

Test Cable Assemblies

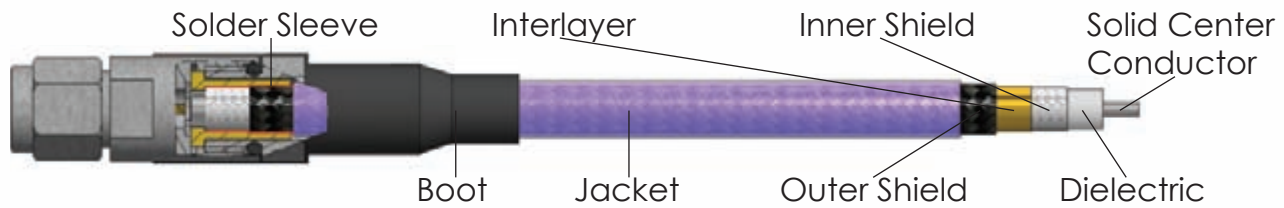
DC-65 GHz



Premium Test Cable

Lab-Flex® 200

Frequency to 31 GHz



With over 6 million feet of test cables sold, our Lab-Flex® 200 has become the premier cable platform for Florida RF Labs' test assemblies. The most popular versions are presented here.



200A – The **Armor** option provides a flexible, stainless steel conduit over the entire cable from connector to connector. The RF cable inside is then protected from severe damage. The armor is terminated with conductive epoxy directly to the connectors, which provides a continuous ground and adds greater than 40 dB of shielding to the assembly. This option is also available with the extruded PVC covering over the armor - 200AW.



200TV – With **Thermal Vacuum** test cables, the connectors used are typically vented to prevent pressure build up. Only materials that are NASA outgassing approved are used for these assemblies. TV assemblies are exposed to extensive thermal pre-conditioning in order to provide the best electrical performance across an extreme temperature range. Add a V after the connector code SMSV for vented connectors.



200UV – This special cable design offers the very highest return loss, (**Ultra Low VSWR**), across the DC-26 GHz frequency band. The cable is built around our standard Lab-Flex® core, but contains a proprietary shield construction that cancels unwanted noise. These assemblies are available with the following options: Weatherized, extended boots and armor. Maximum VSWR: 1.20:1 to 18 GHz, 1.25:1 to 26.5 GHz.



Cost



Stability
(Amplitude & Phase)



Strength



200W – An extruded PVC covering over the standard Teflon Lab-Flex® 200 jacket offers excellent protection (**Weatherized**) from the elements as well as protection from damage due to rough handling. The .34 inch diameter covering gives the cable a comfortable, flexible feel and when coupled with the extended boots makes a very durable test cable assembly.

200LP – This is a **Low Passive Intermodulation (PIM)** cable assembly that utilizes non-ferrous materials in the cable and connector designs in order to minimize the effects of PIM distortion. The connector/cable designs utilize mechanical contact attachment to further minimize PIM effect. Our PIM performance is specified at -155 dBc nominally with a typical performance of -160 dBc. These assemblies come standard with a weatherized jacket and extended boots.

200E – This popular option addresses the most common failure of RF cable assemblies: intermittence at the connector to cable termination area. Our special **Extended booting** system is made using different layers of shrink tubing that provide both stability and a smooth radius when the cable is positioned 90 degrees to the connector mating, while also preventing cable kinking. Add an E after the connector code SMSE for extended booting.



Quick Spec. Frequency	dB/100 ft. LF 200	dB/100 ft. LF 200UV	Phase Over Flexure	Power Watts LF 200	Power Watts LF 200UV
1 GHz	8.6	12.9	0.4 Degrees	740	649.1
10 GHz	28.7	32.7	3.7 Degrees	208	182.5
18 GHz	38.3	43.7	6.7 Degrees	156	136.8
26 GHz	47.6	54.3	10 Degrees	132	115.8
31 GHz	53.3	NA	13 Degrees	116	101.8

Available Interfaces for Lab-Flex® 200:

SMA, 2.9mm, Type N, TNC & 7mm

Low PIM: SMA, Type N & 7/16DIN

DC to 31 GHz Standard (may be limited by connector choice)

DC to 26.5 GHz Low PIM and 200UV (may be limited by connector choice)



Premium Test Cable

Lab-Flex® 160 & 125

Frequency to 40 GHz and 50 GHz



160 – Lab-Flex® 160, with performance to **40 GHz**, offers a very cost effective test cable with 2.92mm and 2.4mm connector interfaces. This cable also offers our **lowest insertion loss** possible at 40 GHz. There is also a wide range of protected coverings available from the most popular extended boot to fully armored and weatherized assemblies. Sharing the same construction as the Lab-Flex® 200, the Lab-Flex® 160 can also be provided for ThermalVac applications (160 TV).



125 – Lab-Flex® 125 with 2.4mm connectors offers excellent performance up to **50 GHz**. Its small, .125 inch diameter makes it a great choice for flexible, low loss test assemblies and the best option for **high density, high frequency** test setups. An assembly as short as 6 inches is possible and a wide range of protective coverings are available. These assemblies can also be offered with the same options as the Lab-Flex® 160 above.

Quick Spec. Frequency	dB/100 ft. LF 125	dB/100 ft. LF 160	Phase Over Flexure	Power Watts LF 125	Power Watts LF 160
1 GHz	16.7	12.6	0.4 Degrees	460	540
10 GHz	55.2	39.5	3.7 Degrees	140	170
18 GHz	71	51.6	6.7 Degrees	105	133
26 GHz	86.9	63.5	10 Degrees	88	103
40 GHz	110.5	81.6	14 Degrees	70	88
50 GHz	125.4	NA	17 Degrees	65	NA



Available Interfaces for Lab-Flex® 160: SMA, 3.5mm, 2.9mm, 2.4mm, Type N

Available Interfaces for Lab-Flex® 125: SMA, 2.9mm, 2.4mm, Type N

DC to 40 GHz Lab-Flex® 160 (may be limited by connector choice)

DC to 50 GHz Lab-Flex® 125 (may be limited by connector choice)

Highly Flexible, Premium Test Cable

Lab-Flex® 235SP, 180SP & 115S

Frequency to 26 GHz, 40 GHz and 65 GHz



235SP – This cable is a **stranded** center conductor, **polyurethane jacket** version of our popular Lab-Flex® 200. When used with our super SMA connectors, the 235SP assemblies have outstanding return loss up to **26 GHz**. The advantage of the 235SP is its flexibility and durability when used in test applications requiring constant movement.

180SP – Lab-Flex® 180SP offers outstanding performance in applications up to **40 GHz**. With a **stranded** center conductor and **polyurethane jacket**, it provides a very flexible and durable test cable, accommodating interfaces from 2.92mm to Type N.

115S – Our 115S is a low-loss, **stranded** center conductor, high performance cable which, when coupled with our custom 1.85mm connectors, makes an excellent **65 GHz** assembly. The special design of the 115S along with its small diameter offers superb flexibility when used in test applications requiring high flexure rates.



Quick Spec. Frequency	dB/100 ft.	dB/100 ft.	dB/100 ft.	Phase Over Flexure (degrees)		
	LF 115S	LF 180SP	LF 235SP	LF 115S	LF 180SP	LF 235SP
1 GHz	27.3	14.3	11.5	0.4	0.4	0.4
10 GHz	100	49.1	36.5	2	2	2
18 GHz	136	81.6	56.1	4	4	4
26 GHz	167	100.6	67.2	6	6	6
40 GHz	213	129.4	NA	10	10	NA
65 GHz	290	NA	NA	14	NA	NA

Available Interfaces for Lab-Flex® 235SP: SMA, 2.9mm, Type N & TNC

Available Interfaces for Lab-Flex® 180SP: SMA, 2.9mm, 2.4mm, Type N

Available Interfaces for Lab-Flex® 115S: SMA, 2.9mm, 2.4mm, 1.85mm
DC to 26 GHz Lab-Flex® 235SP (may be limited by connector choice)
DC to 40 GHz Lab-Flex® 180SP (may be limited by connector choice)
DC to 65 GHz Lab-Flex® 115S (may be limited by connector choice)



Premium Test Port Cable

ASR

Frequency to 50 GHz

Cost



Stability
(Amplitude & Phase)



Strength



ASR – These high-performance **VNA test port cable assemblies** are an excellent value for precision test applications. Since they are **semi-flexible**, they provide a test set up which will maintain its configuration for a very repeatable test platform. ASR is available with precision Type N (NMS, NFS), 2.92mm (KMS, KFS), & 2.4mm (MMS, MFS) interfaces and can also be supplied with the NMD style connector for a direct, rugged connection to the VNA test port adapter.

ASR

Model Number	Description	Model Number	Description
ASR-1010-XX	KMS-ASR-XX.X-KMS	ASR-6060-XX	NFS-ASR-XX.X-NFS
ASR-1020-XX	KMS-ASR-XX.X-KFS	ASR-2010-XX	NMD-KFS-ASR-XX.X-KMS
ASR-2020-XX	KFS-ASR-XX.X-KFS	ASR-0220-XX	NMD-KFS-ASR-XX.X-KFS
ASR-1030-XX	KMS-ASR-XX.X-MMS	ASR-0230-XX	NMD-KFS-ASR-XX.X-MMS
ASR-1040-XX	KMS-ASR-XX.X-MFS	ASR-0240-XX	NMD-KFS-ASR-XX.X-MFS
ASR-3030-XX	MMS-ASR-XX.X-MMS	ASR-0410-XX	NMD-MFS-ASR-XX.X-KMS
ASR-3040-XX	MMS-ASR-XX.X-MFS	ASR-0420-XX	NMD-MFS-ASR-XX.X-KFS
ASR-4040-XX	MFS-ASR-XX.X-MFS	ASR-0430-XX	NMD-MFS-ASR-XX.X-MMS
ASR-5050-XX	NMS-ASR-XX.X-NMS	ASR-0440-XX	NMD-MFS-ASR-XX.X-MFS
ASR-5060-XX	NMS-ASR-XX.X-NFS		

XX = Length in inches
Standard Lengths 12, 24, 36

Quick Spec. Frequency	dB/100 ft. ASR	Phase Over Flexure	Power Watts ASR
1 GHz	16.7	0.4 Degrees	450
18 GHz	71	4 Degrees	130
26 GHz	86.9	6 Degrees	95
40 GHz	110.5	8 Degrees	60
50 GHz	125.4	10 Degrees	30

Available Interfaces for ASR: 2.9mm, 2.4mm, Type N, NMD (direct to test port adapter)
DC to 50 GHz ASR (may be limited by connector choice)



Highly Flexible, Premium Test Port Cable

ASR-F

Frequency to 50 GHz

Cost

Stability
(Amplitude & Phase)

Strength

ASR-F – This phase-stable assembly is a **flexible version of our original ASR** high-performance design. ASR-F comes standard with an abrasion resistant jacket covering the very flexible monocoil armor. These durable test port assemblies provide precision test measurements up to 50 GHz. Like ASR, ASR-F is also available with Type N (NMS, NFS), 2.92mm (KMS, KFS), & 2.4mm (MMS, MFS) interfaces and can also be supplied with the NMD style connector for a direct, rugged connection to the VNA test port adapter.



ASR-F

Model Number	Description	Model Number	Description
ASR-F-1010-XX	KMS-ASR-F-XX.X-KMS	ASR-F-6060-XX	NFS-ASR-F-XX.X-NFS
ASR-F-1020-XX	KMS-ASR-F-XX.X-KFS	ASR-F-2010-XX	NMD-KFS-ASR-F-XX.X-KMS
ASR-F-2020-XX	KFS-ASR-F-XX.X-KFS	ASR-F-0220-XX	NMD-KFS-ASR-F-XX.X-KFS
ASR-F-1030-XX	KMS-ASR-F-XX.X-MMS	ASR-F-0230-XX	NMD-KFS-ASR-F-XX.X-MMS
ASR-F-1040-XX	KMS-ASR-F-XX.X-MFS	ASR-F-0240-XX	NMD-KFS-ASR-F-XX.X-MFS
ASR-F-3030-XX	MMS-ASR-F-XX.X-MMS	ASR-F-0410-XX	NMD-MFS-ASR-F-XX.X-KMS
ASR-F-3040-XX	MMS-ASR-F-XX.X-MFS	ASR-F-0420-XX	NMD-MFS-ASR-F-XX.X-KFS
ASR-F-4040-XX	MFS-ASR-F-XX.X-MFS	ASR-F-0430-XX	NMD-MFS-ASR-F-XX.X-MMS
ASR-F-5050-XX	NMS-ASR-F-XX.X-NMS	ASR-F-0440-XX	NMD-MFS-ASR-F-XX.X-MFS
ASR-F-5060-XX	NMS-ASR-F-XX.X-NFS	ASR-F-7070-XX	SMS-ASR-F-XX.X-SMS

XX = Length in inches

Standard Lengths 12, 24, 36

Quick Spec. Frequency	dB/100 ft. ASR-F	Phase Over Flexure	Power Watts ASR-F
1 GHz	15.6	0.4 Degrees	510
18 GHz	67.1	4 Degrees	150
26 GHz	87.8	5 Degrees	110
40 GHz	112	6 Degrees	75
50 GHz	127.3	8 Degrees	40

Available Interfaces for ASR-F: SMA, 2.92mm, 2.4mm, Type N, NMD (direct to test port adapter)
DC to 50 GHz ASR-F (may be limited by connector choice)

NMD Connector



**2.92mm
NMD-KFS**

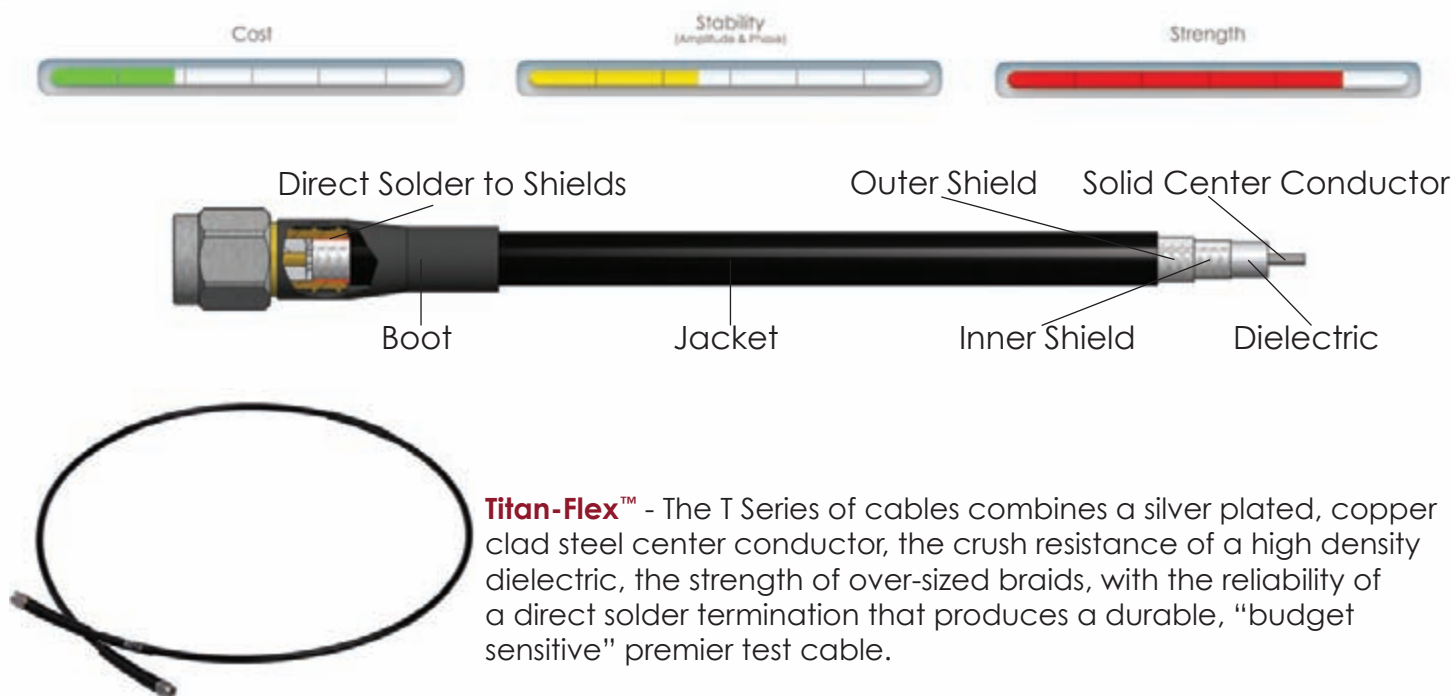


**2.4mm
NMD-MFS**

Excellent, Durable Test Cable

Titan-Flex™

Frequency to 18 GHz



T170 - This unique cable design is an excellent alternative for test applications up to **18 GHz**. T170, having a 0.170 inch diameter, accommodates many standard connector interfaces that might typically be used on RG type assemblies. However, the major advantages are **higher shielding, lower insertion loss and superior strength** exhibited by its connector retention. And its **poly jacket** adds the flexibility needed in many test applications.

T110 - This cable is a **smaller diameter version** (0.110 inch diameter) of the T170 but is every bit as durable. The T110 accommodates many of the smaller connectors associated with this diameter cable and still maintains all of the characteristics of the T170 construction. It has **excellent flexibility** due to its mechanical design and poly jacket and it has superb electrical performance up to **18 GHz**.

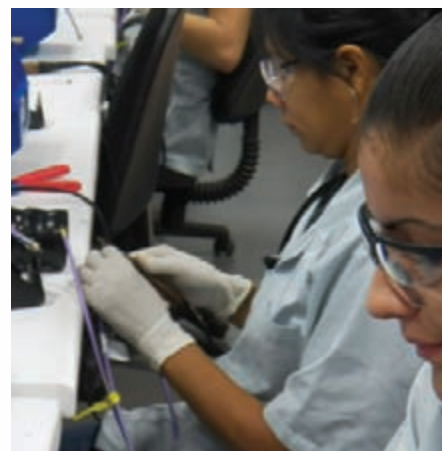
Quick Spec. Frequency	dB/100 ft. T110	dB/100 ft. T170	Phase Over Flexure	RF Leakage T110	RF Leakage T170
1 GHz	25	12	0.4 Degrees	-100 dB	-100 dB
10 GHz	85	46	3.7 Degrees	-95 dB	-95 dB
18 GHz	120	67	6.7 Degrees	-90 dB	-90 dB

Available Interfaces for T170: SMA, Type N, TNC, BNC

Available Interfaces for T110: SMA, Type N, TNC, BNC

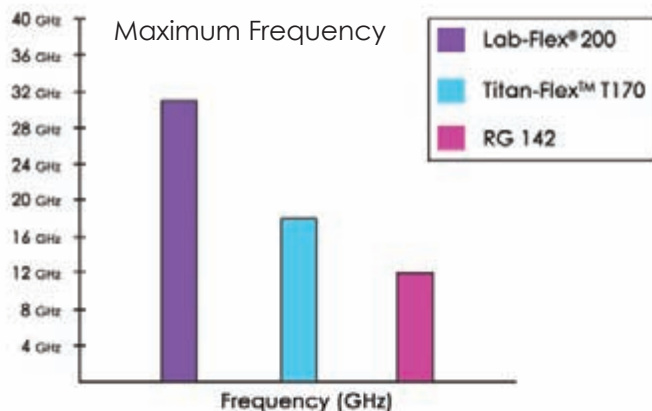
DC to 18 GHz T170 (may be limited by connector choice)

DC to 18 GHz T110 (may be limited by connector choice)

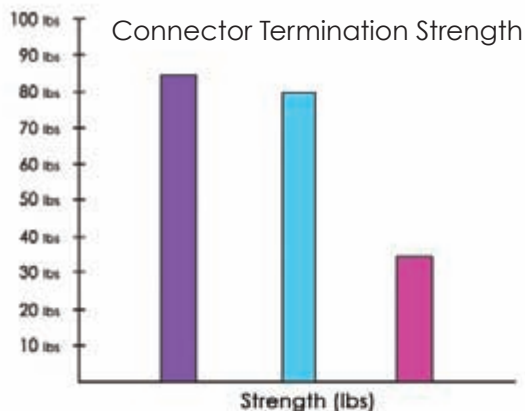


Lab-Flex[®], Titan-Flex[™] and RG Comparison

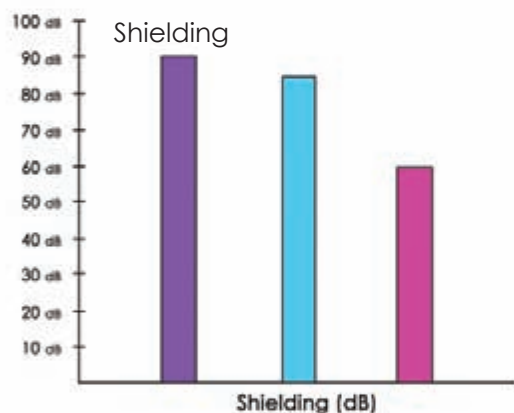
The charts below illustrate a variety of comparisons for 3 cable types that have similar diameters, our popular Lab-Flex[®] 200, the new Titan-Flex[™] 170 and the familiar RG142. As you can see, with a slight increase in cost over RG142, the Titan-Flex[™] T170 is quite respectable in many important test cable characteristics such as strength, shielding and stability typically expected from high performance cable assemblies and should be seriously considered for applications up to 18 GHz where loss is less critical. Of course, for optimal performance and the lowest insertion loss, our Lab-Flex[®] 200 is best.



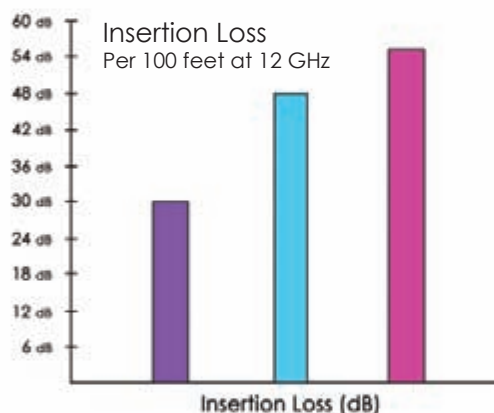
Test applications above 18 GHz will require our LF200.



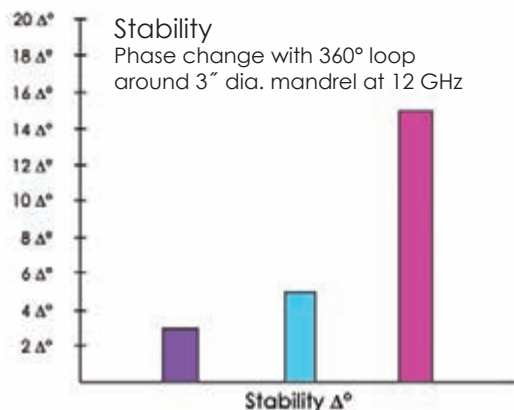
Both LF200 & T170 are far superior in connector retention strength to RG142.



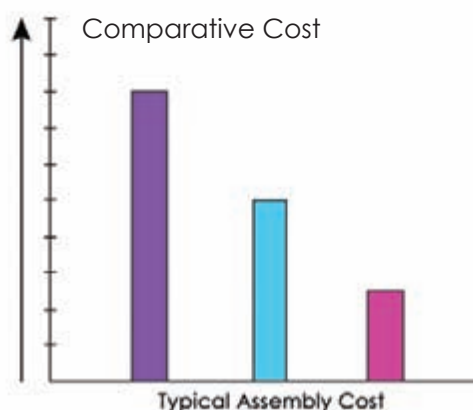
Excellent shielding exhibited by LF200 & T170.



LF200 is by far the lowest in signal transmission losses.



The construction of LF200 & T170 offers a distinct advantage over RG142.



Our T170 offers a superior product, yet has a competitive cost to RG142 assemblies.

Additional RF Labs Test Cable

Mini-Flex, Pro-Form™ and Standard

Frequency to 12 GHz, 18 GHz and 50 GHz

Excellent Test Cable - Mini-Flex 105

Frequency to 50 GHz



Mini-Flex 105 – A very stable, high frequency, cost effective cable for applications requiring great flexibility where slightly higher loss is not an issue. Add to this an **Armor & Weatherized Monocoil** (Mini-Flex 105MC) and you have a test cable with excellent handling and **crush resistant** characteristics. Connector interfaces include SMA, 2.92mm and 2.4mm. The Mini-Flex 105 assembly is an optimal cost conscious alternative to our Lab-Flex 125 while still reaching **50 GHz**.

Quick Spec. Frequency	dB/100 ft. 105M	Phase Over Flexure	Power Watts 105M
1 GHz	19.2	0.4 Degrees	130
18 GHz	101.1	6.7 Degrees	30.8
26 GHz	122.9	10 Degrees	21.3
40 GHz	161.8	16 Degrees	13.5
50 GHz	187.2	20 Degrees	11

Excellent, Hand-Formable Test Cable - RF Pro-Form™

Frequency to 18 GHz



RF Pro-Form™ – Florida RF Labs combines the best connector design with the best performing cable along with state of the art assembly to produce the highest level product at a very reasonable price. The Conformable®, or hand-formable, Braided Jacket (BJ) has a tin filled braid with a metal foil underlay for shielding and mechanical integrity. These hand-formable assemblies with stainless steel connectors provide trouble free, 500 plus matings for applications up to **18 GHz**.

Quick Spec. Frequency	.047 Dia BJ047	.085 Dia. BJ085	.141 Dia BJ141
	dB/100 ft.	dB/100 ft.	dB/100 ft.
1 GHz	33.3	19.2	6.8
5 GHz	77.7	46.2	28.3
18 GHz	157.6	102	64

Standard Test Cable MIL-C-17 / RG Series

Frequency to 12 GHz



MIL-C-17 / RG Series – Many test applications are lower frequency and do not require the demanding phase stability and shielding construction of higher performance cable assemblies. For these applications up to **12 GHz**, we can supply assemblies manufactured using RG316, RG142 & RG400 per MIL-C-17. Popular connectors available are: SMA, Type N, TNC and BNC. Other MIL-C-17 cables are available upon request.

Quick Spec. Frequency	dB/100 ft. RG316	dB/100 ft. RG142	dB/100 ft. RG400
1 GHz	26.8	12.8	14.6
5 GHz	61.7	32	36.1
8 GHz	76.7	42.5	47.7
12 GHz	96.6	54.7	61.1

Components for Test Cables

Coaxial Terminations - Florida RF Labs has a complete series of SMA, 3.5 mm and 2.9 mm interface compatible coaxial terminations. Some designs are specifically suited for narrow or wide band applications. These terminations have low VSWR, and operate at frequencies from DC to 26.5 GHz. Part number designs beginning with "4" feature solderless construction while the part numbers with the "12" prefix use a soldered construction.

Part #	Power Rating	Freq	VSWR	L		SMA
	Watt	Max	Max: 1	mm (inches)		
12-0001	1.0	18.0	1.15	8.89	(0.350)	Male
12-0002	1.0	26.5	1.10	8.89	(0.350)	Male
12-0003	1.0	26.5	1.18	8.89	(0.350)	Male
12-0008	1.0	18.0	1.15	13.33	(0.525)	Male
12-0101	1.0	26.5	1.10	13.33	(0.525)	Female
12-0102	1.0	26.5	1.18	13.33	(0.525)	Female
12-0009	1.0	18.0	1.20	13.53	(0.525)	Male
4113P	1.0	18.0	1.15	8.38	(0.330)	Male
4111P	2.0	18.0	1.15	12.70	(0.500)	Male



Coaxial Attenuators: Our line of precision coaxial attenuators are usable for power applications up to 2 watts. The rugged construction of the device ensures reliability and continuous performance. The standard interface is SMA M/F with other interfaces available upon request.

Specifications	42 Series
Impedance	50 Ohms
Frequency Range	DC to 26 GHz
Power Rating	2 Watts
Operating Temperature	-55°C to 150°C
Contacts	Beryllium Copper, Gold Plated
Body & Nut	Stainless Steel, Passivated
SMA Interface	Male/Female

Attenuation Accuracy (dB)			
dB Value	DC - 26 GHz		
0 - 6	± 0.3		
0 - 7	± 0.5		
21 - 30	± 0.75		
VSWR (MAX)			
DC - 4 GHz	4 - 12 GHz	12 - 18 GHz	18 - 26 GHz
1.15	1.25	1.35	1.5

Part Numbering Code

42	W	XX.00	F
Style	Frequency	dB Value	
42 = Coaxial Attenuator	(blank) = DC - 12 GHz W = DC - 18 GHz UW = DC - 26 GHz	(00.00 - 20.00 & 30.00 dB)	(Blank) = Standard F = RoHS



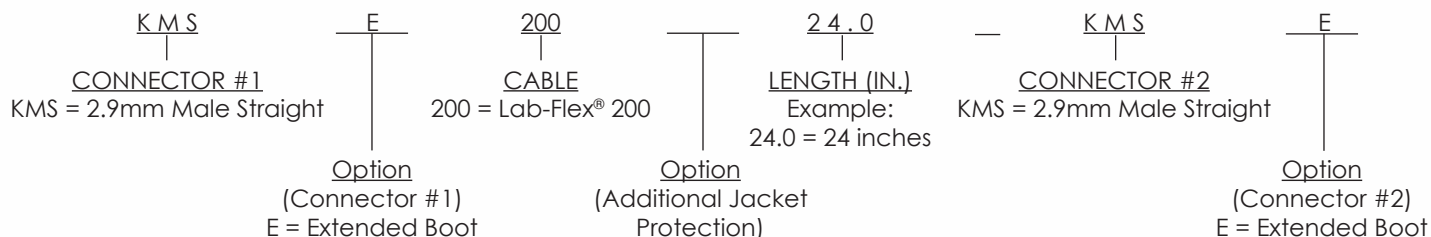
Page	Cable	Application	Type	Range
2-4	Lab-Flex®	Production or Lab	Flexible	Premium Low-Loss - 50 GHz
5	Lab-Flex® S	Production or Lab	Highly Flexible	Premium Low-Loss - 65 GHz
6	ASR	Lab VNA	Semi-Flexible	Premium Stable - 50 GHz
7	ASR-F	Lab VNA	Highly Flexible	Premium Stable - 50 GHz
8-9	Titan-Flex™	Production or Lab	Flexible	Excellent, Durable - 18 GHz
10	Mini-Flex	Production or Lab	Highly Flexible	Excellent Grade - 50 GHz
10	RF Pro-Form™	Production or Lab	Semi-Flexible	Excellent Grade - 18 GHz
10	MIL-C-17 / RG Series	Production or Lab	Flexible	Fair - 12 GHz
11	Coax Components	Production or Lab	Terminations & Attenuators	DC - 26 GHz

Other high quality cables available from Florida RF Labs:

- Lab-Flex® 100 – Smallest diameter Lab-Flex for use to 50 GHz.
- Lab-Flex® 290 – Lowest insertion loss up to 18 GHz
- Lab-Flex® 335 – Low loss, high power, durable construction up to 18 GHz
- Lab-Flex® 335SP – Lowest loss in an 18 GHz stranded center conductor design
- Lab-Flex® 490S – For high power test applications up to 10 GHz
- .047 Semi-Rigid M17 versions
- .085 Semi-Rigid M17 versions and Low Loss
- .141 Semi-Rigid M17 versions and Low Loss
- Mini-Flex 065 – Flexible alternative to .047" diameter semi-rigid and Conformable
- Mini-Flex 165 – Flexible alternative to .141" diameter semi-rigid and Conformable

For a complete Cable Product listing please visit our website at www.emc-rflabs.com.

Part Numbering Code (Example)



Quick Turn Requirements –

We understand that when you need to evaluate or purchase test cables, you cannot wait months.

- We commit to shipping samples of any standard test cable assembly shown in this brochure within 48 hours.
- We commit to shipping production volumes of any standard test cable assembly shown in this brochure within three weeks or less (smaller quantities sooner).