



# Precision Microwave Coaxial Cable Catalog



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# About Semflex

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For more than 40 years, Semflex has been manufacturing some of the highest quality coaxial cable in the world. Over the years, we have developed the expertise necessary to rapidly design and manufacture cable solutions to meet specific and unique requirements for a variety of environmental, mechanical and electrical conditions.

Semflex is a vertically integrated company manufacturing high performance RF/Microwave cables, cable assemblies and connectors for a global list of high technology firms, both large and small. The company's mission is to contribute to the success of its customers by:

- Offering cost-effective solutions and one-stop shopping via a broad line of RF and microwave products
- Reducing time to market by providing rapid turnaround time for new designs
- Increasing system reliability by providing high quality reliable products that exceed their specifications

## Semflex currently supplies cable products to a variety of industries including:

- Land, Sea, and Airborne Military Weapons Platforms
- Electronic Counter Measures and Jammers
- Cellular Antennas and Base Stations
- Satellite Antennas and Earth Stations
- Commercial and Military Airframes
- Precision Test and Measurement
- Semiconductor Sputtering
- Missile Guidance Systems
- Communication Systems
- High Power Applications
- Phased Array Radars
- Professional Audio
- Industrial Lasers
- Medical MRI

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## Cable

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## HPI/LAI Series

### HPI/LAI Series Features

- The most customer configurable cable assembly series
- Custom options such as phase matching and custom marking available upon request
- Available with high performance HP cable series and low attenuation LA cable series
- Wide selection of interfaces and cable jackets
- All connectors designed to meet MIL-C-39012 applicable industry standards
- All connectors designed for cable fit and optimum connector to cable transition
- Wide range of applications through 50GHz

Cable Constants	HP120S	HP160S	HP160U	HP190S	HP305S	HP450	LA190S	LA290S
Max. Freq., GHz	55	40	40	28	18	12	28	18
k1	15.22	11.72	13.33	7.45	4.76	3.44	7.38	4.24
k2	0.59	0.38	0.87	0.35	0.37	0.36	0.32	0.19

Connector Constants, k3	2.4mm	2.92mm	3.5mm	SMA	N	TNC
Straight	0.03	0.03	0.03	0.03	0.05	0.05
Right Angle	0.05	0.05	0.05	0.05	0.07	0.07

### Insertion Loss Calculation

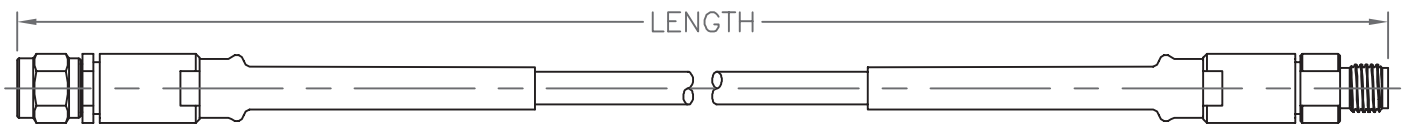
Cable Insertion Loss, dB/ in @ Freq (GHz) =  
 $IL = \text{Cable Loss} + \text{Connector Loss} + \text{Connector Loss}$

Cable Loss, dB/ in @ Freq (GHz) =  
 $L \times \left[ \left( k_1 \times \sqrt{F} \right) + \left( k_2 \times F \right) \right] / 1200$

Connector Loss, dB @ Freq (GHz) =  
 $k_3 \times \sqrt{F}$

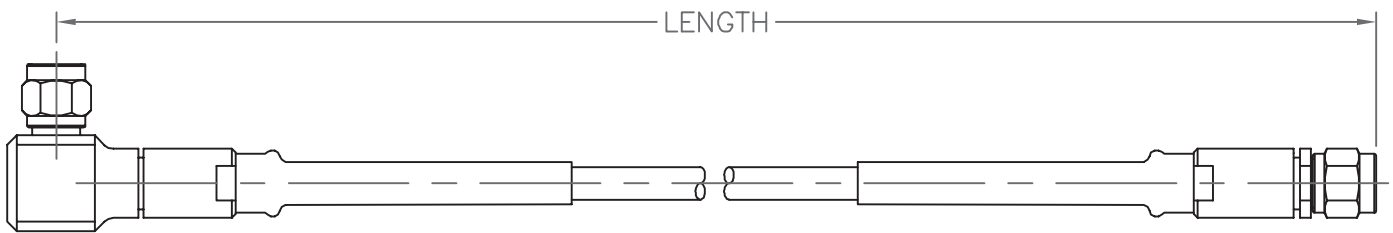
IL = Insertion Loss (dB)  
 L = Length (in)  
 F = Frequency (GHz)

### HPI/LAI Series Assembly Lengths Definitions



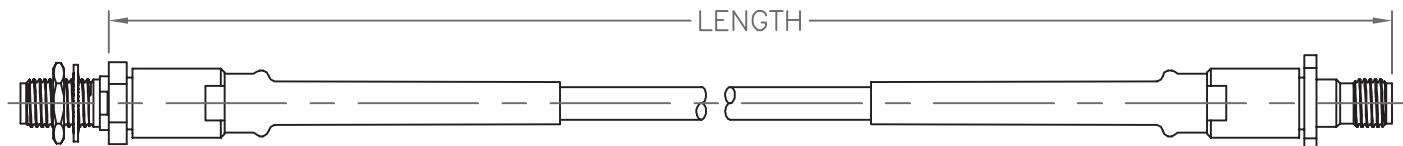
Straight Male/Female

Straight Male/Female



Right Angle/Swept Male

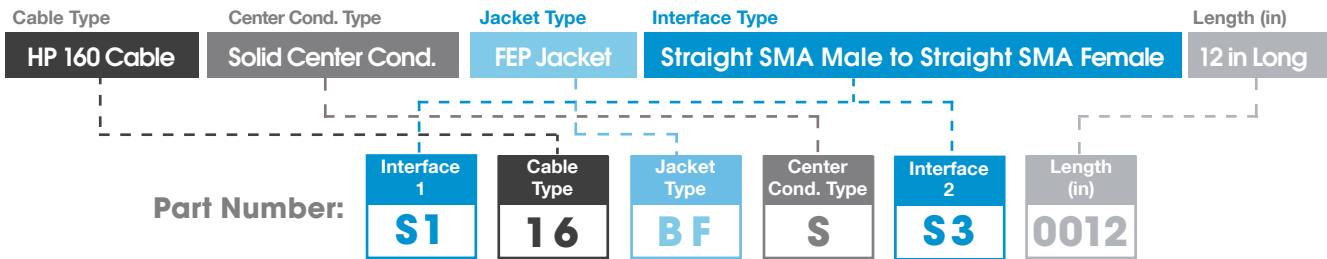
Straight Male/Female



Female Bulkhead

Female Flange, 1/2 in

# CATALOG CONFIGURED CABLE ASSEMBLIES



Interface 1

Connector Selection Order

Interface 2

Interface Type		Cable Type							
		12	16	16U	19	30	45	L19	L29
		HP120	HP160	HP160U	HP190	HP305	HP450	LA190S	LA290S
Z1	2.4mm Male Straight	Y	Y	Y	-	-	-	-	-
Z2	2.4mm Male Right Angle	Y	-	-	-	-	-	-	-
Z3	2.4mm Female Straight	Y	Y	Y	-	-	-	-	-
Z4	2.4mm Female Bulkhead	Y	Y	Y	-	-	-	-	-
Z5	2.4mm Female Flange	-	-	-	-	-	-	-	-
Z6	2.4mm Male Swept Right Angle	Y	Y	Y	-	-	-	-	-
X1	2.92mm Male Straight	Y	Y	Y	-	-	Y	-	-
X2	2.92mm Male Right Angle	Y	Y	Y	-	-	-	-	-
X3	2.92mm Female Straight	Y	Y	Y	-	-	-	-	-
X4	2.92mm Female Bulkhead	Y	Y	Y	-	-	-	-	-
X5	2.92mm Female Flange	-	Y	Y	-	-	-	-	-
X6	2.92mm Male Swept Right Angle	Y	Y	Y	-	-	-	-	-
M1	3.5mm Male Straight	Y	Y	Y	Y	-	-	-	-
M2	3.5mm Male Right Angle	Y	Y	Y	Y	-	-	-	-
M3	3.5mm Female Straight	Y	Y	Y	-	-	-	-	-
M4	3.5mm Female Bulkhead	-	Y	Y	Y	-	-	-	-
M5	3.5mm Female Flange	-	-	-	-	-	-	-	-
M6	3.5mm Male Swept Right Angle	-	-	-	Y	-	-	-	-
S1	SMA Male Straight	Y	Y	Y	Y	Y	-	Y	Y
S2	SMA Male Right Angle	Y	Y	Y	Y	Y	-	-	Y
S3	SMA Female Straight	Y	Y	Y	Y	Y	-	-	-
S4	SMA Female Bulkhead	Y	Y	Y	Y	Y	-	-	Y
S5	SMA Female Flange	-	Y	Y	Y	-	-	-	-
S6	SMA Male Swept Right Angle	-	-	-	Y	Y	-	-	-
N1	N Male Straight	-	-	-	Y	Y	Y	-	Y
N2	N Male Right Angle	-	-	-	Y	Y	Y	-	Y
N3	N Female Straight	-	-	-	Y	Y	Y	-	-
N4	N Female Bulkhead	-	-	-	Y	Y	Y	-	Y
N5	N Female Flange	-	-	-	Y	Y	-	-	-
N6	N Male Swept Right Angle	-	-	-	Y	Y	Y	-	-
T1	TNC Male Straight	-	-	-	Y	Y	Y	-	Y
T2	TNC Male Right Angle	-	-	-	Y	Y	Y	-	Y
T3	TNC Female Straight	-	-	-	Y	Y	-	-	-
T4	TNC Female Bulkhead	-	-	-	Y	Y	Y	-	Y
T5	TNC Female Flange	-	-	-	Y	Y	-	-	-
T6	TNC Male Swept Right Angle	-	-	-	-	Y	Y	-	-

Center Cond. Type	
S	Solid Center Conductor
B	Stranded Center Conductor
-	Omit for LA Series Cables

Jacket Type	
BF	FEP Jacket
BP	Polyurethane Jacket

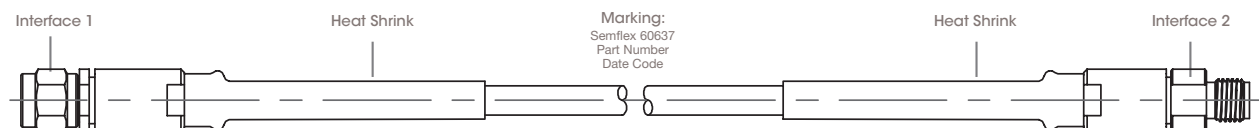
\*Contact factory about polyurethane jacket over flexible stainless steel armor and stainless steel flexible armor options

Length, in	
Min 6 in, Max 480 in*	
Example: 0006=6 in; 0120=120 in,	
*See Assembly Lengths Definition, page 4	
Standard Length Tolerance	
6"~119"	-0", +0.5"
120"~179"	-0", +1"
180"~480"	-0", +4"
*Contact factory about the lengths over 480"	

VSWR Guide		
Freq. GHz	Interface	VSWR* (max)
50	2.4mm, Straight	1.45
50	2.4mm, Right Angle	1.50
40	2.9mm, Straight	1.40
40	2.9mm, Right Angle	1.50
35	3.5mm, Straight	1.40
35	3.5mm, Right Angle	1.50
26	SMA Straight	1.25
26	SMA Right Angle	1.30
18	N Straight	1.30
18	N Right Angle	1.30
18	TNC Straight	1.30
18	TNC Right Angle	1.30

\*Contact factory for detailed VSWR specifications

## HPI Series Cable Assembly Construction



## HPT Series

### HPT Series Features

- Available with high performance HP cable series
- Heavy duty on cable hot molded rubber boot provides exceptional strain relief and extends the life span of the cable assembly
- All connectors specially designed to provide excellent adhesion to the strain relief boot
- All interfaces designed to meet MIL-C-39012 applicable industry standards
- The best option for lab and production testing and high flexure applications up to 50GHz

Cable Constants	HP120S	HP160S	HP160U	HP190S	HP305S
Max. Freq., GHz	55	40	40	28	18
k1	15.22	11.72	13.33	7.45	4.76
k2	0.59	0.38	0.87	0.35	0.37

Connector Constants, k3	2.4mm	2.92mm	3.5mm	SMA	N	TNC
Straight	0.03	0.03	0.03	0.03	0.05	0.05
Right Angle	0.05	0.05	0.05	0.05	0.07	0.07

### Insertion Loss Calculation

Cable Insertion Loss, dB/ in @ Freq (GHz) =

$$IL = \text{Cable Loss} + \text{Connector Loss} + \text{Connector Loss}$$

Cable Loss, dB/ in @ Freq (GHz) =

$$L \times [(k1 \times \sqrt{F}) + (k2 \times F)] / 1200$$

Connector Loss, dB @ Freq (GHz) =

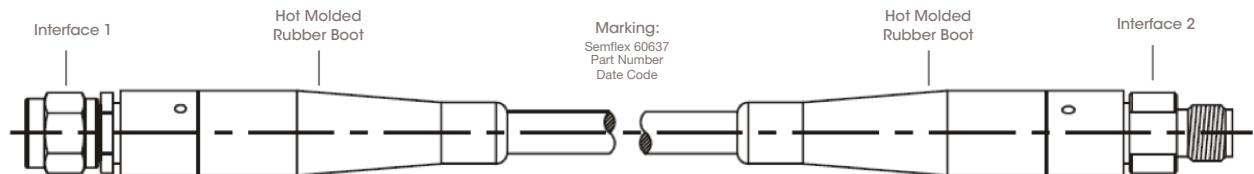
$$k3 \times \sqrt{F}$$

IL = Insertion Loss (dB)

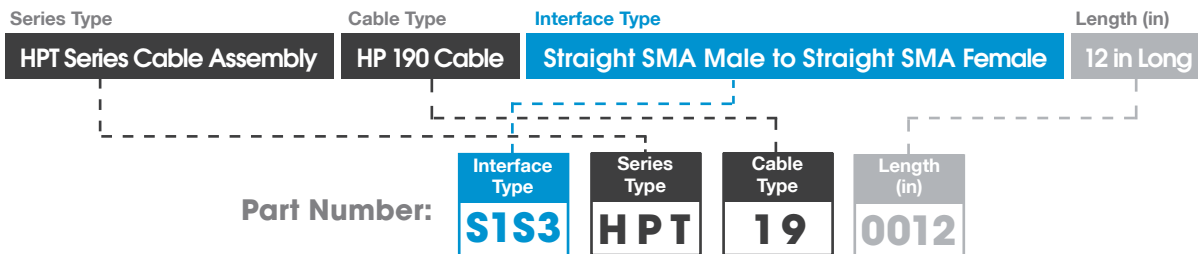
L = Length (in)

F = Frequency (GHz)

### HPT Series Cable Assembly Construction



# CATALOG CONFIGURED CABLE ASSEMBLIES



## Cable Type and Code

	12	16	16U	19	30
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### Interface Type and Code

Interface 1	Interface 2	HP120S	HP160S	HP160U	HP190S	HP305S
Z1	2.4mm Male Straight	Y	-	-	-	-
Z3	2.4mm Female Straight	Y	-	-	-	-
X1	2.92mm Male Straight	Y	Y	Y	-	-
X3	2.92mm Female Straight	Y	Y	Y	-	-
M1	3.5mm Male Straight	Y	-	-	Y	-
M3	3.5mm Female Straight	Y	-	-	Y	-
S1	SMA Male Straight	Y	Y	Y	Y	Y
S3	SMA Female Straight	Y	Y	Y	Y	-
N1	N Male Straight	-	-	-	Y	Y
N3	N Female Straight	-	-	-	Y	-
T1	TNC Male Straight	-	-	-	Y	-
T3	TNC Female Straight	-	-	-	Y	-

Connector Selection Order

## Length, in

Min 6 in, Max 480 in\*  
 Example: 0006=6 in; 0120=120 in  
 \*See Assembly Lengths Definition, page 4

### Standard Length Tolerance

Length Range (in)	Tolerance
6"~119"	-0", +0.5"
120"~179"	-0", +1"
180"~480"	-0", +4"

\*Contact factory about the lengths over 480"

## VSWR Guide

Freq. GHz	Interface	VSWR*(max)
50	2.4mm, Straight	1.45
50	2.4mm, Right Angle	1.50
40	2.9mm, Straight	1.40
40	2.9mm, Right Angle	1.45
35	3.5mm, Straight	1.40
35	3.5mm, Right Angle	1.45
26	SMA Straight	1.25
26	SMA Right Angle	1.30
18	N Straight	1.30
18	N Right Angle	1.30
18	TNC Straight	1.30
18	TNC Right Angle	1.30

\*Contact factory for detailed VSWR specifications

## DKF Series

### DKF Series Features

- Available with high performance HP190S cable
- Heavy duty slip-on rubber boot provides exceptional strain relief and extends the life span of the cable assembly
- All connectors specially designed to provide excellent adhesion to the strain relief boot
- All interfaces designed to meet MIL-C-39012 applicable industry standards
- Available in standard lengths with straight male connectors stocked by distributors for lab and production applications up to 18GHz

Cable Constants	HP190
Max. Freq., GHz	28
k1	7.45
k2	0.35

Connector Constants, k3	SMA	N
Straight	0.03	0.05
Right Angle	0.05	0.07

### Insertion Loss Calculation

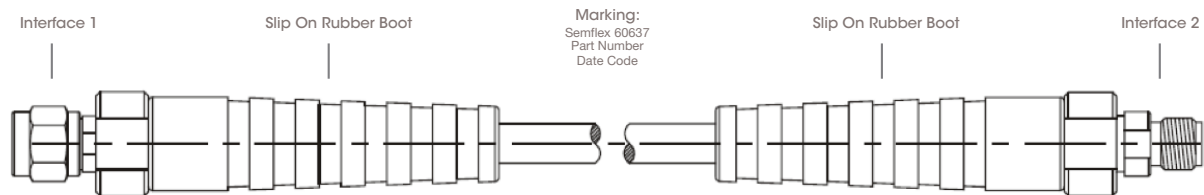
Cable Insertion Loss, dB/ in @ Freq (GHz) =  
 $IL = \text{Cable Loss} + \text{Connector Loss} + \text{Connector Loss}$

Cable Loss, dB/ in @ Freq (GHz) =  
 $L \times \left[ \left( k1 \times \sqrt{F} \right) + \left( k2 \times F \right) \right] / 1200$

Connector Loss, dB @ Freq (GHz) =  
 $k3 \times \sqrt{F}$

IL = Insertion Loss (dB)  
 L = Length (in)  
 F = Frequency (GHz)

### DKF Series Cable Assembly Construction



# CATALOG CONFIGURED CABLE ASSEMBLIES

Series Type	Cable Type	Interface Type	Length (in)
DKT Series Cable Assembly	HP 190S Cable	Straight SMA Male to Straight SMA Female	12 in Long

Part Number:

Interface Type	Series Type	Length (in)
2123	DKF	0012

Interface Type and Code		HP190S
21	SMA Male Straight	Y
22	SMA Male Right Angle	Y
23	SMA Female Straight	Y
51	N Male Straight	Y
52	N Male Right Angle	Y
53	N Female Straight	Y

Interface 1  
↓  
Connector Selection Order  
↓  
Interface 2

## Length, in

Min 6 in, Max 480 in\*

Example: 0006=6 in; 0120=120 in

\*See Assembly Lengths Definition, page 4

## Standard Length Tolerance

6"~119" -0", +0.5"

120"~179" -0", +1"

180"~480" -0", +4"

\*Contact factory about the lengths over 480"

## VSWR Guide

Freq. GHz	Interface	VSWR*(max)
26	SMA Straight	1.25
26	SMA Right Angle	1.30
18	N Straight	1.30
18	N Right Angle	1.30

\*Contact factory for detailed VSWR specifications



## SWI Series

### SWI Series Features

- Available with SW series cable
- Higher performance alternative to RG series cable assemblies
- All interfaces designed to meet MIL-C-39012 applicable industry standards
- Ideal for in-box or in-cabinet applications up to 18GHz

Cable Constants	SW060	SW086	SW110	SW150	SW180
Max. Freq., GHz	129	71	55	40	28
k1	38.38	22.62	16.15	12.45	8.62
k2	0.36	0.63	0.60	0.35	0.39

Connector Constants, k3	SMA	MCX	N	TNC
Straight	0.03	0.03	0.05	0.05
Right Angle	0.05	0.05	0.07	0.07

### Insertion Loss Calculation

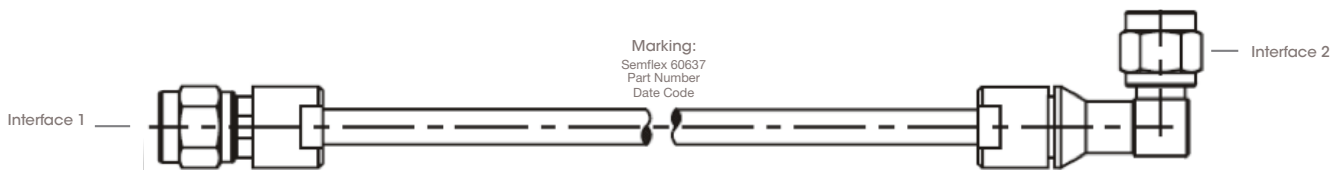
Cable Insertion Loss, dB/ in @ Freq (GHz) =  
 $IL = \text{Cable Loss} + \text{Connector Loss} + \text{Connector Loss}$

Cable Loss, dB/ in @ Freq (GHz) =  
 $L \times \left[ (k1 \times \sqrt{F}) + (k2 \times F) \right] / 1200$

Connector Loss, dB @ Freq (GHz) =  
 $k3 \times \sqrt{F}$

IL = Insertion Loss (dB)  
 L = Length (in)  
 F = Frequency (GHz)

### SWI Series Cable Assembly Construction



# CATALOG CONFIGURED CABLE ASSEMBLIES

Series Type: SWI Series Cable Assembly | Cable Type: SW110 Cable | Interface Type: Straight SMA Male to Right Angle SMA Male | Length (in): 12 in Long

Part Number: **2122** - **SW110** - **0012**

		Cable Type and Code				
Interface Type and Code		SW060	SW086	SW110	SW150	SW180
Interface 1	21 SMA Male Straight	-	Y	Y	Y	Y
	22 SMA Male Right Angle	-	Y	Y	Y	Y
	24 SMA Female Bulkhead	-	Y	Y	Y	Y
Connector Selection Order	81 MCX Male Straight	-	Y	Y	-	-
	82 MCX Male Right Angle	-	Y	Y	-	-
	84 MCX Female Bulkhead	-	Y	Y	-	-
Interface 2	51 N Male Straight	-	-	-	Y	Y
	52 N Male Right Angle	-	-	-	Y	Y
	54 N Female Bulkhead	-	-	-	Y	Y
	61 TNC Male Straight	-	-	-	Y	Y
	62 TNC Male Right Angle	-	-	-	Y	Y
	64 TNC Female Bulkhead	-	-	-	Y	Y

## Length, in

Min 6 in, Max 480 in\*  
 Example: 0006=6 in; 0120=120 in  
 \*See Assembly Lengths Definition, page 4

## Standard Length Tolerance

6"~119"	-0", +0.5"
120"~179"	-0", +1"
180"~480"	-0", +4"

\*Contact factory about the lengths over 480"

## VSWR Guide

Freq. GHz	Interface	VSWR* (max)
26	SMA Straight	1.25
26	SMA Right Angle	1.30
18	N Straight	1.30
18	N Right Angle	1.30
18	TNC Straight	1.30
18	TNC Right Angle	1.30
6	MCX Straight	1.30
6	MCX Right Angle	1.35

\*Contact factory for detailed VSWR specifications

Semflex offers a large selection of microwave connectors designed to provide excellent electrical transitions between the connector interface and cable resulting in very low VSWR characteristics. Along with the popular connectors listed in the following tables, Semflex has hundreds of other connector designs to meet a variety of special requirements (i.e. high power, swept 90° bends, environmental sealing, low intermod characteristics, special plating or finishes, etc). For special requirements, please contact Customer Service at 507.833.8822 or at [ccsorders@us.cinch.com](mailto:ccsorders@us.cinch.com).

## LA290

Part Number	Description	Assembly Procedure
21040-111	SMA Male	70025-802CU
21041-111	SMA R/A Male	70025-803CU
21042-111	SMA Bhd Female	70025-804CU
21043-111	TNC Male	70025-805CU
21044-111	TNC R/A Male	70025-806CU
21045-111	TNC Bhd Female	70025-807CU
21037-111	N Male	70025-799CU
21038-111	N R/A Male	70025-800CU
21039-111	N Bhd Female	70025-801CU

## HP305S

Part Number	Description	Assembly Procedure
20677-111	SMA Male	70025-288CU
20678-111	SMA R/A Male	70025-299CU
20680-111	SMA Bhd Female	70025-302CU
20683-111	TNC Male	70025-408CU
20684-111	TNC R/A Male	70025-409CU
20686-111	TNC Bhd Female	70025-411CU
20695-111	N Male	70025-315CU
20696-111	N R/A Male	70025-316CU
20698-111	N Bhd Female	70025-318CU

## HP160S

Part Number	Description	Assembly Procedure
20668-111	2.4mm Male	70025-818CU
20719-111	2.4mm R/A Male	70025-818CU
20670-111	2.92mm Male	70025-818CU
20723-111	2.92mm R/A Male	70025-818CU
20724-111	2.92mm Bhd Female	70025-818CU
20666-111	3.5mm Male	70025-818CU
20715-111	3.5mm R/A Male	70025-818CU
20716-111	3.5mm Bhd Female	70025-818CU

## SW086

Part Number	Description	Assembly Procedure
MCX109B	MCX Male	70025-652CU
MCX209B	MCX R/A Male	70025-653CU
SMA109B	SMA Male	70025-659CU
SMA209B	SMA R/A Male	70025-660CU

## HP190S

Part Number	Description	Assembly Procedure
20517-111	3.5mm Male	70025-297CU
20727-111	3.5mm R/A Male	70025-393CU
20493-111	SMA Male	70025-307CU
20494-111	SMA R/A Male	70025-384CU
20496-111	SMA Bhd Female	70025-386CU
20499-111	TNC Male	70025-346CU
20500-111	TNC R/A Male	70025-347CU
20502-111	TNC Bhd Female	70025-381CU
20511-111	N Male	70025-309CU
20514-111	N Bhd Female	70025-259CU

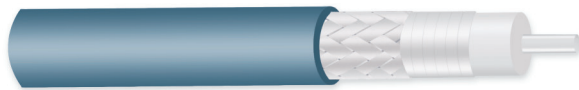
## SW180

Part Number	Description	Assembly Procedure
SMA108B	SMA Male	70025-649CU
SMA208B	SMA R/A Male	70025-633CU
TNC108B	TNC Male	70025-667CU
TNC208B	TNC R/A Male	70025-668CU
TNC408B	TNC Bhd Female	70025-669CU
N108B	N Male	70025-672CU
N208B	N R/A Male	70025-673CU
N408B	N Bhd Female	70025-674CU

Since no single cable is best suited for every type of application, Semflex offers a variety of 50 ohm cables carefully designed to meet specific performance/cost requirements. Different cable characteristics (i.e. flexibility, connector retention, torque and crush resistance, stability/repeatability with respect to temperature or flexure, cost, etc.) require special design considerations. Semflex's products lines take advantage of superior cable technology, carefully matching design and construction to specific application needs.

## Jacket

Semflex utilizes a variety of jacket materials which are selected based on cost, flexibility, chemical and environmental considerations.



### Polyurethane

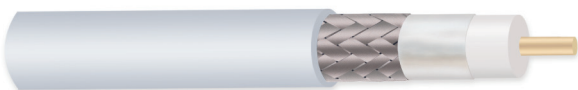
- Low temperature rating
- UV resistant
- Abrasion resistant
- Flexible (-65 to 85°C)

### FEP

- High temperature rating
- Chemical resistant
- Moisture resistant
- Low smoke
- Low outgassing (-65 to 200°C)

## Shielding

Semflex provides several outer shield combinations comprised of silver or tin plated copper wire, bare copper or aluminum wire, and foil tapes ranging from 80 to 100% shielding coverage. Each cable is carefully designed to optimize braid design for cable function. Braid coverage is highly dependent on braid angle, number of picks, wire gauge size and number of strands - all of which affect the attenuation, flexibility, and shielding effectiveness of the cable. As a general rule, higher braid coverage yields better shielding and lower attenuation. Lower braid coverage yields better flexibility.



### Round Braid

- Lower material cost
- Most flexible braid option



### Woven Flat Braid

- Lower contact resistance between braid wires resulting in lower attenuation
- Better coverage provides increased shielding effectiveness
- Smoother conductor for lower VSWR
- Increased connector retention and torque resistance



### Helical Flat Braid

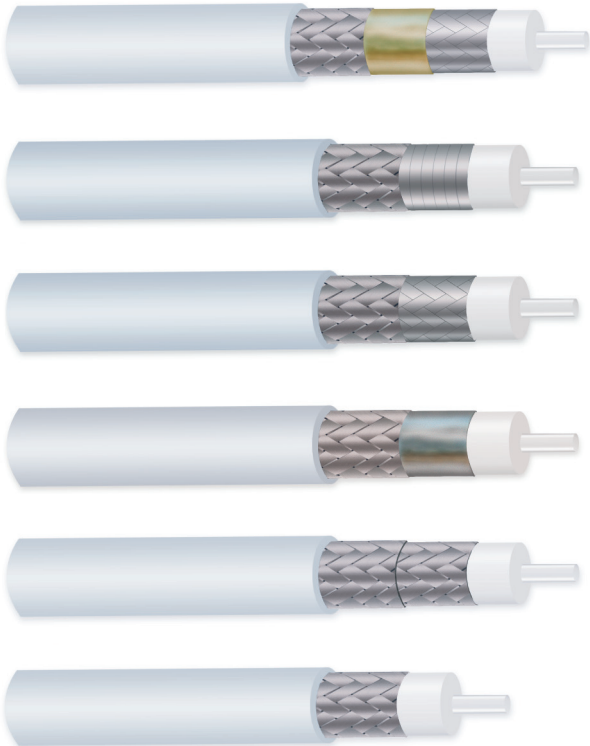
- Improved flexibility and shielding
- Increased phase stability vs flexure
- Lower radial torque resistance



### Wrapped or Folded Foil

- Polyimide (helical wrap) provides increased mechanical strength, high temp, chemical resistant
- Polyester (folded) low temp, low strength, lowers contact resistance and attenuation

## Shielding



### Triple Shield

- Woven flat braid, polyimide foil, round braid
- Provides >90 dB shielding effectiveness, high torque resistance, mechanically strong

### Double Shield

- Helical flat braid, round braid
- Provides >100 dB shielding effectiveness, phase stable vs flexure

### Double Shield

- Woven flat braid, round braid
- Provides >85 dB shielding effectiveness, low contact resistance

### Double Shield

- Polyester foil, round braid
- Provides >85 dB shielding effectiveness, cost effective

### Double Shield

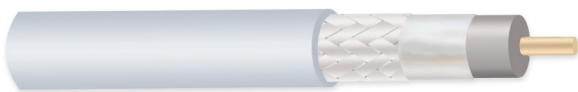
- Round braid, round braid
- Provides >60 dB shielding effectiveness, flexible

### Single Shield

- Round braid
- Provides >40 dB shielding effectiveness, very flexible

## Dielectric

Semflex utilizes a variety of dielectric materials which are selected based on signal loss (dissipation factor), temperature extremes, power rating and velocity of propagation. Our manufacturing process carefully controls the concentricity between the outer conductor and the center conductor to maintain consistent characteristic impedance and low structural return loss.



### Polyethelene

- Temp (-40 to 85°C)
- VP (66-85%)

### Solid PTFE

- Temp (-65 to 125°C)
- VP (70%)

### Low Density PTFE

- Temp (-65 to 200°C)
- VP (74-78%)

### Ultra Low Density PTFE

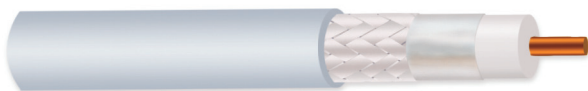
- Temp (-65 to 200°C)
- VP (82-85%)

### Characteristic Impedance Tolerances

- Extruded dielectrics: < +/- 6%
- Tape wrapped dielectrics: < +/- 2%

## Center Conductor

Semflex offers a variety of center conductor materials with several different platings.



### Solid Conductors

- Less resistance
- Lower loss
- Higher power

### Stranded Conductors

- More flexible

### Silver Plating

- Lowest loss
- Solderable

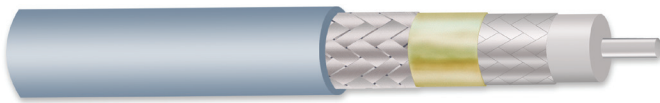
### Copper Clad

- Cost effective
- Solderable

## Military, Aerospace, Medical, Test & Measurement

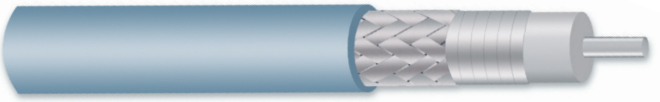
The High Performance Product Line includes four series of cables suitable for applications with the most stringent mechanical, electrical or environmental requirements with up to 50GHz. Low loss, low VSWR, high power, high temperature, flexibility and phase stability are all examples of the many special requirements this product line is suited for. Due to the custom nature of these cables, Semflex also offers a large selection of connectors.

## Cable Selection



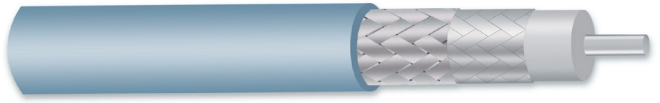
### HP Series

- Test & measurement interconnects - robust construction
- Best all around choice for microwave test and interconnect cables
- Low loss and VSWR to 55GHz, toughest mechanical construction



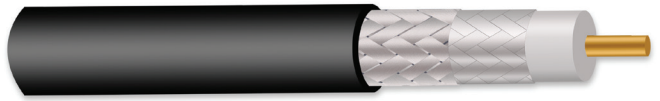
### LA Series

- Extra low attenuation
- The best combination of low attenuation, phase stability and mechanical performance
- Two models available up to 28GHz operation



### SW Series

- Lower cost - ease of assembly
- Good electrical performance, low loss to 129GHz
- Simplified connector attachments and assembly methods



### KW Series

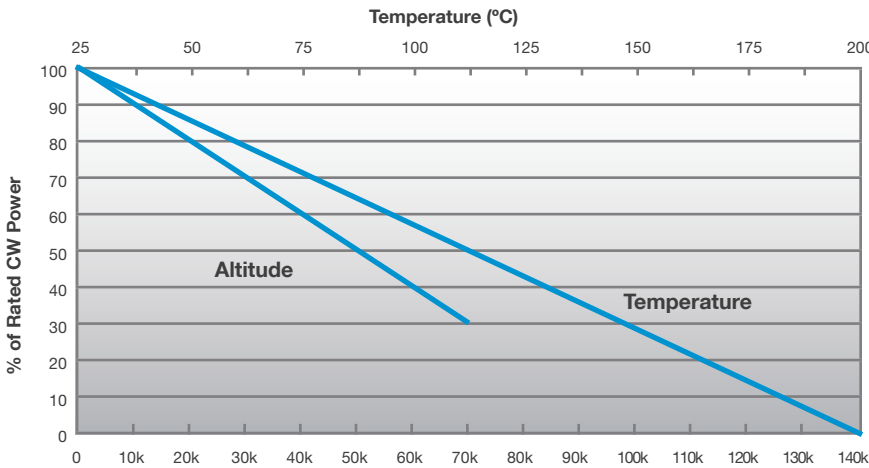
- Tight Installations - high power
- High power, low loss, high flexibility compared to air dielectric corrugated cables

# HIGH PERFORMANCE CABLE

## Power Handling

Average power ratings for coaxial cables are highly dependent on the long term operating temperature of the dielectric material. Semflex's published average power ratings are based on VSWR of 1.0:1, at sea level and an ambient temperature of 25° C. The base line power ratings can be adjusted to meet the actual conditions by using the derating factors for both temperature and altitude from the chart below.

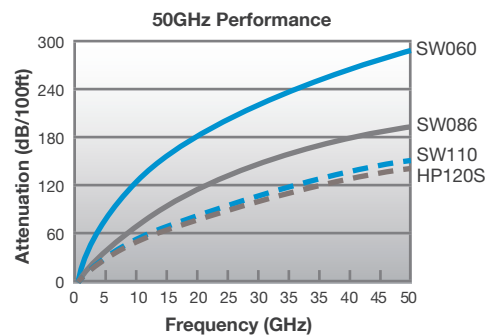
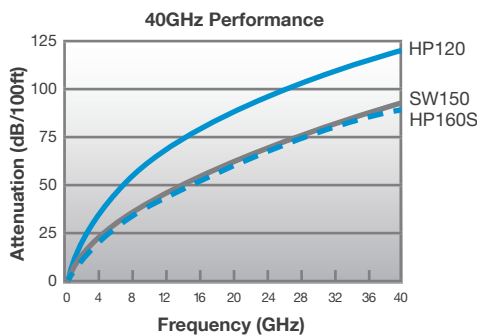
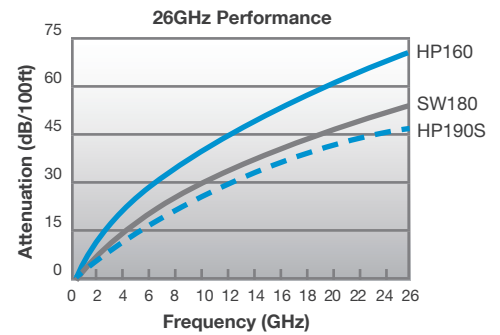
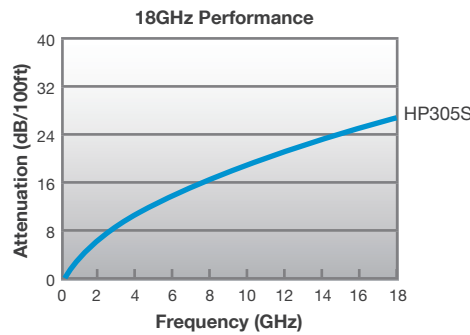
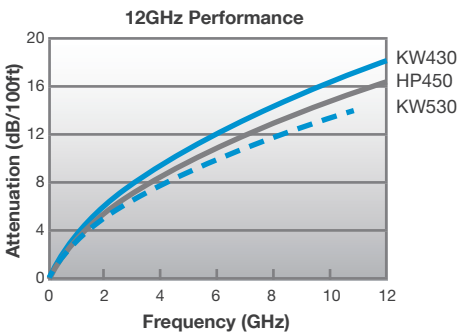
## Derating for Temperature and Altitude



Connector	Avg Power* (kW)	Peak Power (kW)
SMA	0.1	2.5
BNC	0.1	5.6
TNC	0.3	5.6
UHF	0.3	10
N	0.6	10
HN	0.6	40
SC	1.2	44
7/16 DIN	3.0	40
4.1/9.5 DIN	1.2	16
LC	3.5	63
7/8" EIA	4.2	90
1-5/8" EIA	5.2	305

\*Average power ratings of connector interfaces are typical for most applications and based on 900MHz.

## High Performance Comparison Data



The LA Series provides the best available combination of low attenuation, phase stability and mechanical performance. The signal loss at 18GHz for LA290S cable is <20 dB/100 ft with 0.290" overall diameter and for LA190S it is <37 dB/100 ft with 0.190" diameter. The carefully engineered construction provides excellent bend and crush resistance properties when compared to other ultra-low loss cables. This cable series is the best choice for phase stability over temperature\* and flexure as outlined in electrical performance data.

## Electrical Properties

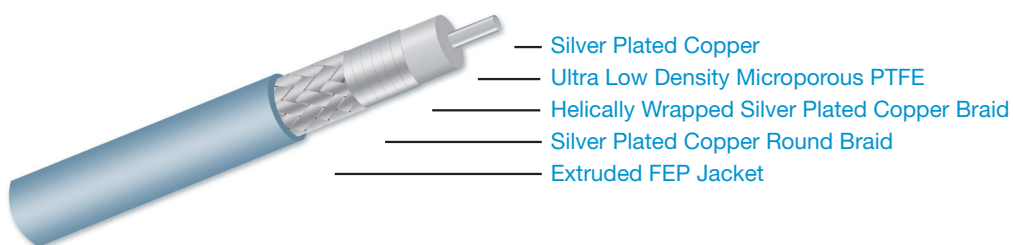
	LA190S	LA290S
Impedance (ohms)	50	50
Capacitance (pf/ft)	23.8	24
Inductance (nH.ft)	59	59
Shielding Effectiveness (dB)	>100	>100
Cut off Frequency (GHz)	28	19.7
Velocity of Propagation (%)	85	83
Breakdown Voltage (KV)	>10	>15
Max Structural VSWR	1.20:1	1.20:1

## Mechanical Properties

	LA190S	LA290S
Jacket O.D. (in)	0.189	0.292
Round Braid O.D. (in)	0.174	0.267
Helical Braid O.D. (in)	0.158	0.249
Dielectric O.D. (in)	0.147	0.235
Center Conductor O.D. (in)	0.055	0.089
Center Conductor Type	Solid	Solid
Inside Minimum Bend Radius (in)	1.1	1.600
Operating Temperature (°C)	-65/+200	-65/+200
Weight (lbs/ft)	0.034	0.090

## Cable Construction

The LA Series uses silver plated inner and outer conductors for excellent attenuation performance. The ultra low density microporous PTFE dielectrics and FEP jackets are engineered to provide the optimum combination of mechanical characteristics and stable electrical performance over temperature extremes. Low loss, phase stability, and shielding effectiveness of >100 dB results from combining a helically served flat braid with a 97% coverage round braid.

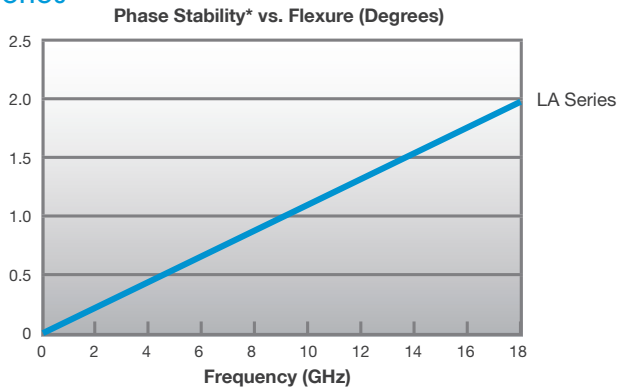


NOTE: Our LA Series published temperature range defines the hot and cold temperature extremes the cable will perform at. This is based on the material properties that are used to construct the LA Series cable. However, there are no implied performance guarantees with respect to rapid temperature excursions between hot and cold extremes in a thermal shock situation. Semflex can not predict the rate of temperature change or the number of temperature excursions our product will experience in all possible customer applications; therefore we do not give a blanket statement of guaranteed product performance for something as strenuous as thermal shock.

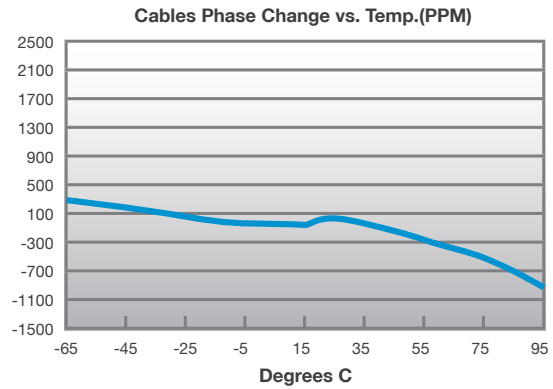


# LA SERIES CABLE

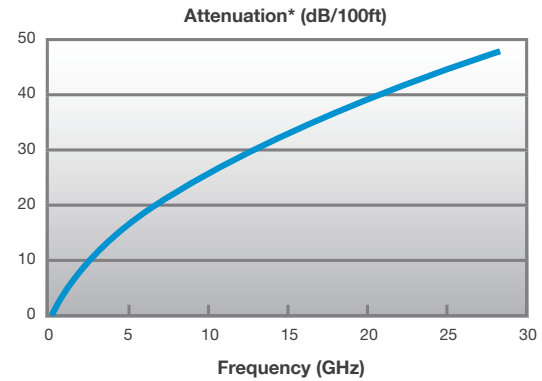
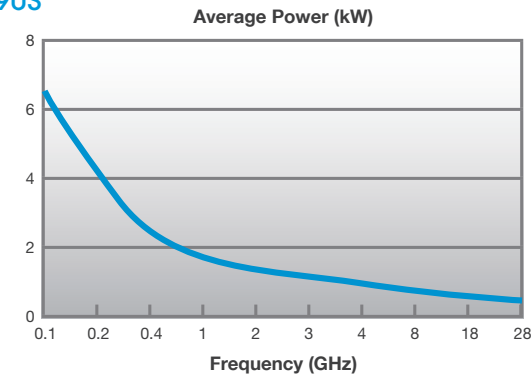
## LA Series



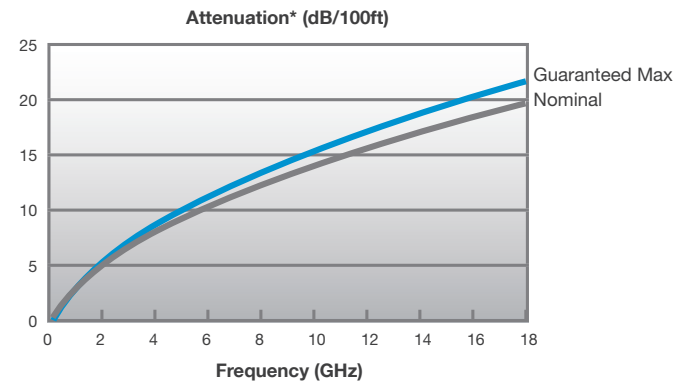
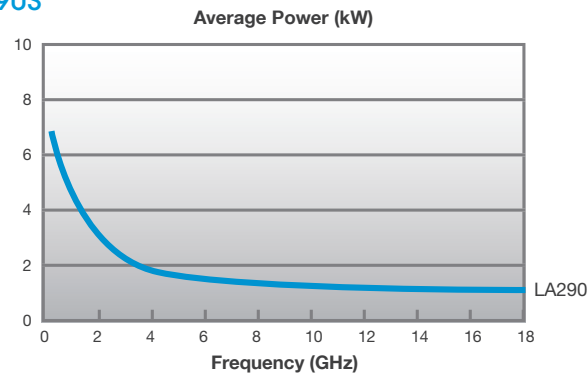
\*Phase stability is defined as the change in phase when the cable is bent 360 degrees around its minimum bend radius.



## LA190S



## LA290S



### \*Attenuation (dB/100 ft)

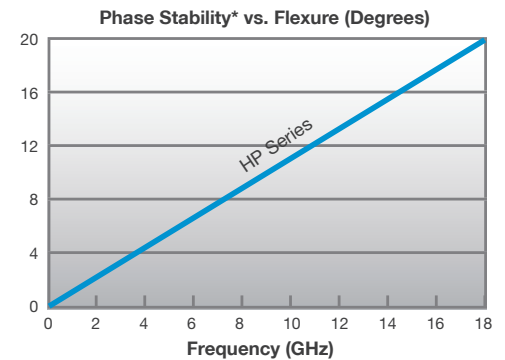
GHz	Guaranteed Max	
	LA190S	LA290S
0.45	5.09	2.93
1	7.7	4.43
3	13.7	7.90
6	20	11.50
12	29.4	16.91
18	37.1	21.32
28	47.9	N/A
*k1	7.38	4.240
*k2	0.32	0.185

\*Attenuation at any frequency =  $(k1 \times \sqrt{\text{freq}(\text{GHz})}) + (k2 \times \text{freq}(\text{GHz}))$

The HP Series has a long history in the military and aerospace industries as the interconnect cable of choice in ground, sea, and airborne systems. This series also excels in test and measurement applications offering high performance, flexibility, and availability of wide range of precision connectors for applications up to 50GHz. HP160U ULTRAFLEX has been especially designed for laboratory use with high flexibility in mind. The triple shield construction of HP Series in combination with Semflex connectors provide connector attachments that exceed 70 lbs of pull off force and can withstand harsh handling such as radial torque, continuous flexing, or wide temperature extremes.

## Electrical Properties

	HP120S	HP160S	HP160U	HP190S	HP305S	HP450
Impedance (ohms)	50	50	50	50	50	50
Capacitance (pf/ft)	26.7	26.9	27	26.7	26.2	26
Inductance (nH.ft)	67	66	66	66	66	62
Shielding Effectiveness (dB)	>90	>90	>90	>90	>90	>90
Cut off Frequency (GHz)	55	40	40	28	18	12
Velocity of Propagation	74%	75%	78%	75.5%	77%	78%
Breakdown Voltage (KV)	>5	>7	>7	>10	>15	>20
Max Structural VSWR	1.20:1	1.20:1	1.20:1	1.20:1	1.20:1	1.20:1



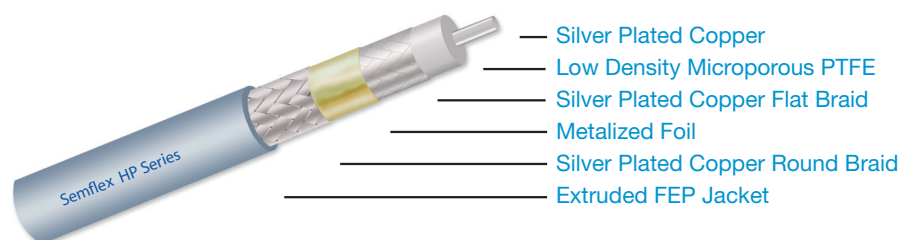
\*Phase stability is defined as the change in phase when the cable is bent 360 degrees around its minimum bend radius.

## Mechanical Properties

	HP120S	HP160S	HP160U	HP190S	HP305S	HP450
Jacket O.D. (in)	0.124	0.160	0.168	0.205	0.305	0.450
Round Braid O.D. (in)	0.104	0.145	0.136	0.188	0.273	0.403
Shield Interlayer O.D. (in)	0.088	0.129	0.120	0.172	0.256	0.378
Flat Braid O.D. (in)	0.080	0.120	0.109	0.163	0.248	0.369
Dielectric O.D. (in)	0.074	0.108	0.097	0.151	0.242	0.357
Center Conductor O.D. (in)	0.025	0.036	0.034	0.051	0.078	0.129
Center Conductor Type	Solid	Solid	Stranded	Solid	Solid	Stranded
Inside Min Ben Radius (in)	0.6	0.9	0.9	1.1	1.8	2.5
Operating Temperature (°C)	-65/200	-65/200	-65/85	-65/200	-65/200	-65/200
Weight (lbs/ft)	0.02	0.04	0.03	0.05	0.09	0.20

## Cable Construction

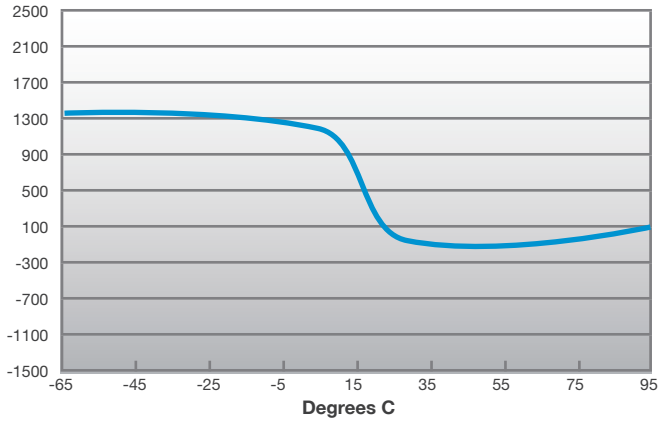
The HP Series uses silver plated copper inner and outer conductors for low attenuation. The microporous PTFE dielectric and FEP jackets provide consistent performance over temperature extremes with better phase performance over temperature compared to solid PTFE dielectrics. Shielding effectiveness >90 dB results from a triple shield construction of woven flat braid, foil, and round braid. This construction also provides substantially better radial torque resistance and connector pull off strength than helically wrapped shields.



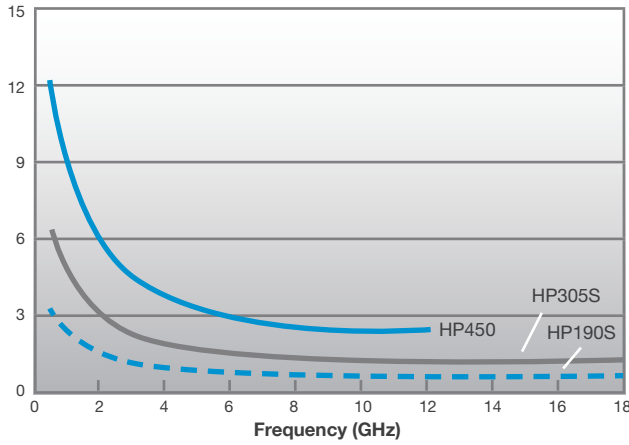
# HP SERIES CABLE

## HP Series

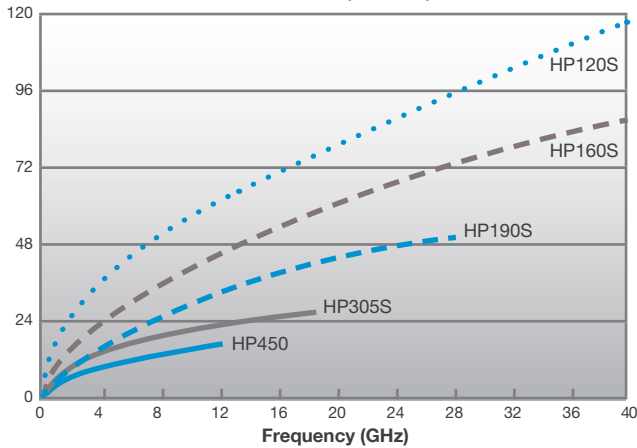
Phase Change vs. Temperature (PPM)



Average Power (kW)



Attenuation\* (dB/100ft)



## Average Power (kW)

GHz	Guaranteed Max					
	HP120S	HP160S	HP160U	HP190S	HP305S	HP450
0.5	1.0	1.5	1.2	3.1	6.4	12.1
1	0.7	1.1	0.8	2.1	4.4	8.2
2	0.5	0.8	0.6	1.4	3.0	5.5
6	0.3	0.4	0.3	0.8	1.6	3.0
12	0.2	0.3	0.2	0.5	1.1	2.0
18	0.1	0.2	0.2	0.4	0.9	-

## \*Attenuation (dB/100 ft)

GHz	Guaranteed Max					
	HP120S	HP160S	HP160U	HP190S	HP305S	HP450
0.5	11.06	8.48	10.2	5.44	3.55	2.61
2	22.71	17.34	20.9	11.24	7.47	5.58
12	59.82	45.15	55.1	30.01	20.89	16.20
18	75.22	56.55	69.2	37.91	26.80	-
26	92.98	69.61	85.5	47.09	-	-
40	119.90	89.27	110.2	-	-	-
*k1	15.22	11.72	13.33	7.45	4.76	3.44
*k2	0.59	0.38	0.87	0.35	0.37	0.36

\*Attenuation at any frequency =  $(k1 \times \sqrt{\text{freq}(\text{GHz})}) + (k2 \times \text{freq}(\text{GHz}))$

The SW Series provides low loss cable solutions that bridge the gap between lower performance RG cables and expensive high performance cables. This series employs the same microporous PTFE dielectrics used in high performance, low loss cables, but offers a simple double braid construction. This construction gives the SW series exceptional electrical performance and allows for simplified connector attachments to reduce overall costs. The SW060, SW086 and SW150 cable sizes can be assembled with standard semirigid or RG style crimp on connectors.

## Electrical Properties

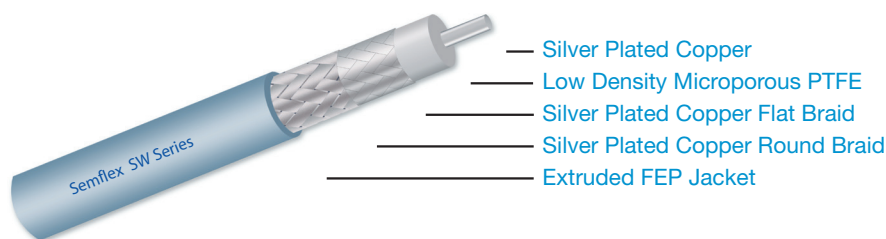
	SW060	SW086	SW110	SW150	SW180
Impedance (Ohms)	50	50	50	50	50
Capacitance (pf/ft)	27	27	27	26.9	26.7
Inductance (nH/ft)	68	67	66	66	62
Shielding Effectiveness (dB)	>85	>85	>85	>85	>85
Cut off Frequency (GHz)	129	71	55	40	28
Velocity of Propagation	75%	74%	76%	76%	77%
Breakdown Voltage (KV)	>1	>3	>5	>7	>10
Max Structural VSWR	1.15:1	1.15:1	1.15:1	1.15:1	1.15:1

## Mechanical Properties

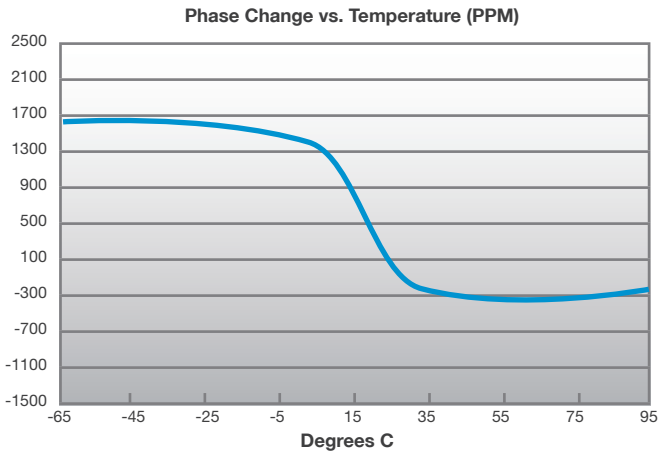
	SW060	SW086	SW110	SW150	SW180
Jacket O.D. (in)	0.060	0.090	0.118	0.153	0.196
Round Braid O.D. (in)	0.049	0.083	0.096	0.136	0.180
Flat Braid O.D. (in)	0.039	0.065	0.080	0.120	0.163
Dielectric O.D. (in)	0.033	0.059	0.074	0.108	0.151
Center Conductor O.D. (in)	0.011	0.020	0.025	0.036	0.051
Center Conductor Type	Solid	Solid	Solid	Solid	Solid
Inside Min Bend Radius (in)	0.275	0.4	0.5	0.8	1.0
Operating Temperature (°C)	-65/200	-65/200	-65/200	-65/200	-65/200
Weight (lbs/ft)	0.010	0.015	0.020	0.040	0.050

## Cable Construction

The SW Series uses silver plated inner and outer conductors for low attenuation. The microporous PTFE dielectrics and FEP jackets provide consistent performance over temperature extremes with better phase performance over temperature than solid PTFE dielectrics. The SW series construction is completed with two woven braids (97% coverage), offering shielding effectiveness >85 dB.

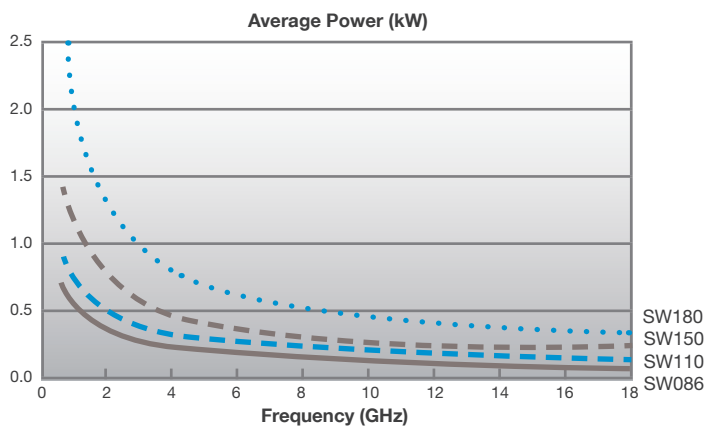


## SW Series



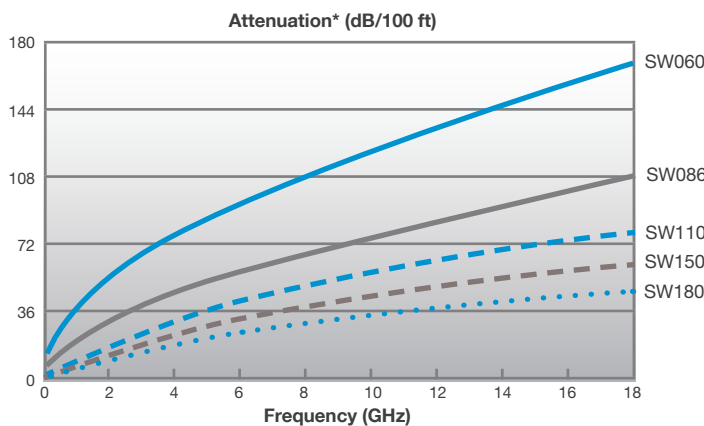
For RF and MW applications requiring interconnects for:

- Racks, cabinets or enclosures
- Miniature flex cable diameters
- Broad temperature extremes
- Tight bends



## Average Power (kW)

GHz	Guaranteed Max			
	SW086	SW110	SW150	SW180
0.5	0.73	0.89	1.45	2.47
1	0.52	0.63	1.02	1.73
2	0.36	0.43	0.70	1.18
6	0.20	0.24	0.38	0.62
12	0.13	0.16	0.25	0.40
18	0.11	0.13	0.19	0.31



## \* Attenuation (dB/100 ft)

GHz	Guaranteed Max				
	SW060	SW086	SW110	SW150	SW180
0.5	27.31	16.31	11.72	8.97	6.29
1	38.73	23.25	16.75	12.79	9.02
2	54.99	33.25	24.03	18.29	12.98
6	96.15	59.19	43.13	32.56	23.48
12	137.24	85.92	63.09	47.27	34.58
18	169.27	107.31	79.23	59.03	43.64
*k1	38.375	22.621	16.151	12.446	8.624
*k2	0.359	0.630	0.595	0.346	0.392

\*Attenuation at any frequency =  $(k1 \times \sqrt{\text{freq(GHz)}}) + (k2 \times \text{freq(GHz)})$

The KW Series has the same ultra low attenuation of rigid, corrugated, air dielectric cables, while offering higher power ratings and incredible flexibility. A copper clad aluminum conductor and soft pliable polyurethane jacket provides the flexibility needed to easily route cable in tight spaces such as cabinets and airframes where rigid cables require special tooling or simply do not fit. These features combine to reduce overall system integration costs by allowing designers to save space and installers to save time.

## Electrical Properties

	KW430	KW530
Impedance (ohms)	50	50
Capacitance (pf/ft)	24	24
Inductance (nH.ft)	62	62
Shielding Effectiveness (dB)	>85	>85
Cut off Frequency (GHz) 129	14	11
Velocity of Propagation	83%	83%
Breakdown Voltage (KV)	>17	>20
Max Structural VSWR	1.20:1	1.20:1

## Mechanical Properties

	KW430	KW530
Jacket O.D. (in)	0.430	0.530
Round Braid O.D. (in)	0.343	0.443
Flat Braid O.D. (in)	0.327	0.417
Dielectric O.D. (in)	0.315	0.405
Center Conductor O.D. (in)	0.114	0.144
Center Conductor Type	Solid	Solid
Inside Min Bend Radius (in)	2.2	2.5
Operating Temperature (°C)	-65/85	-65/85
Weight (lbs/ft)	0.15	0.20

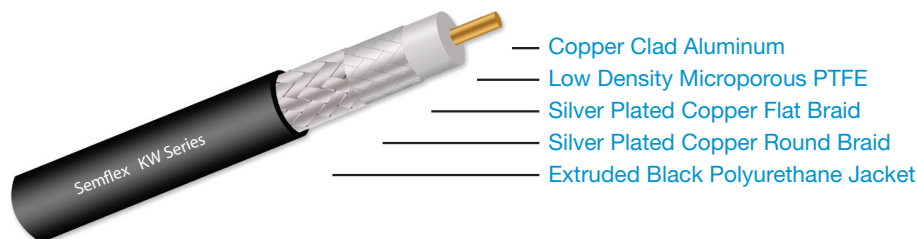
## Superior Flexibility

Compared to corrugated cables, the KW series offers much better flexibility. KW cables are easily hand formed and installed in spaces too tight for other high power or ultra low loss cables.

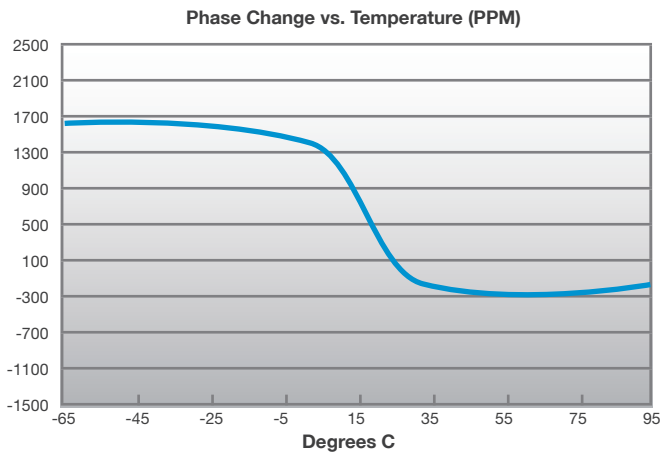


## Cable Construction

KW Series cable uses copper clad aluminum center conductors for increased flexibility. The microporous (expanded) PTFE dielectrics provide increased power handling. Silver plated flat and round braids combined provide >85 dB of shielding effectiveness and robust connector attachment. The soft and pliable polyurethane jacket is fire retardant and UV resistant, suitable for both indoor and outdoor applications.

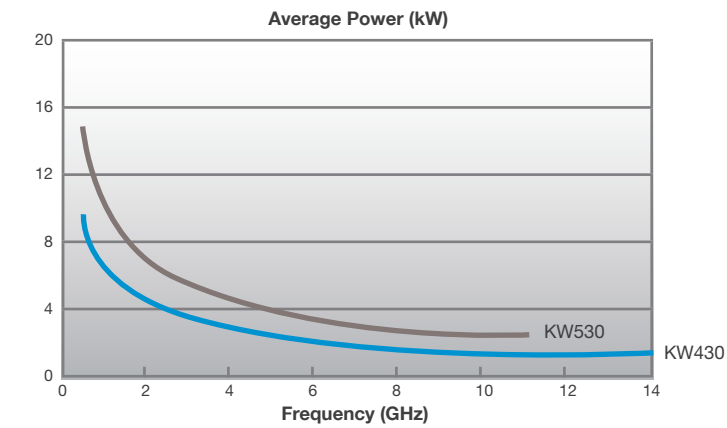


## KW Series



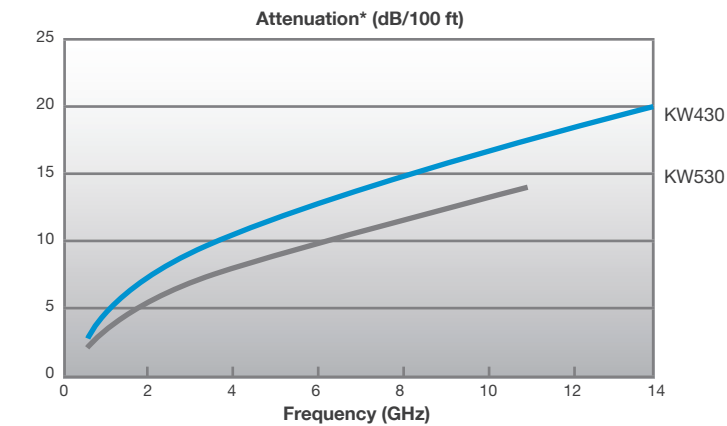
For applications up to 14GHz requiring:

- Improved flexibility over corrugated
- Tight installation spaces
- Ultra low loss
- High power



Average Power (kW)

GHz	Guaranteed Max	
	KW430	KW530
0.45	9.8	15.4
1	6.4	10.0
3	3.5	5.4
6	2.3	3.6
10	1.7	2.6
14	1.4	-



\* Attenuation (dB/100 ft)

GHz	Guaranteed Max	
	KW430	KW530
0.45	2.78	2.23
1	4.29	3.44
3	7.93	6.43
6	11.94	9.73
10	16.27	13.39
14	20.11	-
*k1	3.894	3.079
*k2	0.396	0.365

\*Attenuation at any frequency =  $(k1 \times \sqrt{\text{freq}(\text{GHz})}) + (k2 \times \text{freq}(\text{GHz}))$

The SM Series offers a flexible alternative to semi-rigid cable, employing the same connectors and assembly tooling used for 0.086 and 0.141 versions. This allows designers to bypass the cumbersome and costly step of fabricating three dimensional drawings, for significant cost savings and accelerated time to market. This solution is ideal for applications such as military ECM and guidance systems, commercial antennas, communications applications, and anywhere compact or densely-spaced coaxial interconnects are needed.

## Electrical Properties

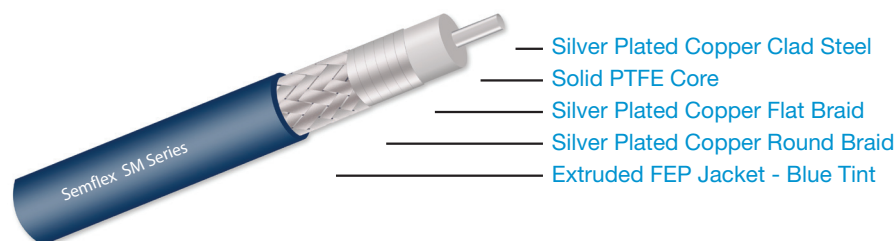
	SM405	SM402
Impedance (ohms)	50	50
Capacitance (pf/ft)	29.4	29.4
Inductance (nH.ft)	71	71
Shielding Effectiveness (dB)	>100	>100
Cut off Frequency (GHz)	60	34
Velocity of Propagation	70%	70%
Breakdown Voltage (KV)	>2	>5
Max Structural VSWR	1.20:1	1.20:1

## Mechanical Properties

	SM405	SM402
Jacket O.D. (in)	0.101	0.161
Round Braid O.D. (in)	0.083	0.141
Helical Braid O.D. (in)	0.066	0.124
Dielectric O.D. (in)	0.060	0.116
Center Conductor O.D. (in)	0.020	0.036
Center Conductor Type	Stranded	Solid
Inside Min Bend Radius (in)	0.150	0.250
Operating Temperature (°C)	-65/125	-65/125
Weight (lbs/ft)	0.015	0.033

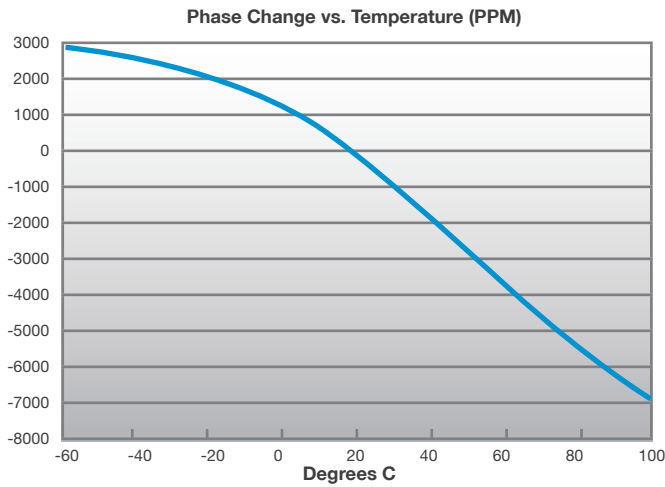
## Cable Construction

The SM Series uses silver plated inner and outer conductors for low attenuation. The solid PTFE dielectrics and FEP jackets provide a -65 to +125 degrees C temperature range. The outer shield construction consists of a helically wrapped braid combined with a second woven round braid to provide >100 dB of shielding effectiveness.



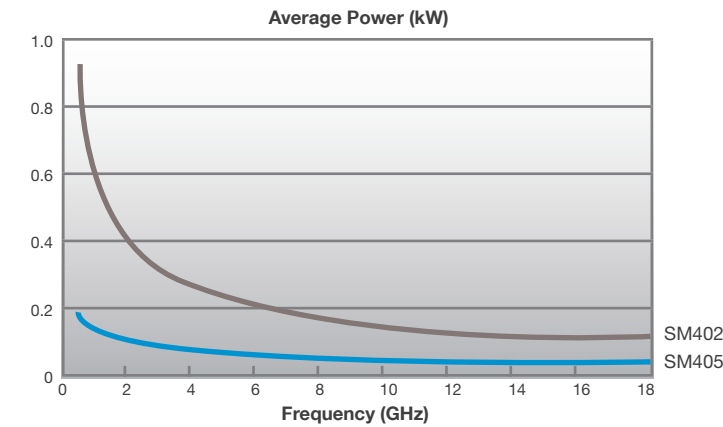


## SM Series



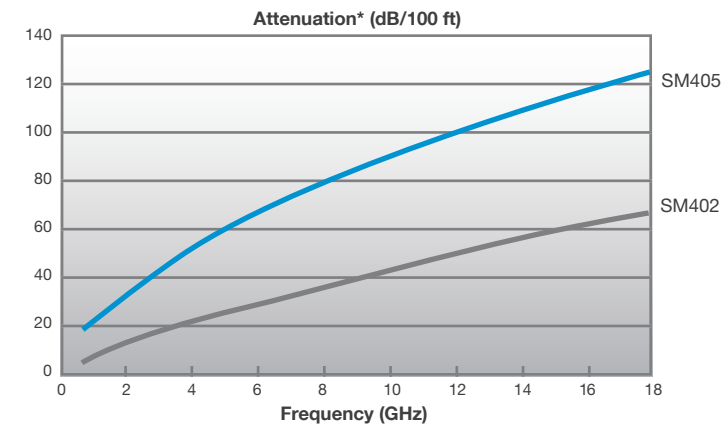
For RF and MW applications requiring interconnects for:

- Semi-rigid replacement
- Military and commercial applications
- Densely packed cable systems
- Communication systems
- Commercial antennas



### Average Power (kW)

GHz	Nominal	
	SM405	SM402
0.5	0.18	0.92
1	0.13	0.62
2	0.09	0.42
6	0.05	0.22
12	0.04	0.15
18	0.03	0.12



### \*Attenuation (dB/100 ft)

GHz	Nominal	
	SM405	SM402
0.5	17.6	7.94
1	25.2	11.59
2	36.3	17.12
6	65.9	32.79
12	97.5	50.73
18	123.3	66.23
*k1	23.98	10.35
*k2	1.20	1.24

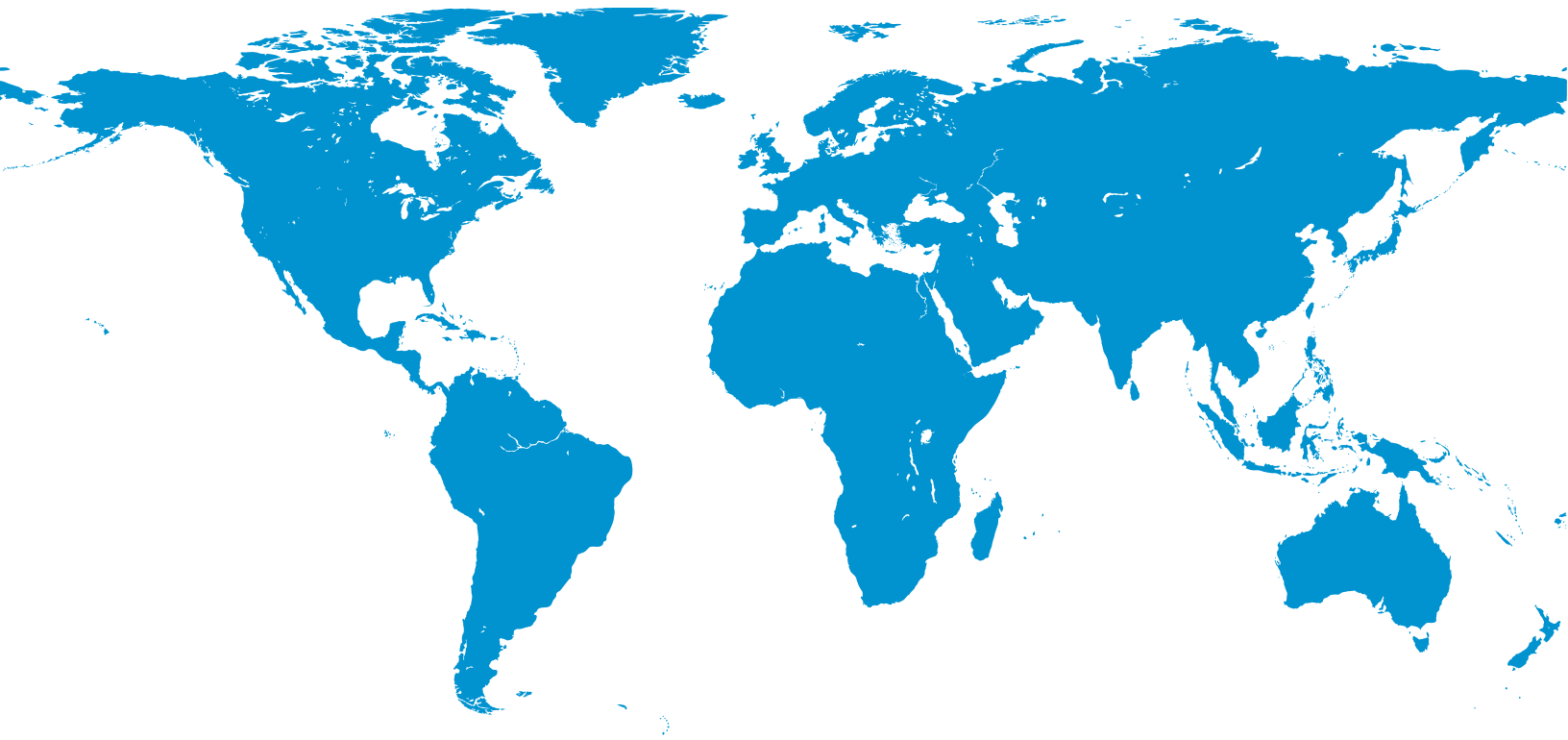
\*Attenuation at any frequency =  $(k1 \times \sqrt{\text{freq(GHz)}}) + (k2 \times \text{freq(GHz)})$



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For over 100 years, Cinch Connectivity Solutions has manufactured high-quality and reliable high-performance connectors and cable assemblies. Cinch is recognized as a world class connectivity supplier of RF, fiber optic, hybrid, microwave components, circular, d-subminiatures, modular rectangular, electronic enclosures and cable assemblies.

Cinch provides innovative solutions to the military, commercial aerospace, networking, telecommunication, test and measurement, oil and gas and other harsh environment industries.



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