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Lab-Flex® Series

High Performance Coaxial Cable Assemblies



Lab-Flex® Series, benchmark precision cable with long heritage for multiple applications.

Smiths Interconnect's Lab-Flex product portfolio provides customers with a robust high performance solution for multiple applications and markets. The combination of repeatable, consistent performance and high reliability products translates to lower cost of ownership while improving system performance. The benefits enable customers to be more competitive with support of an established technology partner.

The Lab-Flex series is the benchmark of precision grade low loss PTFE cables designed for Test & Measurement, Defense, Commercial and other markets which need the ultimate in performance requirements.

This cable series has a very long heritage in high shock and vibration applications such as missile technology as well as repeatable performance in the test & measurement environment. The Lab-Flex cable has a low loss PTFE insulator for minimum attenuation and a solid silver plated copper center conductor for maximum measurement stability. The 125, 160, 190, 200 and 290 products represent the most common sizes needed for today's applications. Lab-Flex cables are an excellent choice for use in SatCom, Radar, Missile Guidance and Test & Measurement applications. Test reports are available on request.

Features and Benefits

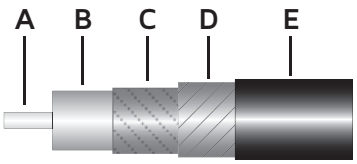
- Up to 50 GHz
- Low Loss (30% less than solid PTFE dielectrics)
- Superior EMI Shielding >90dB
- Phased Matched Pairs and Sets Available (standard tolerance is +/- one degree per GHz or +/-2.8 picoseconds)

Applications

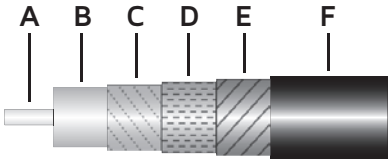
- Ground SatCom
- Missile Guidance
- Radar
- Test & Measurement (Including TVAC)
- Communication Systems
- Point to Point Radio

Technical Characteristics

Lab-Flex Series		125	160	190	200	290
Electrical						
Frequency, Max (GHz)		50	40	31	26	18
Impedance, nominal (Ω)		50	50	50	50	50
Velocity of Propagation (%)		74	76	84	80	85
Shielding Effectiveness, 18 GHz (dB/ft)		>90	>90	> 95	>90	>100
Capacitance (pF/ft)		26.7	26.9	23.8	22.5	24
Delay (ns/ft), (ns/meter)		1.37 (4.49)	1.34 (4.39)	1.2 (3.94)	1.27 (4.17)	1.19 (3.90)
Attenuation k1 (db/100ft) @ 23°C		0.4332	0.3706	0.2100	0.246	0.1341
Attenuation k2 (db/100ft) @ 23°C		0.000531	0.00038	0.000288	0.0001785	0.00011
Attenuation (Typical) at any Frequency = k1 x SqRt (FMHz) + k2 x (FMHz)						
Mechanical & Environmental						
Weight (lbs/100ft), (Kg/100m)		2.0 (2.976)	4.0 (5.95)	3.4 (5.06)	4.8 (7.14)	9.0 (13.39)
*Temperature Range (°C)		-65/+200	-65/+200	-65/+200	-65/+200	-65/+200
Minimum Bend Radius (inch), (mm)		.600 (15.24)	.900 (22.86)	1.10 (27.94)	1.0 (25.40)	1.6 (40.64)
Construction						
Inner Conductor	A	Solid SPC	Solid SPC	Solid SPC	Solid SPC	Solid SPC
Dielectric	B	ePTFE	ePTFE	ePTFE	ePTFE	ePTFE
First Outer Shield	C	SPC Flat	SPC Flat	SPC Spiral	SPC Flat	SPC Spiral
Second Outer Shield	D	Metalized Foil	Metalized Foil	SPC Round	Metalized Foil	SPC Round
Third Outer Shield	E	SPC Round	SPC Round	-	SPC Round	-
Jacket (inch O.D.)	F	FEP (.125)	FEP (.160)	FEP (.190)	FEP (.200)	FEP (.290)



Lab-Flex® 190, 290



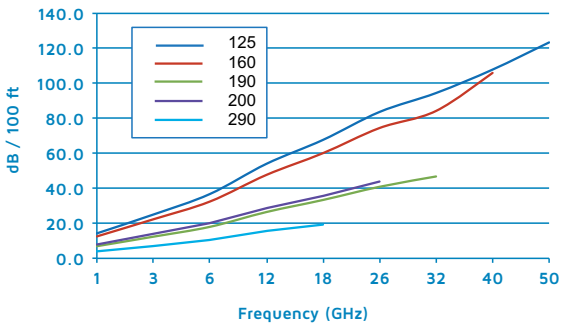
Lab-Flex® 125, 160, 200

Attenuation (dB/100ft)

GHz	125	160	190	200	290
1	14.2	12.5	6.9	7.9	4.0
3	25.0	22.3	12.4	13.9	7.1
6	36.7	32.4	18.0	19.9	10.4
12	54.0	47.7	26.5	28.8	15.3
18	67.7	60.1	33.4	35.9	19.3
26	83.7	74.5	40.9	43.9	
32	94.5	84.2	46.8		
40	107.9	106.0			
50	123.4				

Typical Cable Loss at +25° C & Sea Level

Attenuation vs Frequency



*Temperature range requirements may result in custom designs to meet high temperature applications.

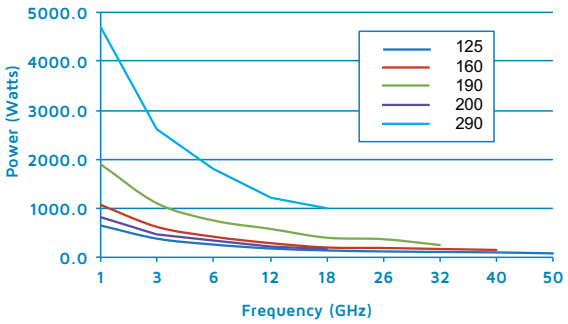
Technical Characteristics

Average Power Rating (Watts)

GHz	125	160	190	200	290
1	650.0	1070	1900	820	4700
3	380.0	620	1100	460	2600
6	260.0	420	750	340	1800
12	180.0	290	580	220	1200
18	140.0	200	400	170	1000
26	120.0	190	370		
32	110.0	170	250		
40	100.0	150			
50	80.0				

Cable Power handling at +25° C & Sea Level

Average Power Rating

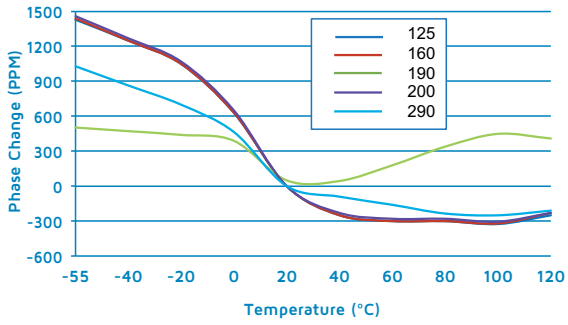


Phase vs. Temperature (PPM)

Temperature (°C)	125	160	190	200	290
-55	1430	1440	504	1460	1030
-40	1250	1250	473	1270	865
-20	1050	1050	441	1070	700
0	630	630	390	650	465
20	0	0	50	0	0
40	-250	-250	45	-230	-90
60	-300	-300	180	-280	-160
80	-300	-300	340	-280	-235
100	-325	-320	450	-305	-250
120	-250	-230	410	-230	-210

Typcal Values

Phase vs Temperature (°C)

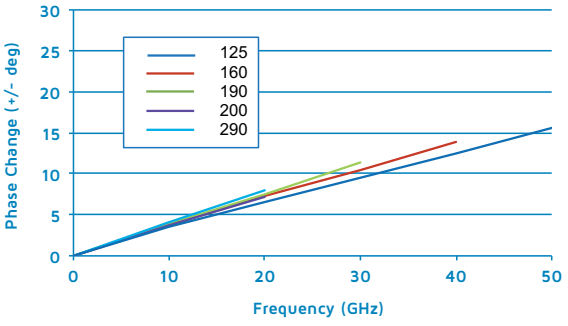


Phase vs. Flexure

Frequency (GHz)	125 (+/-deg)	160 (+/-deg)	190 (+/-deg)	200 (+/-deg)	290 (+/-deg)
0	0	0	0	0	0
10	3.5	3.7	4	3.8	4.2
20	6.5	7.2	7.5	7.2	8
30	9.5	10.5	11.4		
40	12.5	13.9			
50	15.6				

Typcal Values +25°C

Phase vs Flexure



Technical Characteristics

Cable Code	Connector Code	Series	Gender	Type	C-Nut Style[1]	Body Material[2]	Body Finish[3]	Loss per GHz	Frequency Max GHz
125, 160, 190, 200, 290,	SMS	SMA	Male	Straight	H	SS	P	0.01	18
200, 290	SFS	SMA	Female	Straight	N/A	SS	P	0.015	18
160, 200, 290	SMR	SMA	Male	R/A	H	SS	P	0.02	18
200, 290	SFBS	SMA	Female	Straight	N/A	SS	P	0.015	18
125, 160, 190, 200	KMS	2.92mm	Male	Straight	H	SS	P	0.01	40
125, 160	KFS	2.92mm	Female	Straight	N/A	SS	P	0.015	40
160	KFBS	2.92mm	Female	Straight	N/A	SS	P	0.015	40
125, 160	MMS	2.4mm	Male	Straight	H	SS	P	0.01	50
160	MFS	2.4mm	Female	Straight	N/A	SS	P	0.015	50
125, 190, 200, 290	NMS	Type-N	Male	Straight	H	SS	P	0.01	18
200, 290	NFS	Type-N	Female	Straight	N/A	SS	P	0.015	18
200, 290	NMR	Type-N	Male	R/A	N/A	SS	P	0.02	18
200, 290	NFBS	Type-N	Female	Straight	N/A	SS	P	0.015	18
200, 290	TMS	TNC	Male	Straight	H	SS	P	0.01	18
200, 290	TFS	TNC	Female	Straight	N/A	SS	P	0.015	18
200, 290	TFBS	TNC	Female	Straight	N/A	SS	P	0.015	18
200	TMR	TNC	Male	Straight	H	SS	P	0.02	18
290	7/16MS	7/16	Male	Straight	H	B	WB	0.01	6
290	SCMS	SC	Male	Straight	H	SS	P	0.01	10
290	SCMR	SC	Male	R/A	H	SS	P	0.02	10
290	SCFBS	SC	Female	Straight	N/A	SS	P	0.015	10

[1] C-Nut Style: H=Hex, K-Knurled, HK=Hex Nut & Knurled
[2] Body Materials: B=Brass, SS=Stainless, Be=Berylium Copper
[3] Body Finish: N=Nickel, S=Silver, G=Gold, P=Passivated, WB=White Bronze
Sex of connector is determined by center conductor

Cable Code	Option Code	Option Description	Option Details
160, 190, 200, 290	A	Armorized Protection	SS Interlock Armor
125, 160, 190, 200, 290	W	Weatherized	Extruded PVC cover
160, 190, 200, 290	AW	Armorized/Weatherized Covering	SS Interlock Armor with Extruded PVC Cover
160, 200	MC	Armorized/Weatherized Covering	SS Monocoil Armor with Extruded Silicone Cover
200	MP	Armorized/Weatherized Covering	SS Monocoil Armor with Polyolefin Cover
125, 160, 190, 200	Z	Water Tight	Cable to Connector junction "Sealed"
125, 160, 190, 200, 290	D	Dust Caps	Dust Cap with Tether
125, 160, 190, 200	+/- 2.8 ps[4]	Phase Match	Standard Tolerance of +/-2.8ps
125, 160, 190, 200, 290	EE	Extended Boots	Layered Adhesive lined Shrink Tubing
125, 160, 190, 200, 290	RoHS[5]	RoHS Compliant	Per EU Directive 2002/95/EC

[4] for phase matched assemblies (+/-2.8ps) is required to be added to the end of standard part number
example: NMS-200-120.0-NMS +/-2.8ps

[5] for RoHS assemblies (RoHS) is required to be added to the end of standard part number
example: NMS-200-120.0-NMS - RoHS

Custom Options:
The above connectors and options represent the most common types used. Smiths Interconnect offers a wide range of cables, connectors and options. If you do not see an option you require please consult the sales department.

How To Order

			–			–		–					–					
1				2			3				4					5		

1 Connector #1

SMS SMA Male Straight	MMS 2.4mm Male Straight	TFS TNC Female Straight
SFS SMA Female Straight	MFS 2.4mm Female Straight	TFBS TNC Female Bulkhead Str
SMR SMA Male R/A	NMS Type-N Male Straight	TMR TNC Male Straight
SFBS SMA Female Bulkhead Str	NFS Type-N Female Straight	7/16MS 7/16 Male Straight
KMS 2.92mm Male Straight	NMR Type-N Male R/A	SCMS SC Male Straight
KFS 2.92mm Female Straight	NFBS Type-N Female Bulkhead Str	SCMR SC Male R/A
KFBS 2.92mm Female Bulkhead Str	TMS TNC Male Straight	SCFBS SC Female Bulkhead Str

2 Cable *(fixed)*

125 Lab-Flex 125	160 Lab-Flex 160	200 Lab-Flex 200
290 Lab-Flex 290	190 Lab-Flex 190	

3 Length *(inches)*

36.0 Example: 36 in.

4 Connector #2

SMS SMA Male Straight	NMS Type-N Male Straight	7/16MS 7/16 Male Straight
SMR SMA Male R/A	NMR Type-N Male R/A	SCMS SC Male Straight
KMS 2.92mm Male Straight	TMS TNC Male Straight	SCMR SC Male R/A
MMS 2.4mm Male Straight	TMR TNC Male R/A	

5 Assembly Option

+/-2.8 ps +/-2.8ps Phase Matched Electrical Length

RoHS RoHS Compliant Per EU Directive 2002/95/EC

Worldwide Support

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