EMfirst
Fiber RF Systems

Microwave Cables Family

Company Profile

EIM FIRST is a leading provider of RF solutions to defense and industrial markets.
We provide RF cable solutions up to 100 GHz.
Semi-rigid cables, phase matched cable assemblies, flexible cables and fiber optic cables.

All cable assemblies are assembled and tested at the EIM assembly production facility.
Our partners are: Harbor, SRI, Frontlynk, EZ form.

Connectors according to MIL-STD-348 and they meet or exceed MIL-PRF-39012.
Cables are manufactured according to MIL-DTL-17, MIL-STD-87104, and MIL-C-81490.
Cables meet the following environmental conditions: MIL-STD-810D.
Full qualification report will be sent upon request.

EIM FIRST production specializes in providing engineering solutions.
Our highly skilled teams are capable of supporting complex engineering RF military projects, from design to implementation and testing.

The whole group focuses on developing future technologies and supplying its customers with products and systems based on their unique and tailored made needs and requirements.

• EIM Group develops and manufactures a wide range of medical and communication devices, as well as products for the aviation and defense sectors in the area of military standard computers, RF and electronics for aerial, naval, and land based systems.

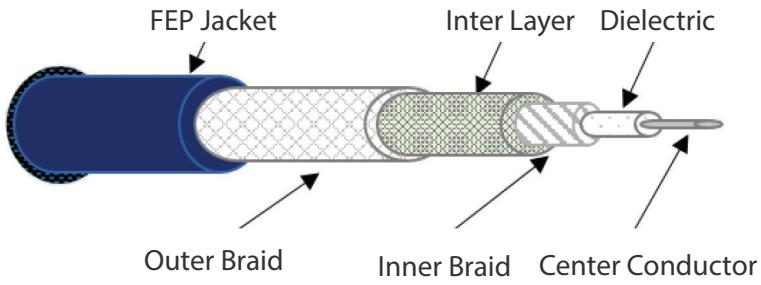
• The group excels in meeting the highest quality standards and is certified for the following standards: AS9100C, ISO 9001: 2008, ROHS and work standards IPC 610, IPC 620.

• EIM Group aspires to strengthen and position itself in both the industrial and defense markets. The group's goal is to continue being an international leader that offers high quality products and excellent customer service.

Neoflex Series Cable Types

The new high-end product range of MW cables for lab, systems and platform usage. Based on the ultimate technology of MW cables. The cables are qualified to extreme environmental conditions, and tested to the MIL-Standards below.

The Neoflex family consist of cables up to 12GHz High power 1Kw, 18GHz low loss 0.72 dB/m, and low loss up to 40GHz with 2.5dB/m.



Cable sizes from 3 mm diameter up to 12.2 mm diameter provide a wide range of cables -

The Neoflex cables have a variety of ruggedizedion options and are engineered using the basic cable design and construction to enhance the handling characteristics of the finished assemblies.

Captivated contact terminations provide long-term interface stability.

These assemblies were designed from the ground up to provide reliable microwave connections you can count on.

Neoflex 160	The smallest 4 mm cable sized for optimum loss of 2.5dB @ 40 GHz.
Neoflex 162STR	High flexibility 4 mm cable with stranded center conductor 1.5dB @ 18 GHz.
Neoflex 142	Optimized 5 mm cable 1.1 dB @18 GHz, the best tradeoff between loss and size.
Neoflex 142STR	High flexibility 5 mm cable with stranded center conductor 1.35dB @ 18 GHz.
Oflex 142STR-105	High flexibility 5.4 mm cable with strandard center conductor.
Neoflex 235	Optimized 6 mm cable 1 dB @18 GHz, the best tradeoff between loss and size.
Neoflex 270STR	High flexibility 7 mm cable with stranded center conductor 1dB @ 18 GHz.
Neoflex 335i	Optimized 8 mm cable 0.72 dB @ 18 GHz, the best tradeoff between loss and size.
Neoflex 450STR	Optimized for low loss 0.42 dB @ 12 GHz performance with great power handling.
Neoflex 480	Lowest Loss 0.36 dB @ 10 GHz uses a stranded center conductor to enhance the handling.

Test Descriptions	Applicable Standards
Insertion loss	MIL-T-81490 paragraph 4.7.3
VSWR	MIL-T-81490 paragraph 4.7.4
Humidity	MIL-STD-810G method 507.5, procedure II
Vibration	MIL-STD-810G method 514.6, category 4, figure 514.6C-2 procedure I
Temperature/Humidity/Altitude	MIL-STD-810G method 520.3, procedure III
Thermal shock	MIL-STD-810G method 503.5, procedure I-C MIL-STD-202 method 107, condition B1 cycles, temperature: -55°C up to 125°C 25
Sand and dust	MIL-STD-810G method 510.5, procedure I +35°C, 3 hours
Salt fog	MIL-STD-810G method 509.5 48 hours exposure to a 5% solution
Mechanical shock saw tooth	MIL-STD-810F method 516.6, procedure I 40g saw tooth pulse of 11 milliseconds duration, 3 shocks in each of six directions
Acceleration operational	MIL-STD-810G method 513.6, procedure II 27G, 5 min
Moisture resistance	MIL-STD-202, method 106G day exposure 10

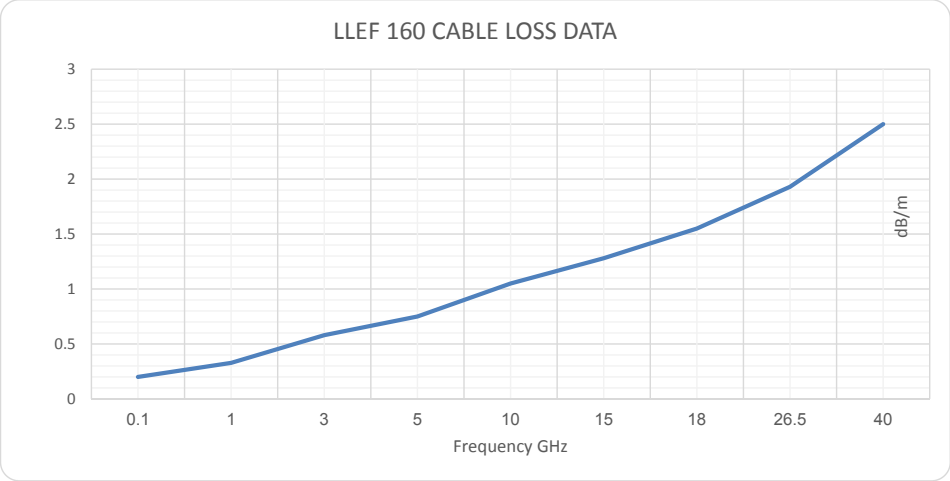
LLEF 160

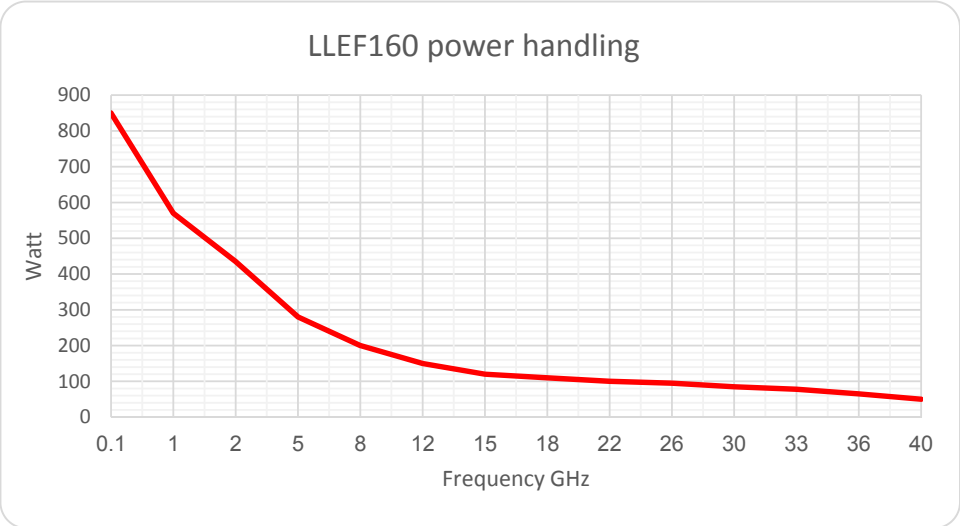
MW cable up to 40GHz

Assembly types

		LLEF160	LLEF160F	LLEF160N	LLEF160S	LLEF160Z
Electrical specifications						
Cut off frequency	GHz	40	40	40	40	40
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	1.5	1.5	1.5	1.5	1.5
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	120	120	120	120	120
Mechanical parameters						
Weight	g/m	31	96	68	118	100
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	20	28	20	40	40
Min. bending radius dynamic	mm	30	40	30	60	60
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	4.10	6,5	4.1	6.9	7.0
Environmental						
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200	–55 to +200	–55 to +85
Construction						
Inner conductor		solid	solid	solid	solid	solid
Dielectric		Expanded PTFE	Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated	Silver Plated Copper	Silver Plated Copper strip	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / Nomex/ Silicon	Nomex Braid	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and Flame retardant	High load and ground based use.	High pressure, Water emesion.

LLEF 160 | MW cable up to 40GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, Class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF160 family

2.92 straight plug (up to 40GHz).

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

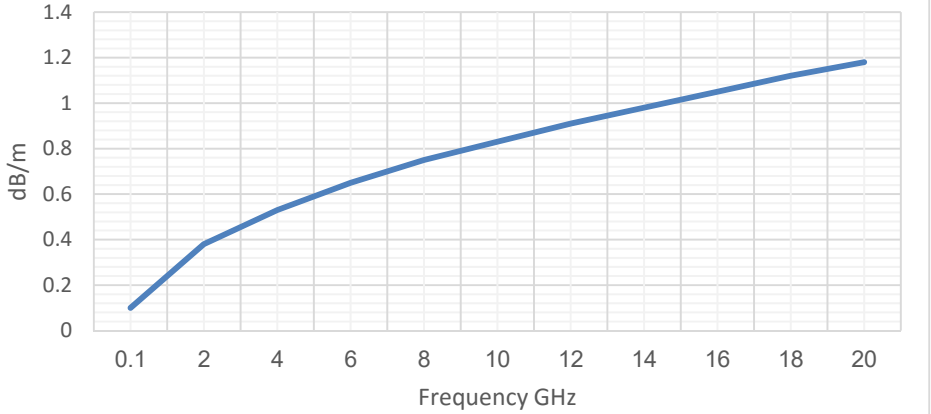
LLEF 142

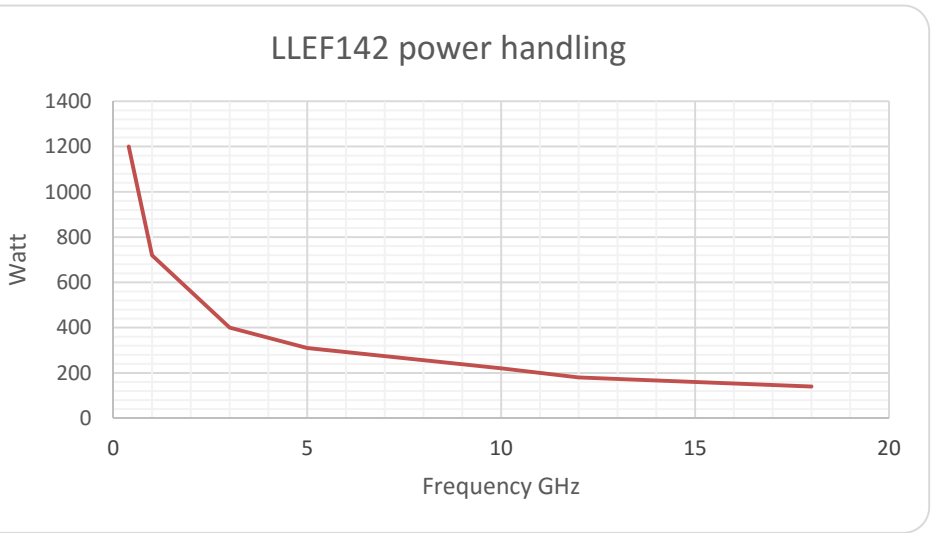
MW cable up to 26GHz

Assembly types

		LLEF142	LLEF142F	LLEF142N	LLEF142S	LLEF142Z
Electrical specifcations						
Cut off frequency	GHz	27	27	27	27	27
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	1.1	1.1	1.1	1.1	1.1
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	140	140	140	140	140
Mechanical parameters						
Weight	g/m	65	92	68	118	100
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	20	28	20	40	40
Min. bending radius dynamic	mm	30	40	30	60	60
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	4.95	7.9	5.0	7.0	8.0
Environmental						
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200	–55 to +200	–55 to +85
Construction						
Inner conductor		solid	solid	solid	solid	solid
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / Nomex/ Silicon	Nomex Braid	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and flame retardant	High load and ground based use	High pressure, Water immersion

LLEF 142 | MW cable up to 26GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF142 family

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

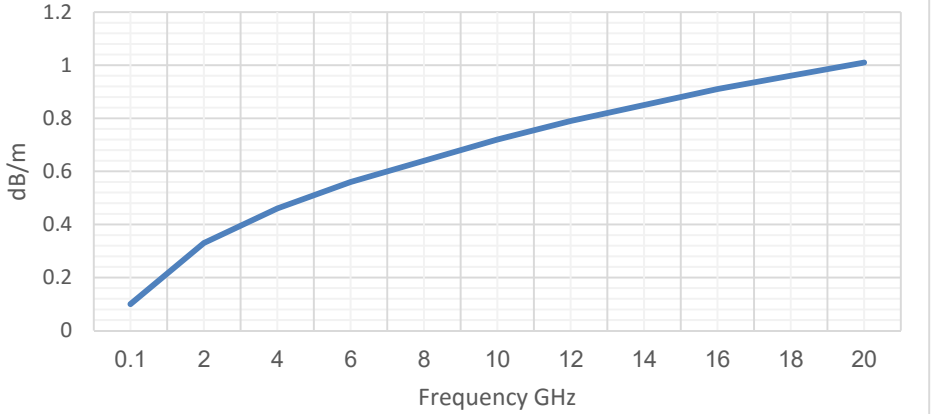
LLEF 235

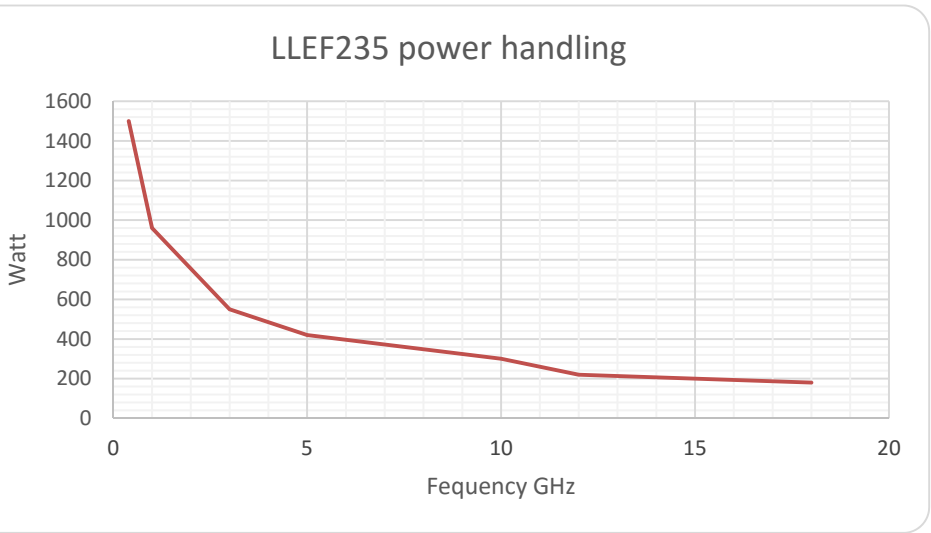
MW cable up to 18GHz

Assembly types

		LLEF235	LLEF235F	LLEF235N	LLEF235S	LLEF235Z
Electrical specifcations						
Cut off frequency	GHz	18	18	18	18	18
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40to +85 °C)	ppm	< 650	< 650	<650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	±0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	1.0	1.0	1.0	1.0	1.0
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling@ 18GHz (see graph for all bands)	Watt	180	180	180	180	180
Mechanical parameters						
Weight	g/m	71	138	73	120	150
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	30	45	30	50	55
Min. bending radius dynamic	mm	40	55	45	65	80
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	5.95	8.9	6.1	8.8	10.0
Enviromental						
Temperature range	C°	–55to+200	–55to+200	–55to+200	–55to+200	–55to+85
Consruction						
Inner conductor		solid	solid	solid	solid	solid
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expand-edPTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil Nomex Silicon	Nomex Braid FR	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and flame retardant	High crush resistance and ground based use	High pressure, Water immersion

LLEF 235 | MW cable up to 18GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and cody components shall be passivated per ASTM A380.
Interface	All Connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF235 family

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

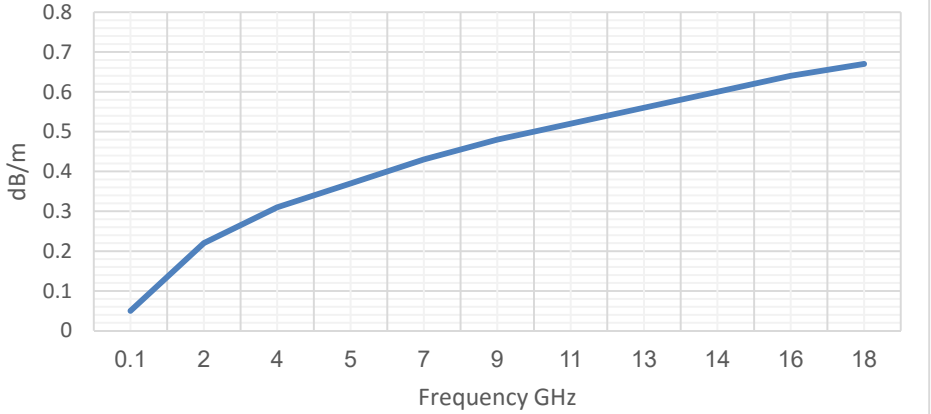
LLEF 335i

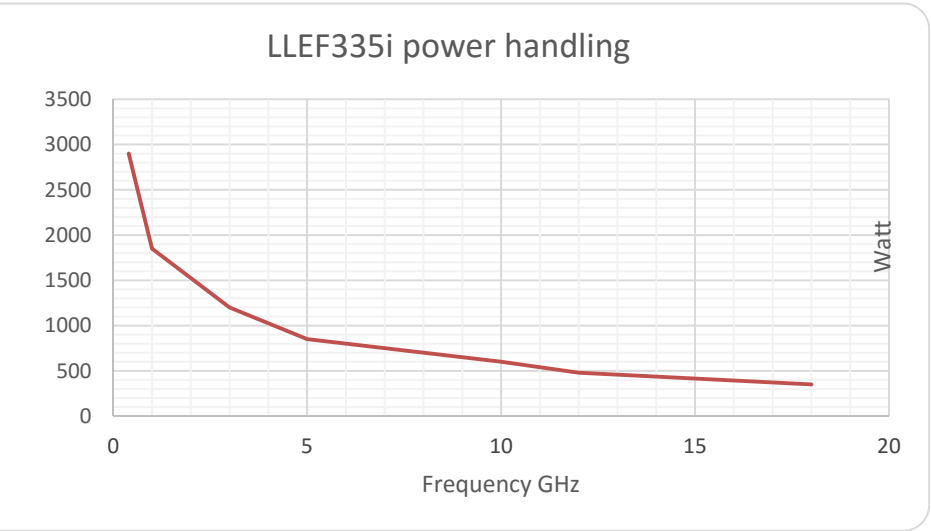
MW cable up to 18GHz

Assembly types

		LLEF335i	LLEF335iF	LLEF335iN	LLEF335iS	LLEF335iZ
Electrical specifications						
Cut off frequency	GHz	18	18	18	18	18
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	0.7	0.7	0.7	0.7	0.7
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	400	400	400	400	400
Mechanical parameters						
Weight	g/m	112	300	115	300	300
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	38	50	40	60	80
Min. bending radius dynamic	mm	65	75	65	80	100
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	7.60	11.6	8.0	12.0	13.0
Environmental						
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200	–55 to +200	–55 to +85
Construction						
Inner conductor		solid	solid	solid	solid	solid
Dielectric		Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE tape
Outer conductor		tape/ polyimide/ braid	tape/ polyimide/ braid	tape/ polyimide/ braid	tape/ polyimide/ braid	tape/ polyimide/ braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / Nomex/ Silicon	Nomex Braid FR	Stainless steel squarelock	EPDM

LLEF 335i | MW cable up to 18GHz





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Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

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-55 to +200 °C for most connector types

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0.72 dB/m @ 18 GHz for Neoflex

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650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

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Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF335i family

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

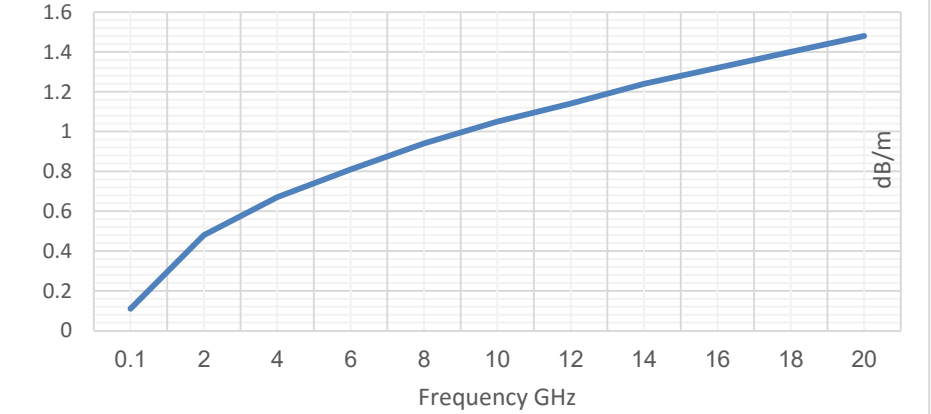
LLEF 162 STR

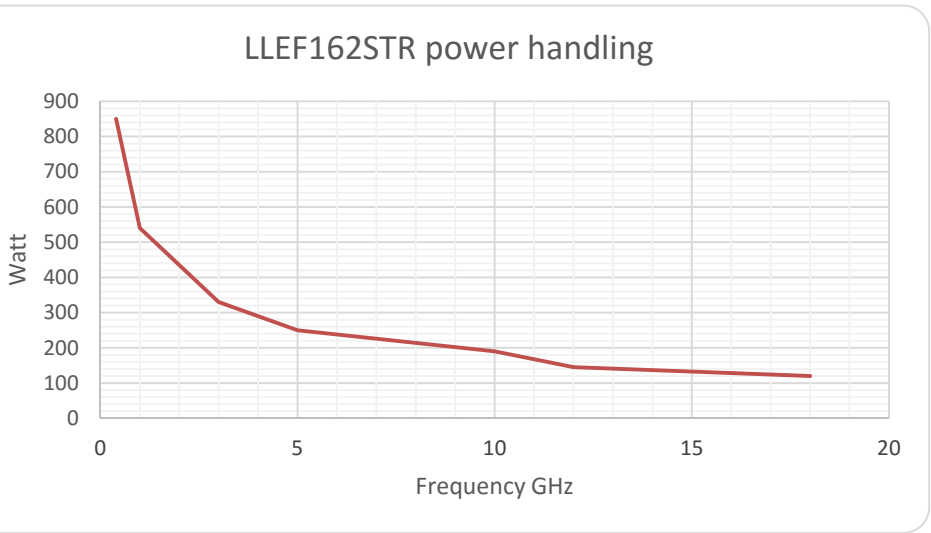
MW cable up to 18GHz

Assembly types

		LLEF162STR	LLEF162STRF	LLEF162STRN	LLEF162STRS	LLEF162STRZ
Electrical specifcations						
Cut off frequency	GHz	18	18	18	18	18
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phasestabilityvs.temperature(–40 to+85°C)	ppm	<650	<650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz(see graph for all bands)	dB/m	1.5	1.5	1.5	1.5	1.5
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	120	120	120	120	120
Mechanical parameters						
Weight	g/m	31	96	68	118	100
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	20	28	20	40	40
Min. bending radius dynamic	mm	30	40	30	60	60
Application		dynamic	dynamic	dynamic	dynamic	dynamic
Outer diameter	mm	4.10	6,5	4.1	6.9	7.0
Enviromental						
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200	–55 to +200	–55 to +85
Consruction						
Inner conductor		stranded	stranded	stranded	stranded	stranded
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil Nomex Silicon	Nomex Braid FR	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and flame retardant	High crush resistance and ground based use	High pressure, Water immersion

LLEF 162 STR | MW cable up to 18GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF162 family

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

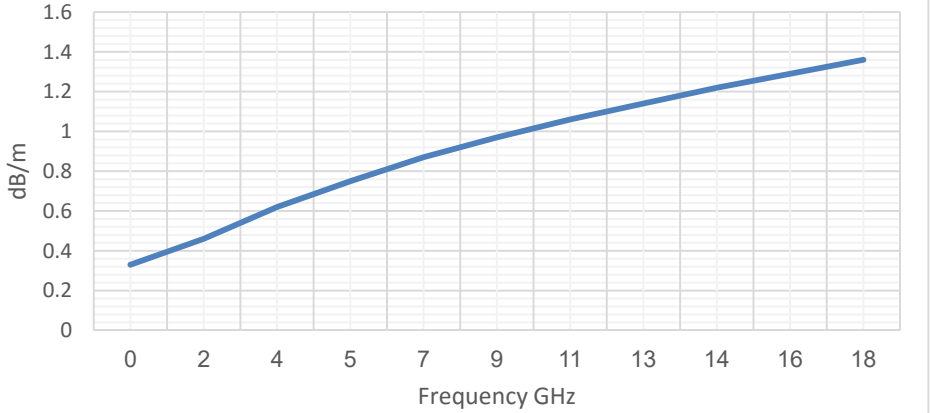
LLEF 142 STR

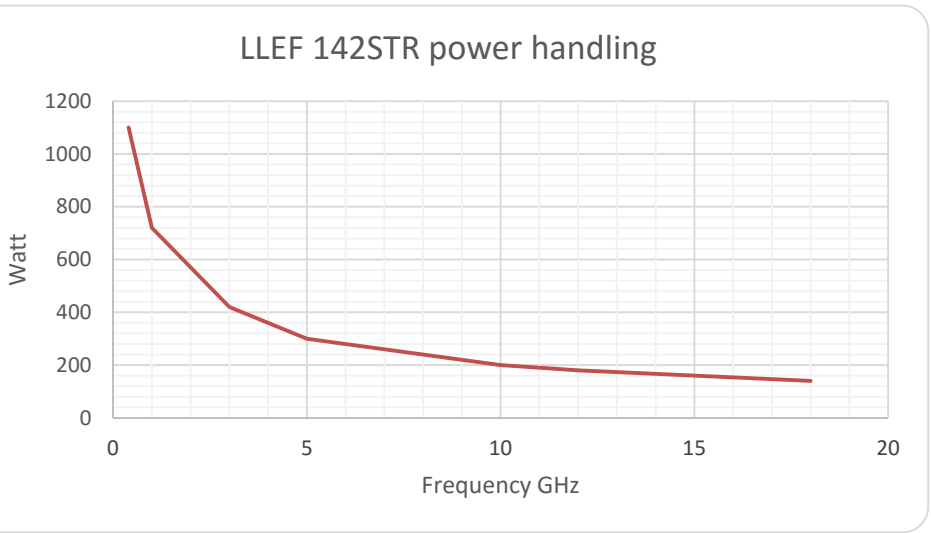
MW cable up to 18GHz

Assembly types

		LLEF142STR	LLEF142STRF	LLEF142STRN	LLEF142STRS	LLEF142STRZ
Electrical specifcations						
Cut off frequency	GHz	27	27	27	27	27
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	1.3	1.3	1.3	1.3	1.3
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	140	140	140	140	140
Mechanical parameters						
Weight	g/m	65	92	68	118	100
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	20	28	20	40	40
Min. bending radius dynamic	mm	30	40	30	60	60
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	4.95	7.9	5.0	7.0	8.0
Environmental						
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200	–55 to +200	–55 to +85
Construction						
Inner conductor		stranded	stranded	stranded	stranded	solid
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / Nomex/ Silicon	Nomex Braid	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and flame retardant	High load and ground based use	High pressure, Water immersion

LLEF 142 STR | MW cable up to 18GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF142 STR family

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

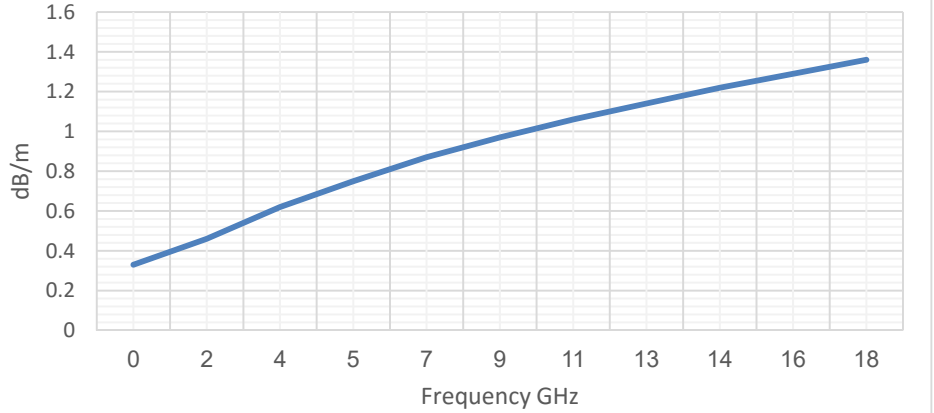
LLEF 142 STR-105 Flex

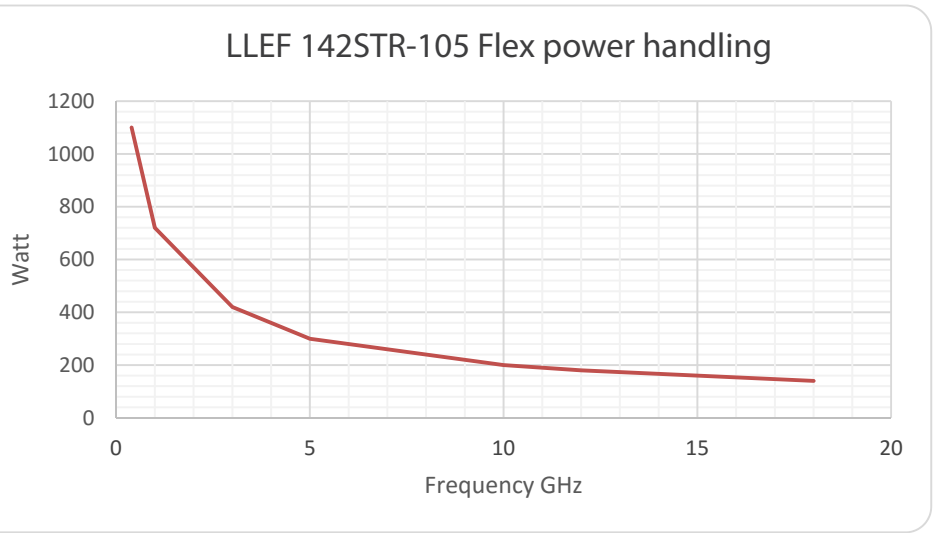
MW cable up to 18GHz

Assembly types

		LLEF142STR -105 Flex	LLEF142STR -105 Flex F	LLEF142STR -105 Flex N	LLEF142STR -105 Flex S	LLEF142STR -105 Flex Z
Electrical specifcations						
Cut off frequency	GHz	27	27	27	27	27
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	1.1	1.1	1.1	1.1	1.1
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling @ 18GHz (see graph for all bands)	Watt	140	140	140	140	140
Mechanical parameters						
Weight	g/m	65	92	68	118	100
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	26	34	26	46	46
Min. bending radius dynamic	mm	30	40	30	60	60
Application		Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic	Limited dynamic
Outer diameter	mm	5.4	7.9	6.5	7.0	8.0
Environmental						
Temperature range	°C	–40 to +105	–40 to +105	–40 to +105	–40 to +105	–40 to +105
Construction						
Inner conductor		solid	solid	solid	solid	solid
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / Nomex/ Silicon	Nomex Braid	Stainless steel squarelock	EPDM
Applications						
		Laboratory use high- flex	Laboratory use high- flex	Fuselage installation and flame retardant	High load and ground based use	High pressure, Water immersion

LLEF 142 STR-105 Flex | MW cable up to 18GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-40 to +105 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF142 STR -105 Flex family

2.92 straight plug (up to 18 GHz).

SMA all range (up to 18 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

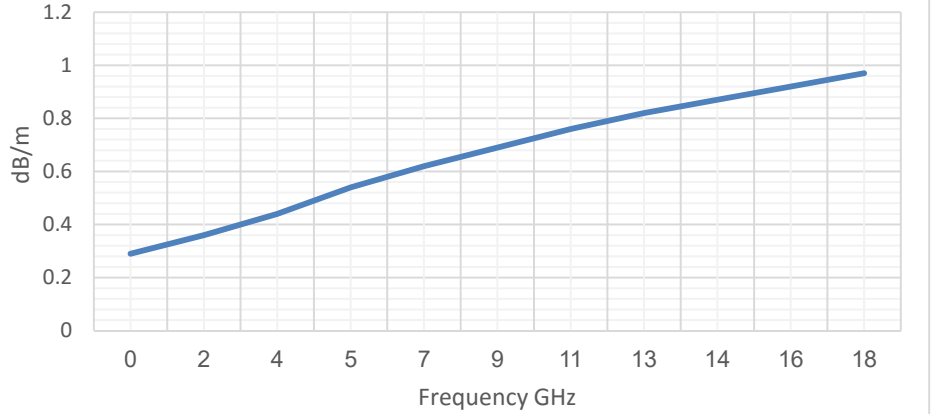
LLEF 270 STR

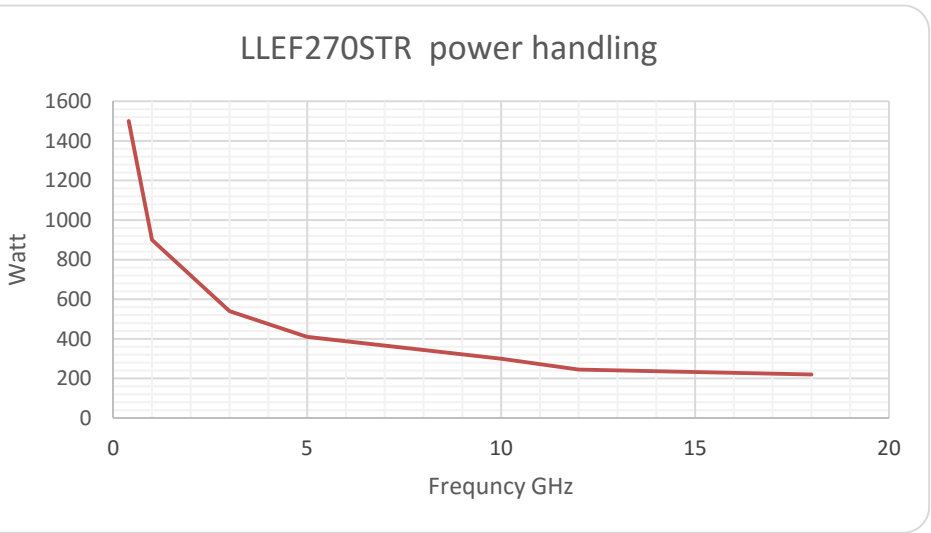
MW cable up to 18GHz

Assembly types

		LLEF270STR	LLEF270STR F	LLEF270STR N	LLEF270STR S	LLEF270STR Z
Electrical specifcations						
Cut off frequency	GHz	18	18	18	18	18
VP	%	83	83	83	83	83
Screening effectiveness (up to 18 GHz)	dB	> 95	> 100	>95	>100	>100
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40to +85 °C)	ppm	< 650	< 650	<650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25	± 0.25	±0.25
Cable attenuation at 25 °C @ 18GHz (see graph for all bands)	dB/m	0.75	0.75	0.75	0.75	0.75
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Power handling@ 18GHz (see graph for all bands)	Watt	220	220	220	220	220
Mechanical parameters						
Weight	g/m	105	295	110	295	330
Crush resistance	kN/m	12	80	12	120	100
Tensile load	N	125	400	125	800	600
Min. bending radius static	mm	25	50	40	60	80
Min. bending radius dynamic	mm	50	75	65	80	100
Application		dynamic	dynamic	dynamic	dynamic	semi dynamic
Outer diameter	mm	6.90	11.6	7.0	9.5	12.0
Enviromental						
Temperature range	°C	–55to+200	–55to+200	–55to+200	–55to+200	–55to+85
Consruction						
Inner conductor		stranded	stranded	stranded	stranded	stranded
Dielectric		Expanded PTFE	Expanded PTFE tape	Expanded PTFE tape	Expand-edPTFE	Expanded PTFE tape
Inner braid		Silver Plated	Silver Plated Copper	Silver Plated Copper	Silver Plated	Silver Plated Copper
Interlayer		Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape	Metalized Tape
Outer conductor		Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid	Silver Plated Copper Braid
Jacket		FEP	FEP	FEP	FEP	FEP
Cable armor		no	Monocoil / nomex/ Silicon	Nomex Braid	Stainless steel squarelock	EPDM
Applications						
		Internal system	Laboratory use high- flex	Fuselage installation and flame retardant	High crush resistance and ground based use	High pressure, Water immersion

LLEF 270 STR | MW cable up to 18GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF120 family

2.92 straight plug (up to 40 GHz).

TNC all range (up to 18 GHz).

N TYPE all range (up to 18 GHz).

LLEF 450 STR

MW cable up to 12GHz

NO ARMOR

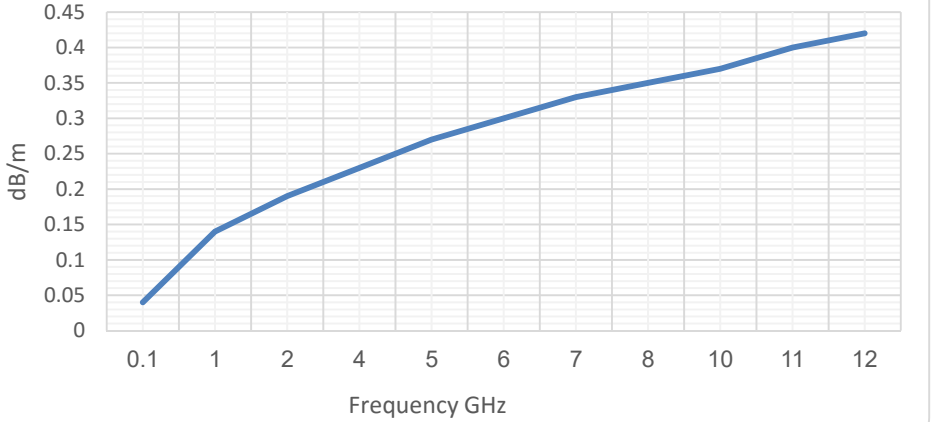
F

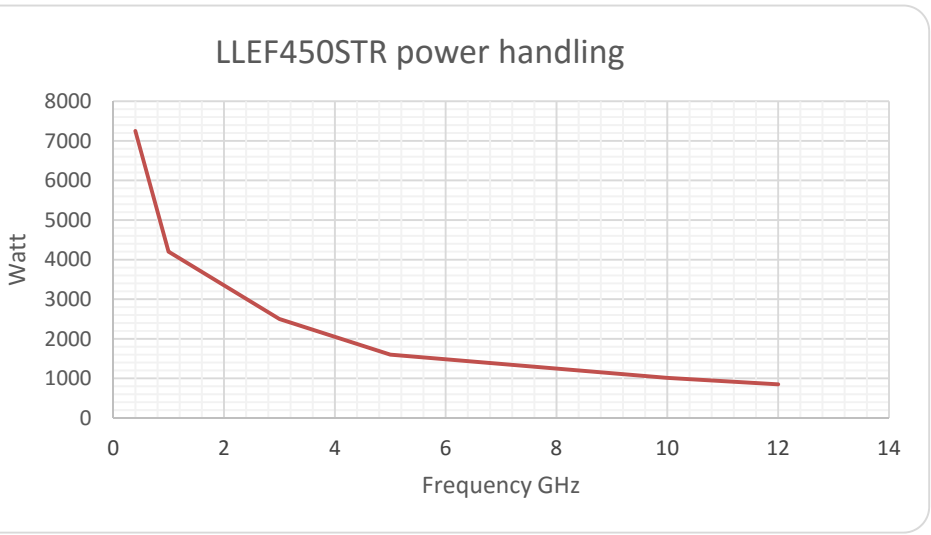
N

Assembly types

		LLEF450STR	LLEF450STRF	LLEF450STRN
Electrical specifications				
Cut off frequency	GHz	12	12	12
VP	%	83	83	83
Screening effectiveness (up to 10 GHz)	dB	> 95	> 100	>95
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25	± 0.25
Cable attenuation at 25 °C @ 10GHz (see graph for all bands)	dB/m	0.42	0.42	0.42
Insertion loss stability vs. bending	dB	± 0.2	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1	< 0.1
Power handling @ 10GHz (see graph for all bands)	Watt	1015	1015	1015
Mechanical parameters				
Weight	g/m	246	400	250
Crush resistance	kN/m	12	80	12
Tensile load	N	125	400	125
Min. bending radius static	mm	25	50	40
Min. bending radius dynamic	mm	50	75	65
Application		dynamic	dynamic	dynamic
Outer diameter	mm	11.40	15.0	12.0
Environmental				
Temperature range	°C	–55 to +200	–55 to +200	–55 to +200
Construction				
Inner conductor		stranded	stranded	stranded
Dielectric		Expanded PTFE tape	Expanded PTFE tape	Expanded PTFE tape
Outer conductor		tape/polyimide/braid	tape/polyimide/braid	tape/polyimide/braid
Jacket		FEP	FEP	FEP
Cable armor		no	Monocoil /Nomex/ Silicon	Nomex Braid FR

LLEF 450 STR | MW cable up to 12GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the Following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF450 STR family

TNC all range (up to 12 GHz).

N TYPE all range (up to 12 GHz).

LLEF 480

MW cable up to 11GHz

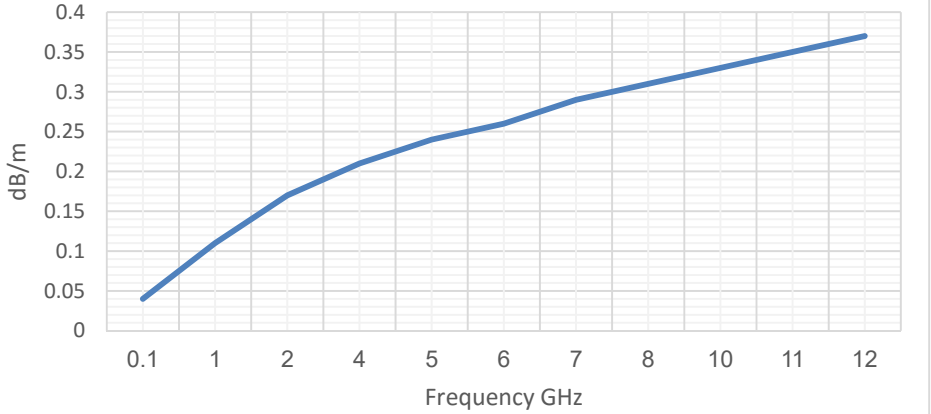
NO ARMOR

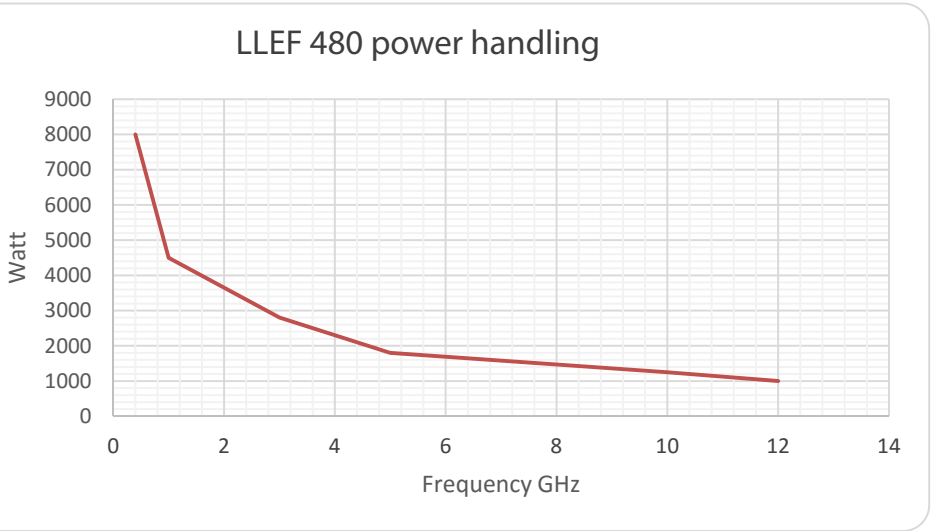
N

Assembly types

		LLEF480	LLEF480N
Electrical specifications			
Cut off frequency	GHz	11	11
VP	%	83	83
Screening effectiveness (up to 10 GHz)	dB	> 95	>95
Phase stability vs. flexure (360°, diameter 40 mm)	deg/GHz	<0.7	< 0.7
Phase stability vs. temperature (–40 to +85 °C)	ppm	< 650	< 650
Assembly phase matching tolerances	deg/GHz	± 0.25	± 0.25
Cable attenuation at 25 °C @ 10GHz (see graph for all bands)	dB/m	0.36	0.36
Insertion loss stability vs. bending	dB	± 0.2	± 0.2
Insertion loss stability vs. temperature	%/°C	< 0.1	< 0.1
Power handling @ 10GHz (see graph for all bands)	Watt	1250	1250
Mechanical parameters			
Weight	g/m	294	300
Crush resistance	kN/m	12	12
Tensile load	N	125	125
Min. bending radius static	mm	25	40
Min. bending radius dynamic	mm	50	65
Application		dynamic	dynamic
Outer diameter	mm	12.20	13.0
Environmental			
Temperature range	°C	–55 to +200	–55 to +200
Construction			
Inner conductor		stranded	stranded
Dielectric		Expanded PTFE tape	Expanded PTFE tape
Outer conductor		tape/polyimide/braid	tape/polyimide/braid
Jacket		FEP	FEP
Cable armor		no	Nomex Braid FR

LLEF 480 | MW cable up to 11GHz





All connectors are made according to the following materials and MIL standards:	
Body of connector	Stainless steel. corrosion-resistant, non magnetic 303, per ASTM A484 and A582.
Center conductor	Beryllium copper per ASTM-B-196, QQ-C-530.
Insulator	PTFE per ASTM-D-1 710
Finish	Center conductors and solder components Are plated per MIL-G- 45204 Type II, class 1 Over nickel plate per QQ-N-290. Body and body components shall be passivated per ASTM A380.
Interface	All connectors interface per MIL-STD 348 and MIL-PRF- 39012 accordingly.
Environmental	All connectors meet MIL-STD-202- per the following tests:
Temp. Range	-54 to +155 deg C.
Thermal shock	MIL –STD 202 Meth.107 Cond B.
Vibration	MIL –STD 202 Meth. 204 Cond B.
Shock	MIL–STD 202 Meth. 213 Cond I.
Waterproofing	IP67 and on selected types IP68.
Material option	SS-316 per request.

Advantages of the Neoflex MW cable family

Wide temperature range

-55 to +200 °C for most cable types

-55 to +200 °C for most connector types

Mechanical protection

A wide range of armors are available for most Neoflex coble types.

Chemical stability

Thanks to excellent materials (FEP).

Lowest losses and excellent stability vs. Temperature

0.72 dB/m @ 18 GHz for Neoflex LL335i

Lowest Phase over temperature

650 ppm over -55 to +75 deg. C

High power performance

Neoflex LLEF335i withstanding

400 Watt CW @ 18 GHz

Low weight, small diameter

Neoflex family of cables use expanded PTFE tape which reduces the weight of any given cable by 20-35 % as compared to other technologies while still maintaining same electrical performance.

Likewise smaller diameter cables are achieved for same electrical performance vs. thicker cables using other technologies

Wide frequency range

Neoflex Family from DC up to 40 GHz.

Connector selection guide for cable LLEF480 family

TNC all range (up to 11 GHz).

N TYPE all range (up to 11 GHz).

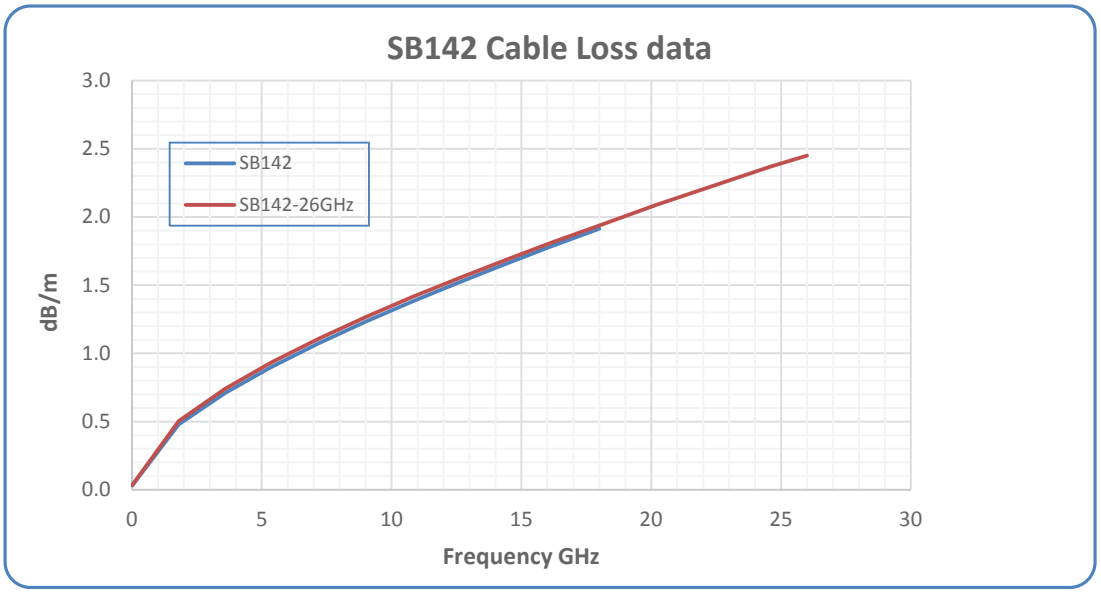
SB (Strip Braid) Coaxial Cable

Construction:
Center conductor: SCCS
Dielectric: Solid PTFE
Inner braid: Flat silver plated copper strip
Outer braid: Round silver plated copper
Jacket: Clear FEP.
Compound Operating temperature: -55 +200° C
Velocity of Propagation: 70%
Shielding Effectiveness: >-95 dB

Product Portfolio:

Products	Outer Diameter mm (in)	VOP (%)	Max Frequency (GHz)	Insertion loss (18GHz/m @)	Weight (gram/m)	Minimum Bend radius (mm/inch)
SB142	3.86 (0.152″)	70	18	1.91	55.2	25.4/1″
SB142-26GHz	3.88 (0.153″)	70	26	2.45	47.6	22.86/0.9″

SB coaxial cables have been designed for low attenuation at high frequencies, while using similar dimensions to MIL-DTL-17 constructions. Standard may frequently be used, thereby avoiding tooling charges.
Solid PTFE dielectrics are manufactured with tight tolerances to ensure impedance uniformity and to effect VSWR levels that meet or exceed MIL-DTL-17 specifications for cables of comparable size. The strip braid configuration is by far the most effective means of lowering attenuation levels of coaxial cable at high frequencies while providing shielding effectiveness levels that exceed those of flexible MIL-DTL-17 cables. Flat strips of silver plated copper are braided over the dielectric core, frequently with an intermediate metallized polyester or polyimide layer, and an outer round wire braid.
This shielding technique provides superior shielding effectiveness and lower transfer impedance than any standard double braided mil-spec. construction FEP jackets are typically used, but alternate designs are available such as flame retardant PVC and abrasion resistant overall braids.
Marker tapes or surface printing are used for positive identification.



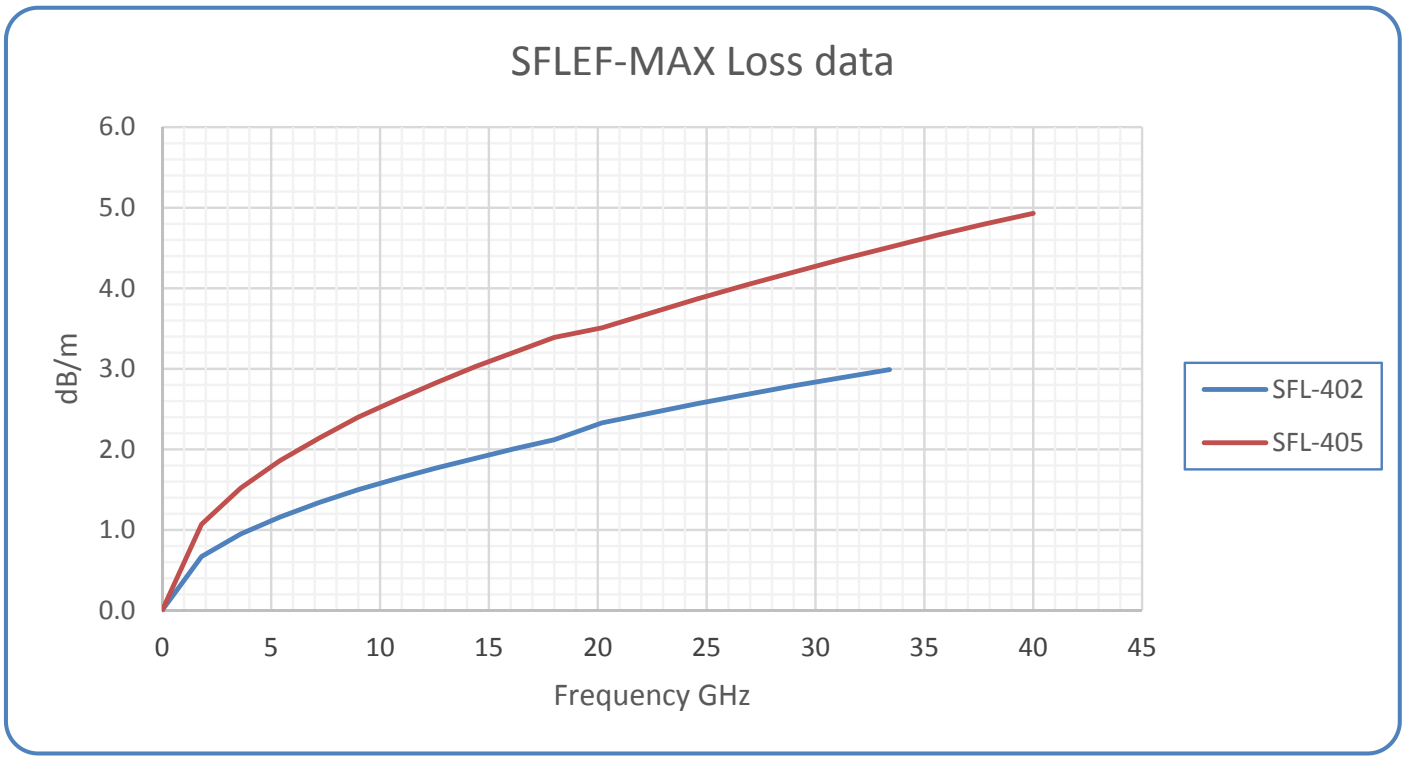
SFLEF MAX FLEX® Spiral Flex Coaxial Cable

Construction:
Center conductor: Stranded silver plated copper
Dielectric: Solid PTFE
Inner braid: Spiral silver plated copper strip
Outer braid: Round silver plated copper
Jacket: Solid light blue specially formulated compound
Operating temperature: -55 +105° C
Velocity of Propagation: 70%
Shielding Effectiveness: >110 dB

Product Portfolio:

Products	Outer Diameter mm (in)	VOP (%)	Max Frequency (GHz)	Insertion loss (18GHz/m @)	Weight (gram/m)	Minimum Bend radius (mm/inch)
SFL402-105	4.50 (0.180")	70	34	2.10	43	20/0.8"
SFL 405-105	2.92 (0.115")	70	63	3.50	31	16/0.625"

SFL Spiral Flex™ coaxial cables, more flexible and supple versions of the industry standard SS Spiral Strip constructions, have been designed with a specially formulated 105ºC jacket compound and stranded silver plated copper center conductors. These 50 ohm versions exhibit VSWR levels that meet or exceed similar size flexible constructions, and just like their SS cable counterparts, offer excellent shielding effectiveness with readily available connectors. Although the insertion loss is slightly higher than their SS cable counterparts, SFL attenuation levels through 18 GHz are substantially lower than comparable MIL-DTL-17 constructions.



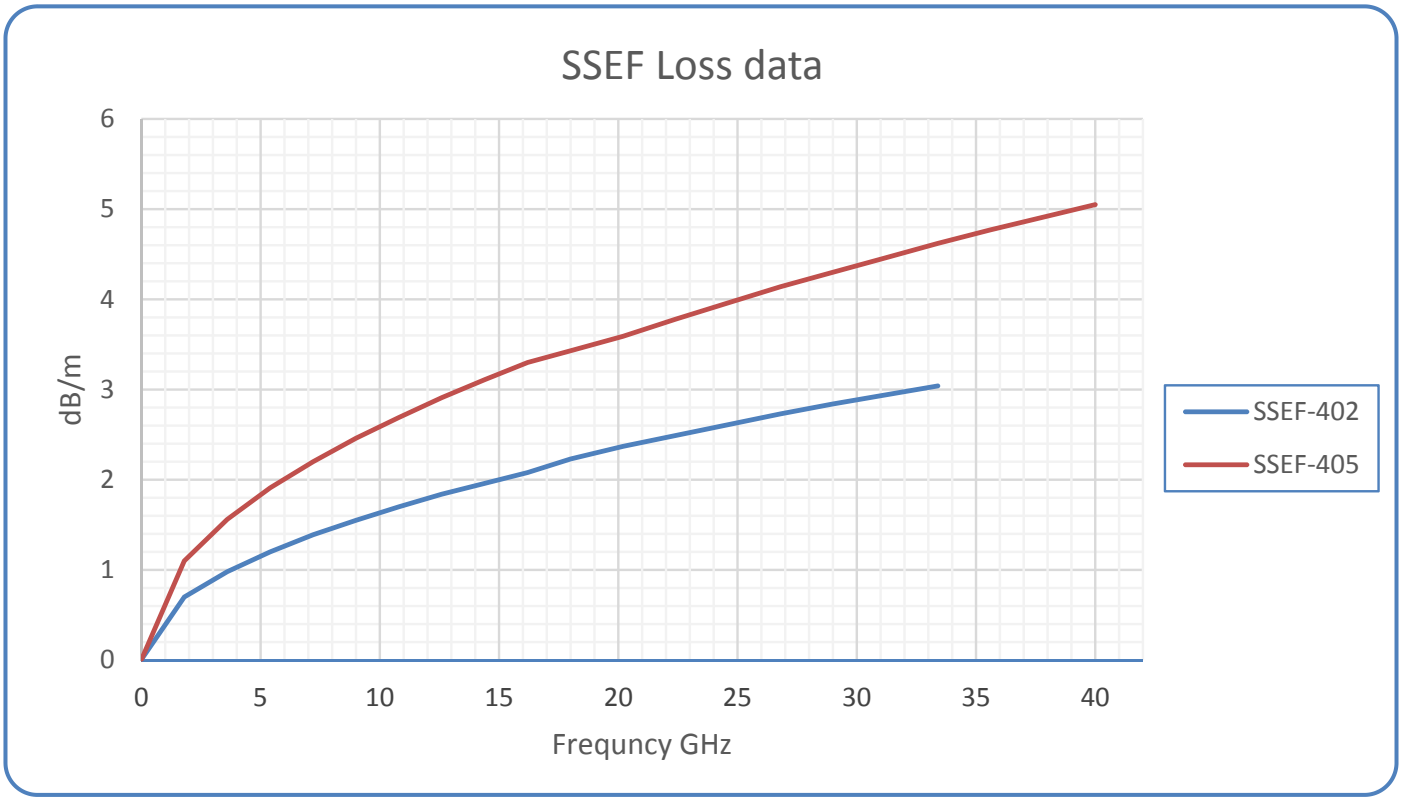
SSEF ROCK SSTABLE® Spiral Flex Coaxial Cable

Construction:
Center conductor: Solid silver plated copper weld
Dielectric: Solid PTFE
Inner shield: Spiral strip of silver plated copper
Outer braid: Round silver plated copper
Jacket: Solid blue FEP
Operating temperature: -55 +200° C
Velocity of Propagation: 70%
Shielding Effectiveness: >110 dB

Product Portfolio:

Products	Outer Diameter mm (in)	VOP (%)	Max Frequency (GHz)	Insertion loss (18GHz/m @)	Weight (gram/m)	Minimum Bend radius (mm/inch)
SSEF402	4.14 (0.163")	70	34	2.10	47	20/0.8"
SSEF405	2.64 (0.104")	70	63	3.45	20	16/0.625"

SS coaxial cables are flexible alternatives to semi-rigid coax, and the unique shielding configuration offers a cost effective, low attenuation option. The use of strip/round braid composite shields results in low transfer impedance levels. The 50 ohm constructions exhibit the same attenuation characteristics as the M17/130-RG402 and M17/133-RG405 cables. All SS cables have VSWR characteristics that meet or exceed similar size flexible constructions. SS402 and SS405 have been designed with diameters over the outer braids of .141" and 086" respectively, so standard SMA connectors may be used.
An overall FEP jacket is resistant to oil and chemicals. The cable is either unmarked or surface printed eliminating a marker tape that may cause problems in termination. Without the marker tape, an improved level of adhesion exists between the braided core and the jacket that allows ease of termination with short length assemblies



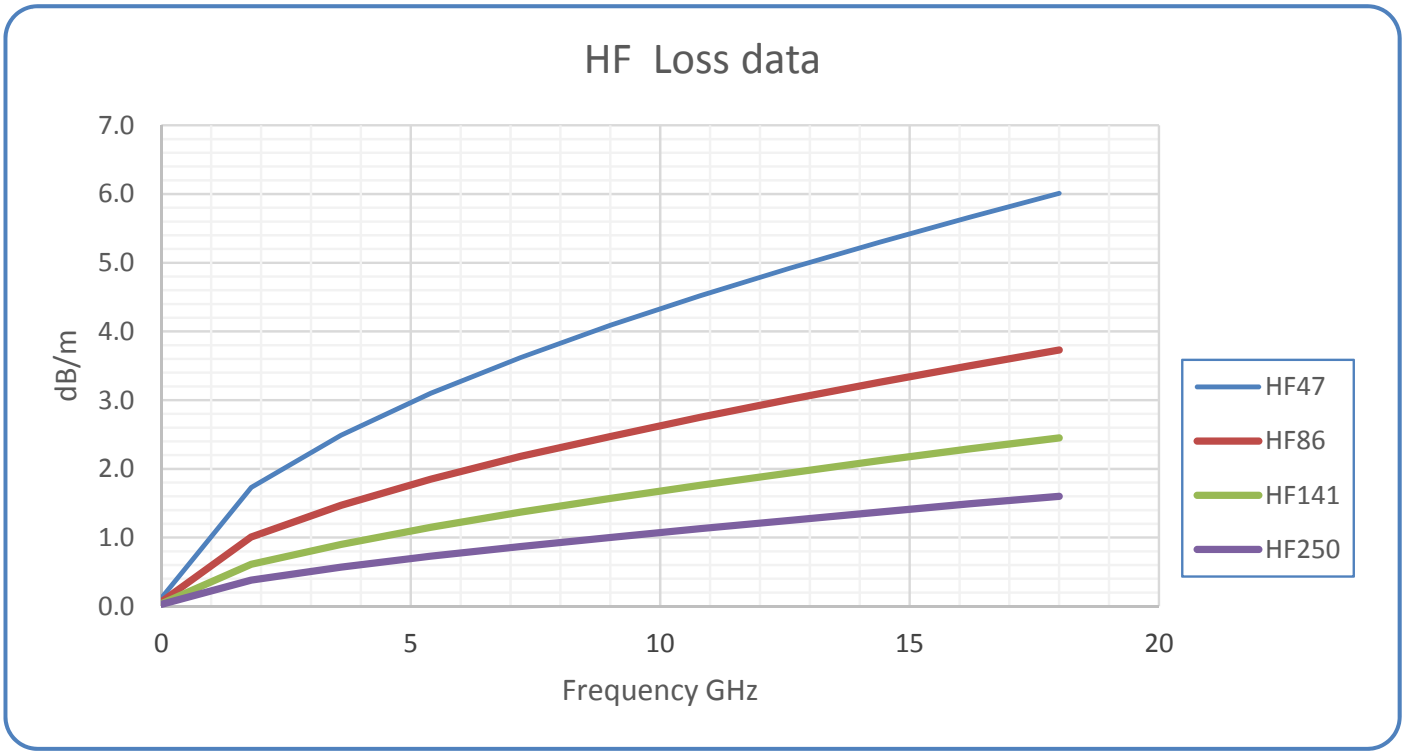
HAND FORMABLE ® Coaxial Cable

Construction:
Center conductor: Solid silver plated copper wire
Dielectric: Solid PTFE
Copper outer braid: Tin soaked copper braid
Operating temperature: -55 +105° C
Velocity of Propagation: 70%
Shielding Effectiveness: >110 dB

Product Portfolio:

Products	Outer Diameter mm (in)	VOP (%)	Max Frequency (GHz)	Insertion loss (18GHz/m @)	Minimum Bend radius (mm/inch)	Minimum Bend Radius Repeat (mm)
HF47	1.2/ (0.047")	70	40	5.4	3.2	15
HF86	2.2/ (0.086")	70	40	3.4	6	20
HF141	3.6/ (0.141")	70	33	2.2	8	40
HF250	6.35/ (0.250")	70	18	1.4	30	120

HF coaxial cables are flexible alternatives to semi-rigid coax, and the unique shielding configuration offers a cost effective, low attenuation option. The use of round braid composite shields results in low transfer impedance levels. The 50 ohm constructions exhibit the same attenuation characteristics as the M17/130-RG402 and M17/133-RG405 cables. All HF cables have VSWR characteristics that meet or exceed similar size flexible constructions. HF47 HF86 HF141 and HF250 have been designed with diameters over the outer braids of 0.047" , 0.250", 0.141" and 086" respectively, so standard SMA connectors and others may be used.
An overall tin soaked jacket is not resistant to oil and chemicals. The cable is either unmarked or surface printed eliminating a marker tape that may cause problems in termination. Without the marker tape, an improved level of adhesion exists between the braided core and the jacket that allows ease of termination with short length assemblies



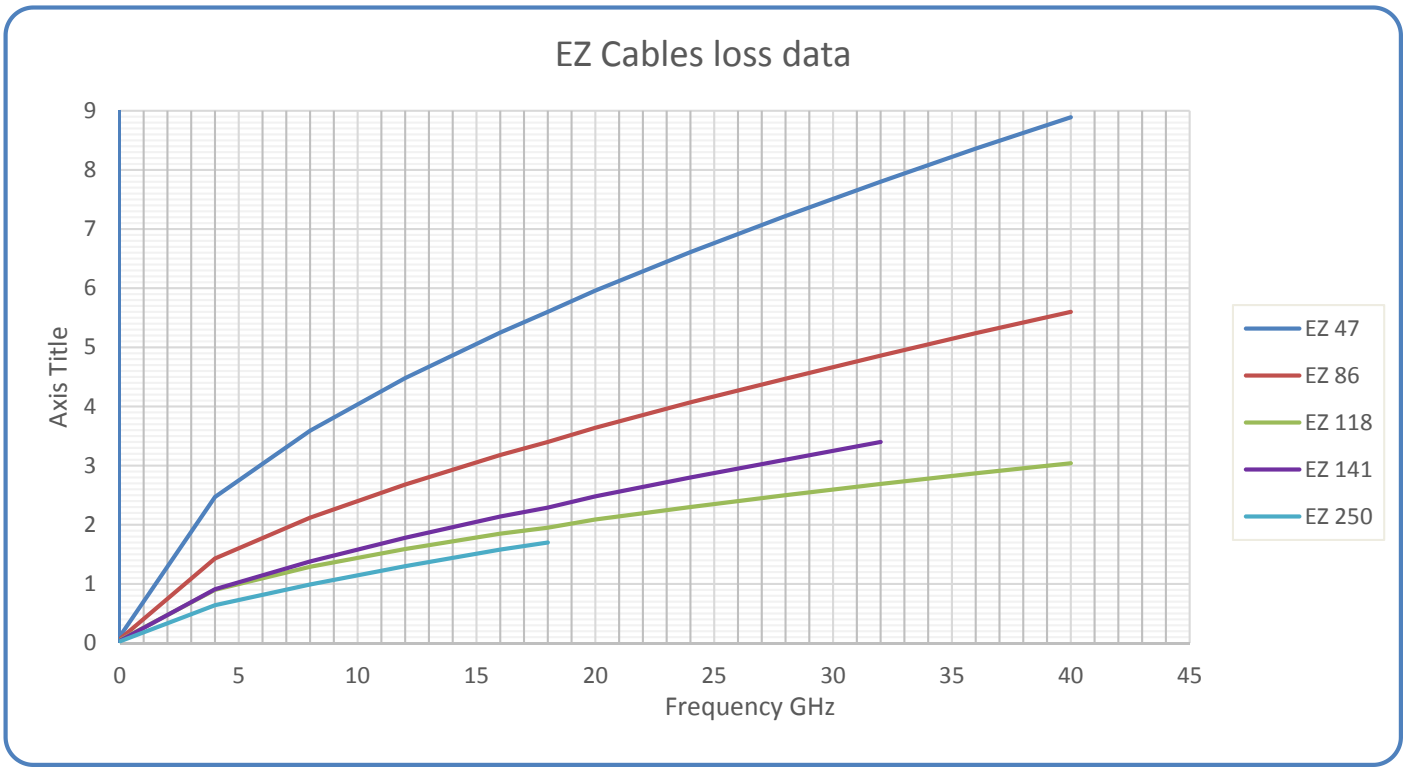
SEMI RIGID® Coaxial Cable

Construction:
Center conductor: Solid silver plated copper wire
Dielectric: Solid PTFE
Copper Outer braid: Seamless copper tubing, tin plated
Operating temperature: -55 +125° C
Velocity of Propagation: 70%
Shielding Effectiveness: >110 dB

Product Portfolio:

Products	Outer Diameter mm (in)	VOP (%)	Max Frequency (GHz)	Insertion loss (18GHz/m @)	Minimum Bend radius (mm/inch)
EZ-34TP-M17	0.86/ (0.034")	70	110	9.1	2.5
EZ-47TP-M17	1.2/ (0.047")	70	110	5.4	3.2
EZ-86TP-M17	2.2/ (0.086")	70	40	3.4	6
EZ-118TP-M17	3/ (0.118")	80	40	2	8
EZ-141TP-M17	3.6/ (0.141")	70	33	2.2	8
EZ-250TP-M17	6.35/ (0.250")	70	18	1.4	30

EZ coaxial cables are semi-rigid coax, and the unique shielding configuration offers a cost effective, low attenuation option. The use of round tube composite shields results in low transfer impedance levels. The 50 ohm constructions exhibit the best attenuation characteristics as the M17/130-RG402 and M17/133-RG405 cables. All S/R cables have VSWR characteristics that meet or exceed MIL-C-17.
Standard SMA connectors and others types may be used.



Cable Selection Guide

Cable Type / Connector type	SMA	TNC	N	BMA	SMP	K (2.9)	2.4	1.85	SC
Typical VSWR @ 18GHZ	1.25:1	1.25:1	1.25:1	1.25:1	1.2:1	1.15:1	1.15:1		1.25:1 @ 11GHz
Typical VSWR @ 40GHZ					1.35:1	1.25:1		1.25:1	
LLEF160	✓	✓	✓		✓	✓	✓		
LLEF142	✓	✓	✓						
LLEF235	✓	✓	✓	✓					
LLEF335i	✓	✓	✓						✓
LLEF142STR	✓	✓	✓						
LLEF142STR-105 Flex	✓	✓	✓						
LLEF162STR	✓	✓	✓	✓					
LLEF270STR	✓	✓	✓						
LLEF450STR	✓	✓	✓						✓
LLEF480	✓	✓	✓						✓
SB142	✓		✓						
SB142 - 26GHz	✓		✓						
SFLEF402	✓	✓	✓	✓	✓	✓	✓		
SFLEF405	✓	✓	✓	✓	✓	✓	✓		
SSEF402	✓	✓	✓	✓	✓	✓	✓		
SSEF405	✓	✓	✓	✓	✓	✓	✓		
HF34	✓	✓	✓	✓	✓	✓	✓		
HF47	✓	✓	✓	✓	✓	✓	✓	✓	
HF86	✓	✓	✓	✓	✓	✓	✓		
HF141	✓	✓	✓	✓	✓	✓	✓		
HF250	✓	✓	✓	✓			✓		
EZ-34TP-M17	✓	✓	✓	✓	✓	✓	✓		
EZ-47TP-M17	✓	✓	✓	✓	✓	✓	✓	✓	✓
EZ-86TP-M17	✓	✓	✓	✓	✓	✓	✓		
EZ-141TP-M17	✓	✓	✓	✓			✓		
EZ-250TP-M17	✓	✓	✓				✓		✓
EZ-118TP	✓				✓	✓			

Notice!

*Special connectors
such as Hermetic sealed, quick lock:
On request

The Power Handling Capability of Coaxial Cable

The power handling capability of coaxial cable is dependent either on its maximum voltage-withstanding capability for the transmission of peak power or on its thermal dissipation ability for average power transmission, which is the more common problem for RF applications. The thermal dissipation of cable depends upon its thermal resistance. For a cable in air, the thermal resistance of the surrounding air is related to the condition and radiation losses and dependent upon the surface area of the cable, the temperature of the surfaces, the ambient temperature, emissivity of the surface, and the flow of air.

The amount of heat which flows radially from the line will depend upon the composite thermal resistivity of the dielectric and insulating material of the cable, and the temperature gradients therein. The heat generated within a cable is given by the ratio of temperature rise between the inner conductor and the ambient temperature to its thermal resistance, which is equal to the difference of the input power and the output power in a matched system. The ratio of these powers is a function of the attenuation per unit length, which is directly proportional to the heat generated in the cable.

For any particular cable construction, the average power rating will depend on the permissible temperature rise above a stated ambient which is limited by the maximum operating temperature that the dielectric can withstand. The generally accepted maximum operating temperature for polyethylene is 80°C and for PTFE is 250°C. Simply stated, power handling of a coaxial cable is a function of attenuation and the temperature of the dielectric. The higher the operating frequency, the lower the power handling capability.

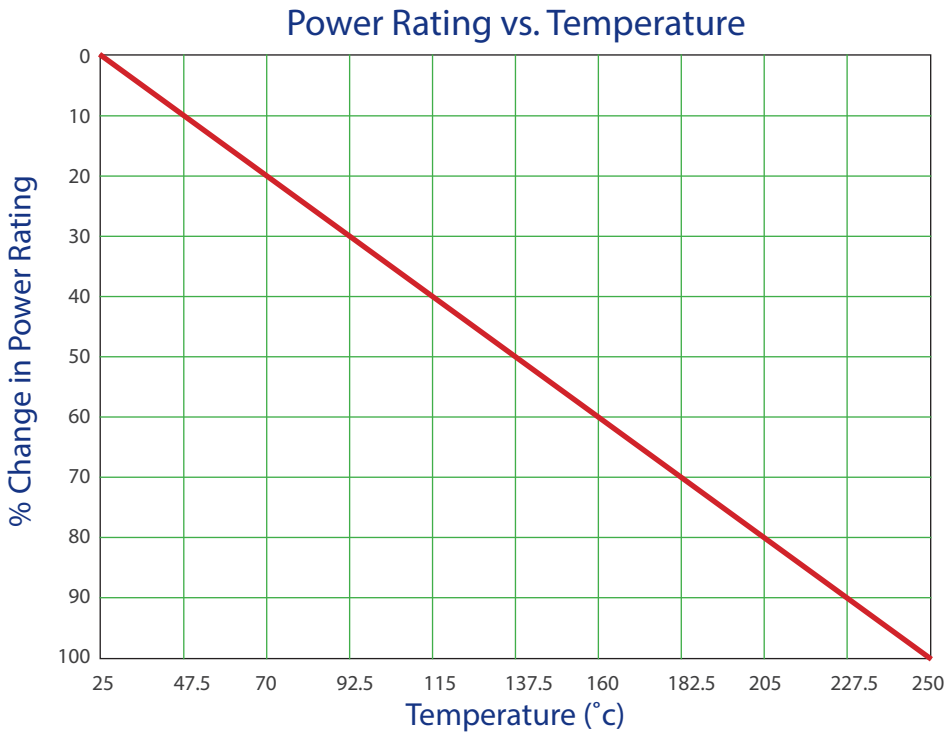
The chart references the maximum power handling capability at various frequencies for MIL-DTL-17 cables and Harbour's special cable constructions at 25°C temp and sea level.

Power Handling Capability of Coaxial Cable (Watt)

Cable Type	400 MHz	1 GHz	3 GHz	5 GHz	10 GHz	12 GHz	18 GHz
LLEF160	850	540	330	250	190	145	120
LLEF142	1200	720	400	310	220	180	140
LLEF235	1500	900	540	410	300	220	180
LLEF335i	2900	1800	1050	850	600	480	400
LLEF162STR	850	540	330	250	190	145	120
LLEF142STR	1100	680	350	300	200	180	140
LLEF142STR - 105 Flex	1100	680	350	300	200	180	140
LLEF270STR	1500	900	540	410	300	245	220
LLEF450STR	7250	4200	2200	1600	1015	850	N/A
LLEF480	8000	4500	2500	1800	1250	1000	N/A
SB142 / SB142 26GHz	965	590	315	235	150	130	105
SFLEF402	880	440	280	200	110	90	67
SFLEF405	200	130	65	45	30	23	20
SSEF402	1100	550	350	245	140	120	80
SSEF405	240	160	80	57	35	25	22
HF47	15	12	7	5	5	3	3
HF86	150	120	100	80	50	45	40
HF141	250	220	200	180	150	130	100
HF250	500	450	380	300	220	180	120

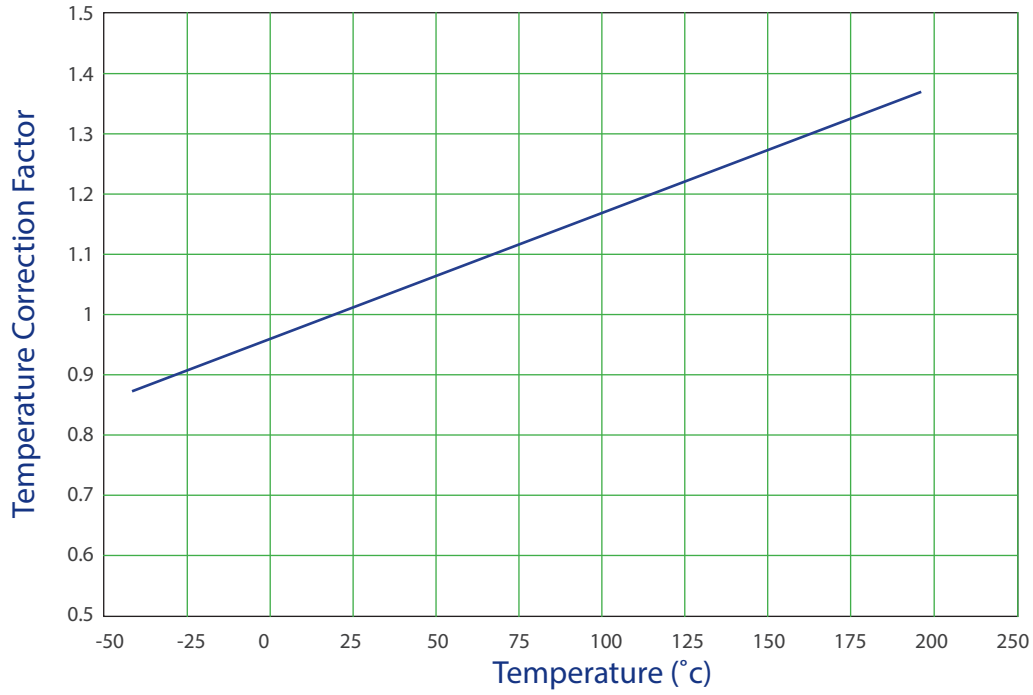
Power vs. Temperature Derating Factors

The chart below recalculates the power handling capability of a coaxial cable at various temperatures.



Attenuation vs. Temperature Correction Factor

The chart below recalculates the attenuation of a coaxial cable at various temperatures



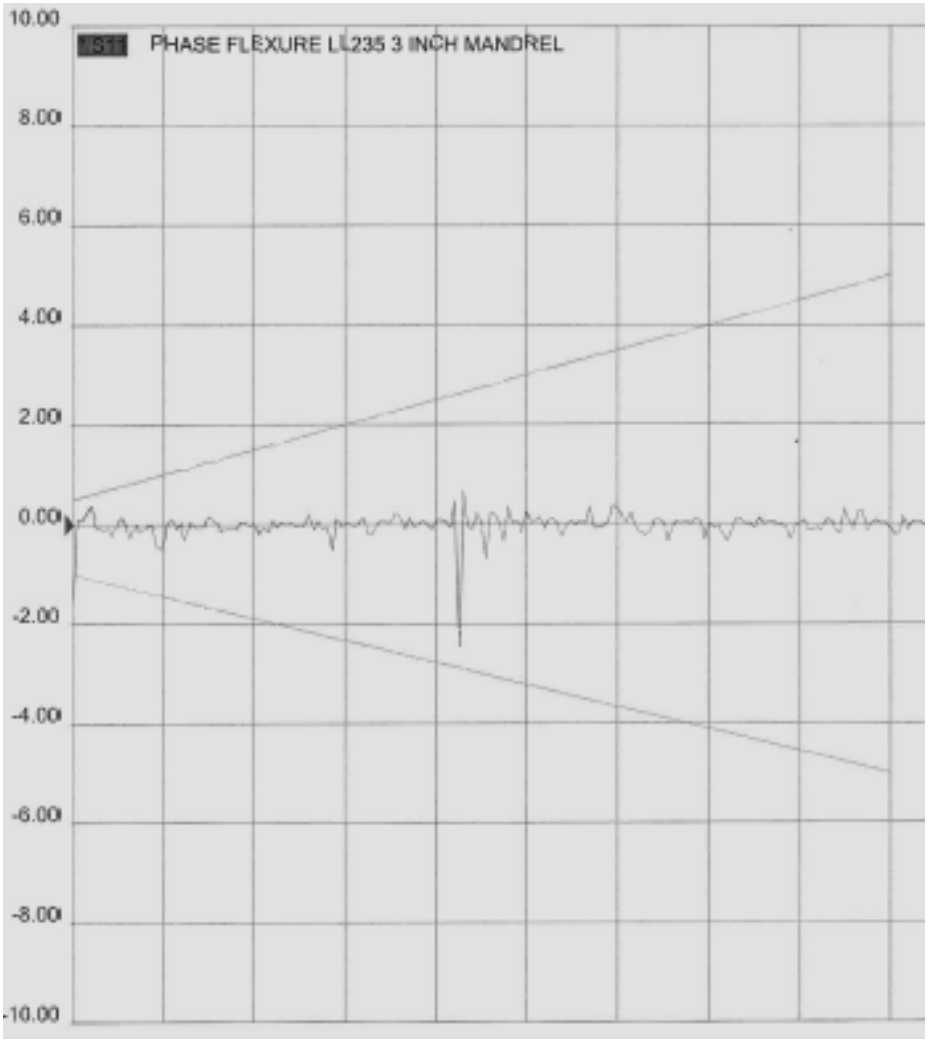
Phase Stability over Flexure for LLEF Cables

Phase stability over flexure can be significantly affected by the cable assembly technique, cable bend radius, and the length of the cable assembly. Harbour's Low Loss coax cables are typically tested for phase stability over flexure using an Agilent E8362B Network Analyzer using the following procedure:

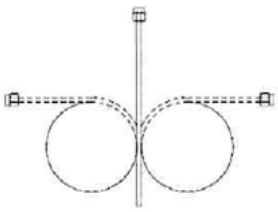
a. Perform dynamic testing on a given length of cable (see Figure 1)
b. Record phase in the network analyzer
c. Flex cable over various size mandrels depending on the cable diameter
d. Retest cable for phase change when the cable is coiled around the mandrel
e. Record change in the network analyzer
f. Display phase change on the analyzer as degrees of change over frequency.

Performance - less than:
+/- 2.0º up to 4 GHz
+/- 4º from 4.01 to 8 GHz
+/- 6º from 8.01 to 18 GHz

Phase Change (degrees)

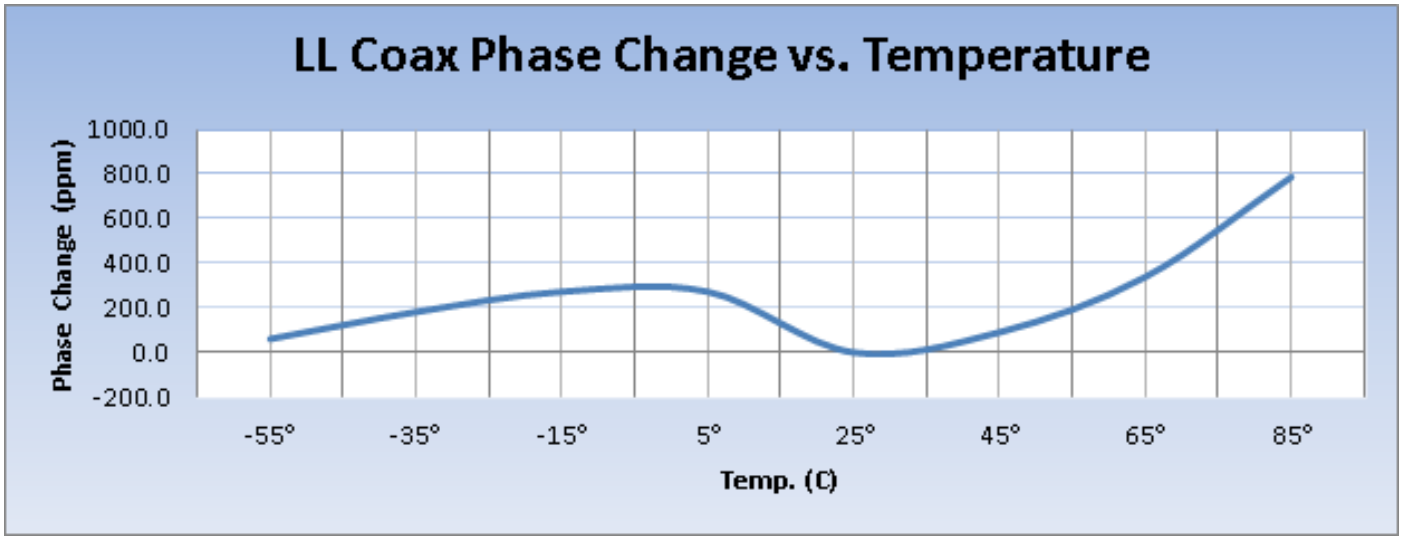


Dynamic Bend Test (Figure 1)



This data is representative of anticipated results. As phase stability over flexure is application dependent, please contact the factory regarding your specific cable and application.

Phase Stability over Temperature for LLEF Cables



WE created the above graph by measuring the time delay change of a 10ft length of LL Low Loss coax when subjected to the following conditions:

- Place the assembly in a cold box and oven chamber and connect to a Network Analyzer
- Soak the assembly for 2hrs at 20°C and record the initial measurement. This is the reference value Td (ref)
- Decrease the temperature to -55°C and soak for 1 hour before recording measurement. Td (@ temp)
- Raise the temperature at 20°C intervals; soak the assembly for 1 hour before recording data. Td (@ temp)
- Calculate ppm with 2 equations: 1st calculate the difference from the reference: ΔTd = Td(ref)-Td (at temp) 2nd calculate ppm using the formula: ppm = ΔTd(ref) x 106 / Td (ref)

Phase change occurs as a result of environmental changes: mechanical stresses, connector torque, and thermal conditions. Phase change is expressed in change of the electrical length (EL). Using the above information, phase change can be predicted by using the formula:

$$\Delta EL = EL \times (ppm/106)$$

Before calculating the excepted phase shift, a few additional questions need to be answered:

- What is the mechanical length of the assembly (ft.)?
- What is the frequency of interest (GHz)?
- What is the dielectric constant of the insulation (E)?
- What is the temperature of interest (°C)?
- What is the electrical length at the frequency of interest (EL)?

$$EL = 365.7 \times \sqrt{E} \times (ft.) \times (GHz)$$

For example, the phase change of a 10 ft. LL142 assembly at -35°C and at 18GHz is 15.32°
Step 1. Electrical length (EL) EL = 365.7 x √1.5 x 10 x 18 = 80,620°
Step 2. Using the chart above identify the ppm at -35°C ppm = 190
Step 3. Solve for the change in Phase (Δ EL) Δ EL = 80,620° x (190/106) = 15.32°

Construction at deg c temp and sea level power handling capability of coaxial cable.

How To Order

XXXX - A- YY-C1 -YY-C2-100-CM

XXXX – Cable type*

(Table 1)

Cable TYPE	Code XXXXX*
LLEF160	160
LLEF142	142
LLEF235	235
LLEF335i	335
LLEF162STR	162S
LLEF142STR	142S
LLEF142STR - SF	142SF
LLEF270STR	270S
LLEF450STR	450S
LLEF480	480S
SB142	SB142S

*cable code from 3 to 5 digit

A - Armor type

(Table 2)

Description	Code A
Flex spring	F
Nomex shield	N
Neoprene	Z
Stainless tube	S
No Armor	-

YY- Connector shape

(Table 3)

Description	Code YY
Straight Plug	SP
Right angle Plug	RP
Bulkhead Jack	BJ
Straight Jack	SJ

C - Connector family

(Table 4)

Family	Code C
SMA	S
TNC	T
N Type	N
BMA	B
SMP	P
K (2.9)	K
SC	SC
2.4	2.4
1.85	1.8

Local Stock
Local Production
Short Delivery Time

Example:
For LLEF142S -Armor type N (Nomex) –SMA straight plug -Right angle N plug - 100CM
Ordering code is: 142S-N-SPS-RPN-100CM

*note: additional specifications (such as phase, labels, etc. should be specified separately).
All cables are shipped with I/L and R/L test data.
Individually packed in a sealed nylon bag inside a cardboard box.
(The box can contain up to 5 identical cables).

HARBOUR INDUSTRIES provides technical support to OEMs and cable assembly houses around the world, and supplies cable to all these companies with authorized distributors supplementing their effort. Harbour Industries' record of quality, consistency of product, on-time delivery and technical response time has been responsible for continuous growth.

Visit Harbour's website at **www.harbourind.com** for additional information and the following catalogs:

- Coaxial Cable
- Aerospace Data Cables
- Mil- Spec and Commercial Wire & Cable
- Industrial Wire & Cable

CAPABILITIES:

Harbour's product capabilities include, but are not limited to, conductor sizes from 30 AWG through 4/0 AWG. Standard conductors available are silver plated copper, tin plated copper, nickel plated copper, proprietary alloys, and bare copper. Hybrid conductors are also available. Insulations available from Harbour include PTFE, FEP, ETFE, silicone rubber, fiberglass, mica, mineral filled PTFE, PFA, PEEK, PVDF and TPE.

Harbour Industries LLC and its associated facilities maintain the largest and most diverse manufacturing base in the world today.

Through continued investment, Harbour's process engineering capability has brought material science and operational excellence to a level unparalleled by any other wire and cable company. Whether it's extrusion of leading edge fluoropolymer compounds or processing of tape wrap, shielding and high performance testing, when performance counts Harbour is the only manufacturer that can do it all.

Harbour INDUSTRIES
High Performance Wire & Cable

CERTIFICATIONS:

Quality System: ISO9001-2008

Inspection: MIL-I-45208

Test Lab: MIL-STD-202

DSCC approved

FAA, FAR25 Flammability

UL and CSA listed (rated CMP/FT6)

RoHS complaint

REACH certified

ITAR complaint

Airbus smoke and toxicity ABS0031

Program Qualifications:

Aegis	Stryker	Patriot	F-15, 16,18,22,35
Predator	CREW	KC-135	Hellfire Missiles
AWACS	AH-64 Apache	Humvee	H-60 Black Hawk
Cruise Missiles	B-1, 2, 52	Bradley	Stealth Technologies
MRAP vehicles	C-130	BAMS UAV	Phased Antenna Systems

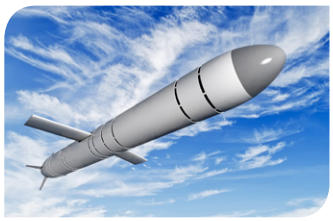
Neoflex™

PROGRAM QUALIFICATIONS

- Aegis
- AH-64 Apache
- BAMS UAV
- Predator
- B-1, 2, 52
- F-15, 16, 18, 22, 35
- AWACS
- C-130
- Hellfire Missiles
- Cruise Missiles
- Patriot
- H-60 Black Hawk
- MRAP Vehicles
- KC-135
- Stealth Technologies
- Stryker
- Humvee
- Phased Antenna Systems
- CREW
- Bradley
- F16 fighter jet
- EITAN UAV
- HERON UAV
- Arrow missile 2
- Arrow missile 3
- Barak 8 missile
- Kfir fighter jet
- F15 fighter jet

Naval applications

Ground based radar



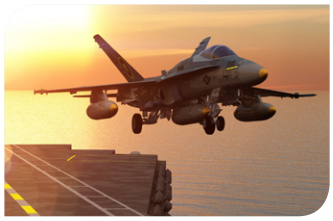
Missiles

Aircraft fuselage

Mobile sensors

Submarine

Helicopters



Fighter Aircraft

Mobile Radar

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