104, and MIL-PRF-39012 experience
- ISO 9001 Certification

With over 70 years of Times Microwave Systems aerospace cable and connector technology experience and unparalleled design expertise, Times Microwave Systems' staff of Field Applications Engineers can help to provide the right solution for your interconnect applications.



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