

# SPACE FLIGHT

## Cable Assemblies



SpaceFlight™

PhaseTrack®



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Our cable assemblies are low outgassing in accordance with NASA and ECSS standards and are designed for leading edge performance in challenging space applications. PhaseTrack® cable assemblies are designed for applications demanding minimal phase

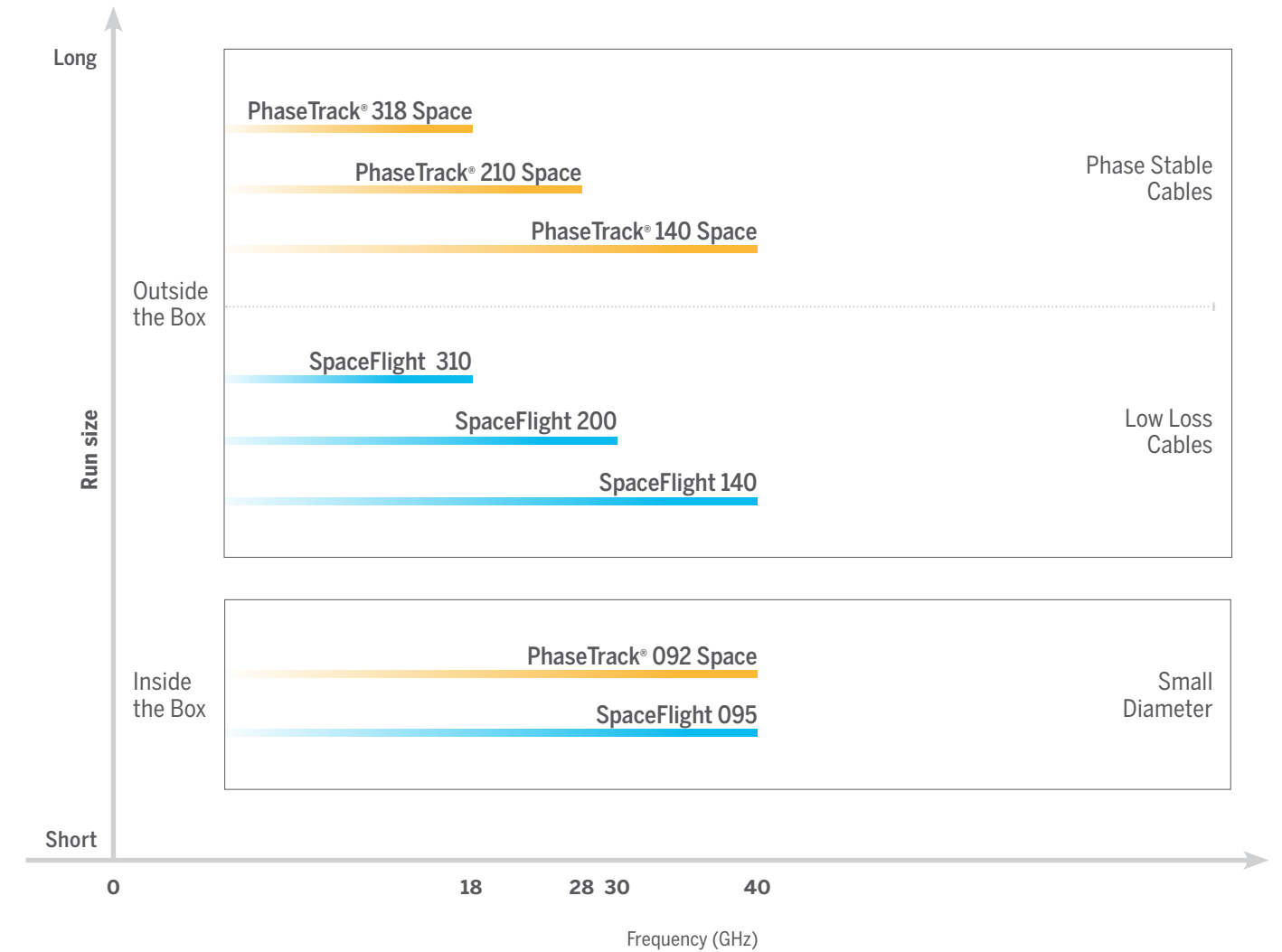
change over temperature. All PhaseTrack cables use a proprietary TF4® dielectric that does not have the abrupt shift in the phase that occurs with solid- or tape-wrapped PTFE-based products under normal room ambient temperature conditions.

## Space Assembly Comparison Chart

Space Assembly Type	Cable	Max. Frequency
SpaceFlight™ Space Assemblies	SPFLX-095	40
	SPFLT-140	40
	SPFLT-200	30
	SPFLT-310	18.5
PhaseTrack® -SP Space Assemblies	PT092-SP	40
	PT140-SP	40
	PT210-SP	28
	PT318-SP	18

## Cable Assembly Guide

Selecting the correct assembly for the right application is not always an easy task. Below are some considerations when selecting RF test assemblies.



- Sold as cable assemblies
- Class 100,000 clean room manufacturing
- Vented connectors, if applicable
- Optimized for lowest attenuation
- Radiation Resistance: 100 MRads

## Features

- Low Loss
- Radiation Resistant
- Low Outgassing
- Light Weight



## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

Units

Diameter	in (mm)	0.102 (2.5908)
Weight	lb/ft (kg/m)	0.081 (0.1205)
Minimum Bend Radius	in (mm)	0.5 (12.7)
Maximum Frequency	GHz	40
Maximum Operating Voltage	VACrms	1300
Capacitance	pF/ft (pF/m)	25.8 (83.62)
Velocity of Propagation	%	81
Delay	ns/ft (ns/m)	1.25 (4.1)
Shielding	dB	> 90

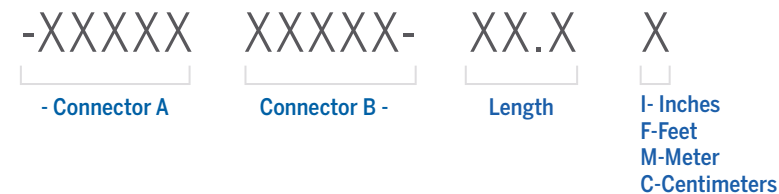
## Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 $f = \text{Frequency (MHz)}$   
 Use K values with  
 matching length unit

K values	dB/ft	dB/m
K1	0.6525	2.14085
K2	0.0001509	0.00050

## Ordering Guide SPFLX095



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP099	2.92mm Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP054	2.92mm Male 90°	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)

## Features

- Low Loss
- Radiation Resistant
- Low Outgassing
- Light Weight



## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

Units

Diameter	in (mm)	0.139 (3.5306)
Weight	lb/ft (kg/m)	0.0148 (0.022)
Minimum Bend Radius	in (mm)	0.625 (15.875)
Maximum Frequency	GHz	40
Maximum Operating Voltage	VACrms	3000
Capacitance	pF/ft (pF/m)	25.4 (84.66)
Velocity of Propagation	%	80
Delay	ns/ft (ns/m)	1.29 (4.23)
Shielding	dB	> 90

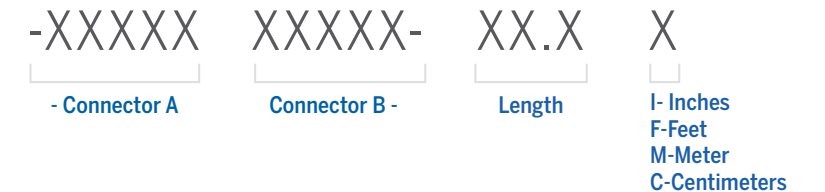
## Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 $f = \text{Frequency (MHz)}$   
 Use K values with  
 matching length unit

K values	dB/ft	dB/m
K1	0.364	1.194284
K2	0.000144	0.00047246

## Ordering Guide SPFLT140



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP047	SMA Male 90	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP042	SMA Female Bulk Head	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
SP074	2.92mm Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)

## Features

- Low Loss
- High Power Handling
- Multipaction Resistant – Vented Connectors
- Radiation Resistant
- Low Outgassing

## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

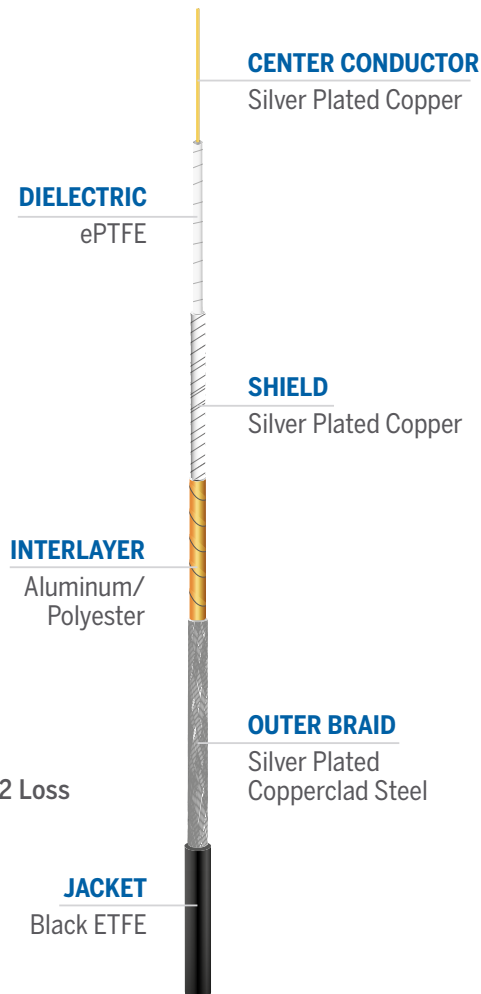
	Units	
Diameter	in (mm)	0.194 (4.9276)
Weight	lb/ft (kg/m)	0.035 (0.0521)
Minimum Bend Radius	in (mm)	1.0 (25.4)
Maximum Frequency	GHz	30
Maximum Operating Voltage	VACrms	3000
Capacitance	pF/ft (pF/m)	25.81 (84.66)
Velocity of Propagation	%	80
Delay	ns/ft (ns/m)	1.27 (4.16)
Shielding	dB	> 90

## Calculation

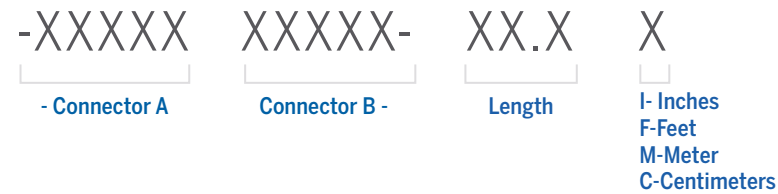
$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 f = Frequency (MHz)  
 Use K values with matching length unit

K values	dB/ft	dB/m
K1	0.2201	0.722148
K2	0.00014	0.000459



## Ordering Guide SPFLT200



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP068	2.92mm 90	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.05 x √f (GHz)
SP018	SMA Male	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP028	SMA Male 90	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.05 x √f (GHz)
SP023	3.5mm Male	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP021	2.92mm Male	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)

## Features

- Low Loss
- High Power Handling
- Multipaction Resistant – Vented Connectors
- Radiation Resistant
- Low Outgassing

## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

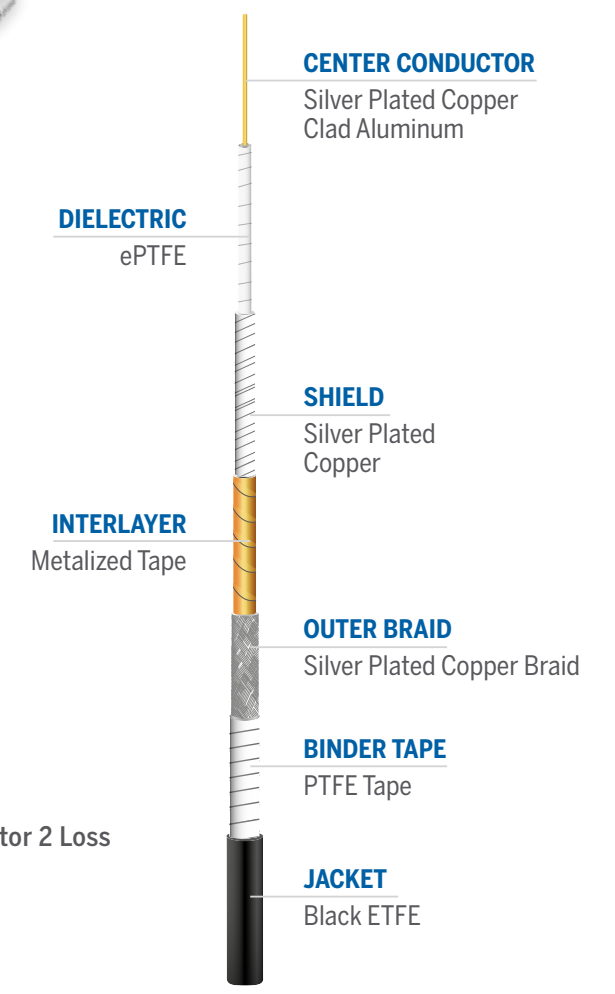
	Units	
Diameter	in (mm)	0.313 (7.9502)
Weight	lb/ft (kg/m)	0.7176 (1.0679)
Minimum Bend Radius	in (mm)	1.5 (38.1)
Maximum Frequency	GHz	18.5
Maximum Operating Voltage	VACrms	1300
Capacitance	pF/ft (pF/m)	25.49 (83.62)
Velocity of Propagation	%	81
Delay	ns/ft (ns/m)	1.25 (4.11)
Shielding	dB	> 90

## Calculation

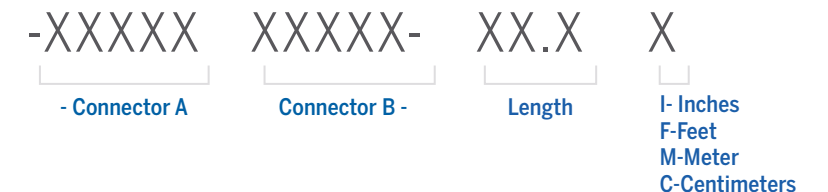
$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 f = Frequency (MHz)  
 Use K values with matching length unit

K values	dB/ft	dB/m
K1	0.1404	0.460652
K2	0.00012	0.000394



## Ordering Guide SPFLT310



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP052	2.92mm Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP055	2.92mm 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x √f (GHz)

# PhaseTrack® 092-SP

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## Features

- Superior Phase Stability
- PTFE "Knee" is Nonexistent
- TF4™ Dielectric Technology
- Radiation Resistant
- Low Outgassing

## Specifications

**Ω Impedance**  
50 Ohms

**Op Temp**  
-238 to +302°F  
-150 to +150°C

	Units	
Diameter	in (mm)	0.103 (2.62)
Weight	lb/ft (kg/m)	0.0113 (0.00513)
Minimum Bend Radius	in (mm)	0.500 (12.70)
Maximum Frequency	GHz	40
Maximum Operating Voltage	VACrms	500
Capacitance	pF/ft (pF/m)	24.2 (79.4)
Velocity of Propagation	%	80
Delay	ns/ft (ns/m)	1.24 (4.07)
Shielding	dB	> 90

## Calculation

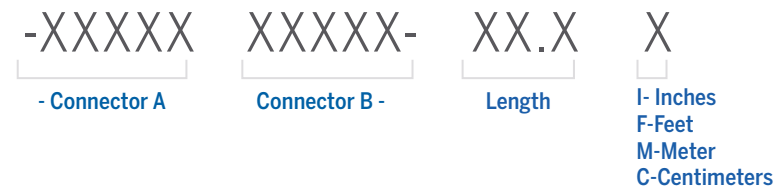
$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
f = Frequency (MHz)

Use K values with  
matching length unit

K values	dB/ft	dB/m
K1	0.6575	2.1573
K2	0.0009607	0.0031521

## Ordering Guide PT092



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP099	2.92mm Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
47211	2.92mm Male 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
47212	SMA Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP072	SMA Male 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
3190-3379	SMP Female 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)

# PhaseTrack® 140-SP

Cable Assemblies • Space Flight Applications

**TIMES**  
 MICROWAVE SYSTEMS  
 AN AMPHENOL COMPANY

## Features

- Superior Phase Stability
- PTFE "Knee" is Nonexistent
- TF4™ Dielectric Technology
- Radiation Resistant
- Low Outgassing

## Specifications

**Ω Impedance**  
50 Ohms

**Op Temp**  
-238 to +302°F  
-150 to +150°C

	Units	
Diameter	in (mm)	0.144 (3.6576)
Weight	lb/ft (kg/m)	0.01975 (0.0895)
Minimum Bend Radius	in (mm)	0.75 (19.05)
Maximum Frequency	GHz	40
Maximum Operating Voltage	VACrms	500
Capacitance	pF/ft (pF/m)	25.23 (82.78)
Velocity of Propagation	%	81
Delay	ns/ft (ns/m)	1.26 (4.13)
Shielding	dB	> 90

## Calculation

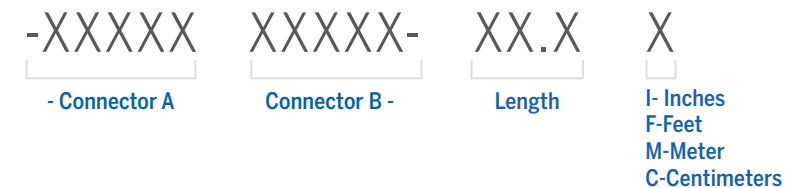
$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
f = Frequency (MHz)

Use K values with  
matching length unit

K values	dB/ft	dB/m
K1	0.423250	1.388615
K2	0.000535	0.001755

## Ordering Guide PT140



Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP002	SMA Male	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
SP043	SMA Male 90	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP046	SMA Female Bulk Head	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
3190-3212	SMPM Female	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP062	SMP Female	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
SP073	SMP Female 90	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.05 x vf (GHz)
SP081	2.92mm Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)
SP042	2.92mm Female Bulk Head	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x vf (GHz)

# PhaseTrack® 210-SP

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## Features

- Superior Phase Stability
- PTFE "Knee" is Nonexistent
- TF4™ Dielectric Technology
- High Power Handling
- Multipaction Resistant – Vented Connectors
- Radiation Resistant
- Low outgassing

## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

Units

Diameter	in (mm)	0.224 (5.69)
Weight	lb/ft (kg/m)	0.048 (0.02177)
Minimum Bend Radius	in (mm)	1.125 (28.575)
Maximum Frequency	GHz	28
Maximum Operating Voltage	VACrms	1900
Capacitance	pF/ft (pF/m)	24.4 (80.06)
Velocity of Propagation	%	83
Delay	ns/ft (ns/m)	1.23 (4.04)
Shielding	dB	> 90

## Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 f = Frequency (MHz)  
 Use K values with matching length unit

K values	dB/ft	dB/m
K1	0.2597	0.8521
K2	0.0009435	0.0030956

## Ordering Guide PT210SP

-XXXXX Connector A  
 XXXXX- Connector B -  
 XX.X Length  
 X I-Inches  
 F-Feet  
 M-Meter  
 C-Centimeters

Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP039	SMA Male	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP024	SMA Male 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x √f (GHz)
SP080	SMA Female Bulk Head	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP001	SMPM Female	Gold Plate, MIL-DTL-45204	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)

# PhaseTrack® 318-SP

Cable Assemblies • Space Flight Applications

**TIMES**  
 MICROWAVE SYSTEMS  
 AN AMPHENOL COMPANY

## Features

- Superior Phase Stability
- PTFE "Knee" is Nonexistent
- TF4™ Dielectric Technology
- High Power Handling
- Multipaction Resistant – Vented Connectors
- Radiation Resistant
- Low outgassing

## Specifications

Impedance 50 Ohms  
 Op Temp -238 to +302°F  
 -150 to +150°C

Units

Diameter	in (mm)	0.32 (8.128)
Weight	lb/ft (kg/m)	0.0874 (0.1301)
Minimum Bend Radius	in (mm)	1.75 (44.45)
Maximum Frequency	GHz	18
Maximum Operating Voltage	VACrms	500
Capacitance	pF/ft (pF/m)	24.0 (78.74)
Velocity of Propagation	%	82.5
Delay	ns/ft (ns/m)	1.23 (4.04)
Shielding	dB	> 90

## Calculation

$$IL = (K1 \times v(f) + K2 \times f) \times \text{Cable Length} + \text{Connector 1 Loss} + \text{Connector 2 Loss}$$

Cable Insertion Loss  
 f = Frequency (MHz)  
 Use K values with matching length unit

K values	dB/ft	dB/m
K1	0.1415	0.464262
K2	0.0006975	0.002288

## Ordering Guide PT318SP

-XXXXX Connector A  
 XXXXX- Connector B -  
 XX.X Length  
 X I-Inches  
 F-Feet  
 M-Meter  
 C-Centimeters

Connector Code	Description	Connector Body	Center Contact	Connector Loss
SP070	SMA Male	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.03 x √f (GHz)
SP104	SMA Male 90	Passivate, AMS-2700	Gold Plate, MIL-DTL-45204	0.05 x √f (GHz)



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