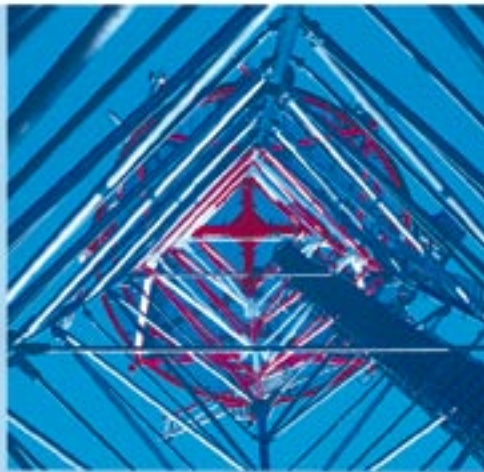


Rosenberger LEONI Site Solutions

FlexLine[®]

**Connection technology for
wireless communication systems**





Rosenberger®

Rosenberger

Rosenberger, founded in 1958, is a family owned company and ranks today among the top global manufacturers of high-frequency coaxial connectors. The products include RF-coaxial connectors in all common world-wide standards, automotive connectors, precision connectors for test & measurement applications and wireless terminal components, mainly for consumer electronics or mobile phone terminal applications. In addition, a comprehensive line of adapters, attenuators, calibration kits, as well as cable assemblies is also available.

Globally, Rosenberger operates 13 manufacturing and assembly locations plus sales offices throughout the world. Over 2000 employees develop, produce and sell Rosenberger products.

LEONI

LEONI Special Cables

LEONI Special Cables stands for decades of experience and innovation within the field of communications cables and cable systems. Friesoythe, initially a manufacturing facility for Siemens AG, grew into a competence center for coaxial cables and cable systems. With more than 500 employees, LEONI Special Cables is part of the LEONI Group, a leading global manufacturer of cables, wire and wiring systems. The LEONI Group employs approximately 30,000 people at more than 60 locations worldwide.



Contents

- 4 Fields of Application
- 8 Cable Types
- 29 Packaging
- 30 Connectors & Adaptors
- 34 Tools
- 36 Jumper Cables
- 42 Lightning & EMP Protection
- 44 Power Splitters
- 46 Grounding Kits
- 48 Installation Material
- 60 Insulation & Weatherproofing
- 62 Hoisting Grips
- 65 Quality & Environment
- 66 Technical Data

Rosenberger LEONI Site Solutions

Rosenberger and LEONI Special Cables have joined their extensive coaxial know-how and experience to form Rosenberger LEONI Site Solutions. At Rosenberger LEONI Site Solutions, we offer high frequency connections for mobile radio stations from a single source. Our fully developed FlexLine system solutions are based on high-quality cables, connectors and assembly accessories. Together, these components add up to a complete family of cable connectivity products from the antenna down to the base station. As a system supplier we design, develop and produce perfectly coordinated components of the highest quality.

Rosenberger LEONI Site Solutions supplies tailor-made FlexLine components to meet the requirements of modern mobile radio systems.

Our FlexLine family of cables, connectors and accessories guarantee excellent electrical characteristics (e.g. high return loss and low passive intermodulation) and has outstanding mechanical and climatic properties ideal for outdoor installations. Our comprehensive list of FlexLine accessories include lightning and EMP protection, jumper cables, power splitters, grounding kits, installation materials as well as special tools for very easy and fast installations.

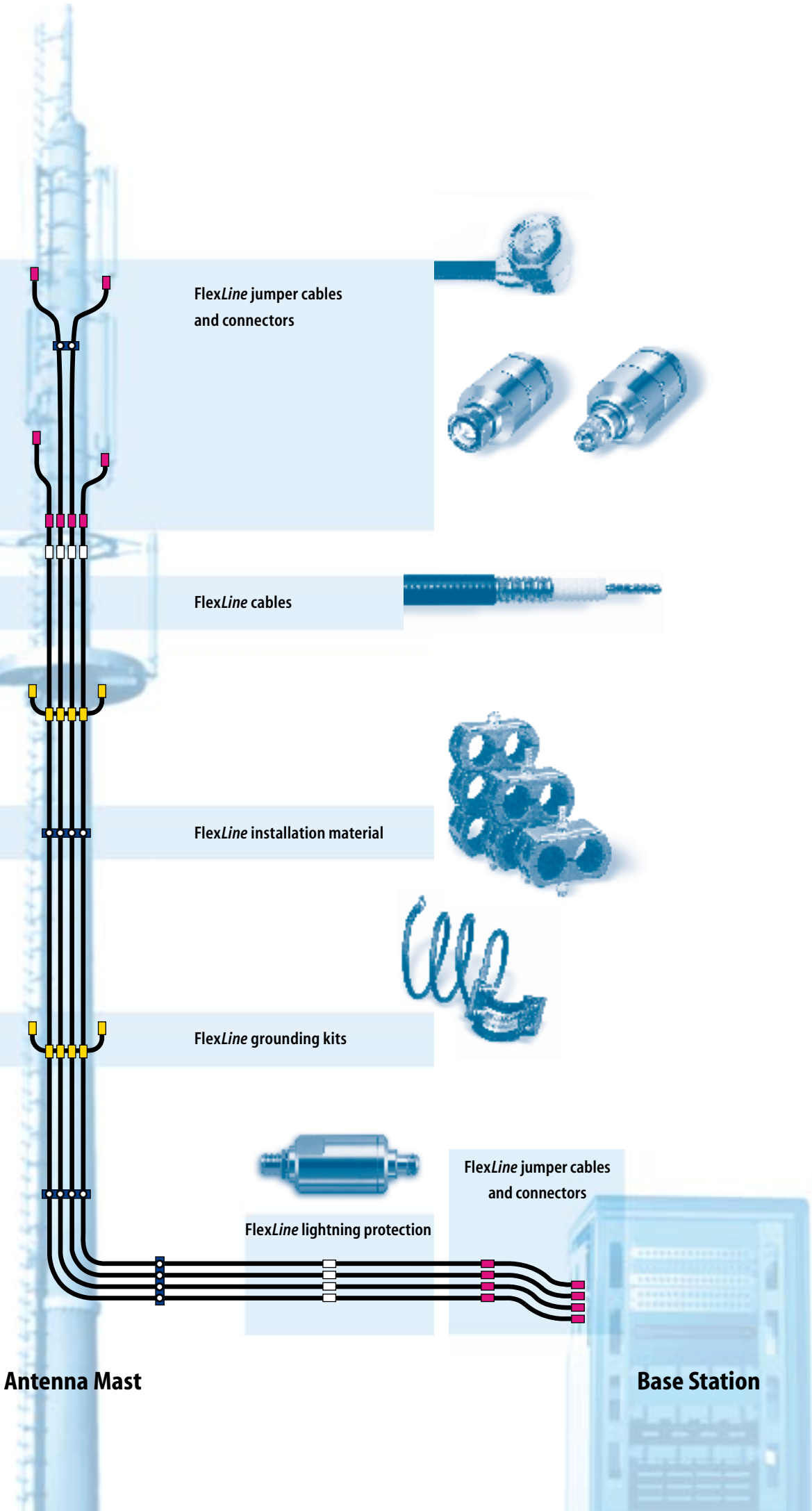


Fields of Application

The high pace of innovation in mobile communications requires products that meet the highest standards of performance and reliability. The new 3rd generation (3G) networks impose very high requirements on the passive RF transmission line system components.

FlexLine corrugated cables, connectors and accessories were specially developed to serve as the link between the base station and the antenna in current and new 3G mobile telephone networks. *FlexLine* cable systems have excellent electrical performance and are ideal for a wide range of RF applications. Some of these applications include jumper cables for the internal cabling of base stations, antenna systems for the WLL sectors and antenna systems for Land Mobile Radio (LMR).

Flexibility, low attenuation values and high shielding effectiveness make *FlexLine* cable systems a World Class product. Together with the right installation materials, *FlexLine* creates connections that are both future-proof and durable.





Characteristics

90 mm
105 mm

120 mm

190 mm

200 mm

Jacket options

All FlexLine cables are available with a standard black polyethylene outer jacket or, alternatively, with a flame-retardant outer jacket (FRNC). Both versions guarantee outstanding thermal and mechanical characteristics:

- Halogen-free
- Non corrosive gases
- Tested in compliance with IEC 60754-1 and IEC 60754-2
- UV resistant
- High resistance to mechanical damage
- Thermostable from – 55 °C to + 85 °C
- Resistant to weathering

Additional advantages offered by the flame-retardant outer jacket (FRNC):

- Flame and fire-retardant, tested in compliance with
 - IEC 60332-1
 - IEC 60332-3-24 (C)
 - UL 1581, Sec. 1080 VW-1
 - UL 1685, Vertical Tray (UL 1581, Sec. 1160); for highly flexible cables
- UL certification
 - Wires, Miscellaneous
 - Appliance Wiring Material
- Compliant with NEC, type CATV (for highly flexible cables)
- Low smoke density, tested in compliance with IEC 61034

Outer jackets of polyethylene and flame retardent FRNC materials are available in various standard colors.

Bending radii

Corrugations of the outer conductor enable the smallest bending radii. Electrical and mechanical values of FlexLine cables remain stable even after repeated bending. The minimum bending radii guarantee simple and reliable installation of the cables, resulting in dependable and enduring connections.

Attenuation

FlexLine cables feature excellent attenuation values. Maximum transmission distances can be realized due to the efficient signal propagation characteristics of FlexLine cables. The secret lies in the high foaming of the dielectric and the optimized dimensions of the cables. Which cable type is correct depends on the system requirements and the length of the connection.

Return loss

FlexLine cables feature excellent return loss values of 26 dB in the specified frequency ranges. The upper frequency range of 2700 MHz is in accordance with the new 3rd generation (3G) standards in mobile communications. This level of quality insures the system operator the necessary performance and reliability for all future applications.

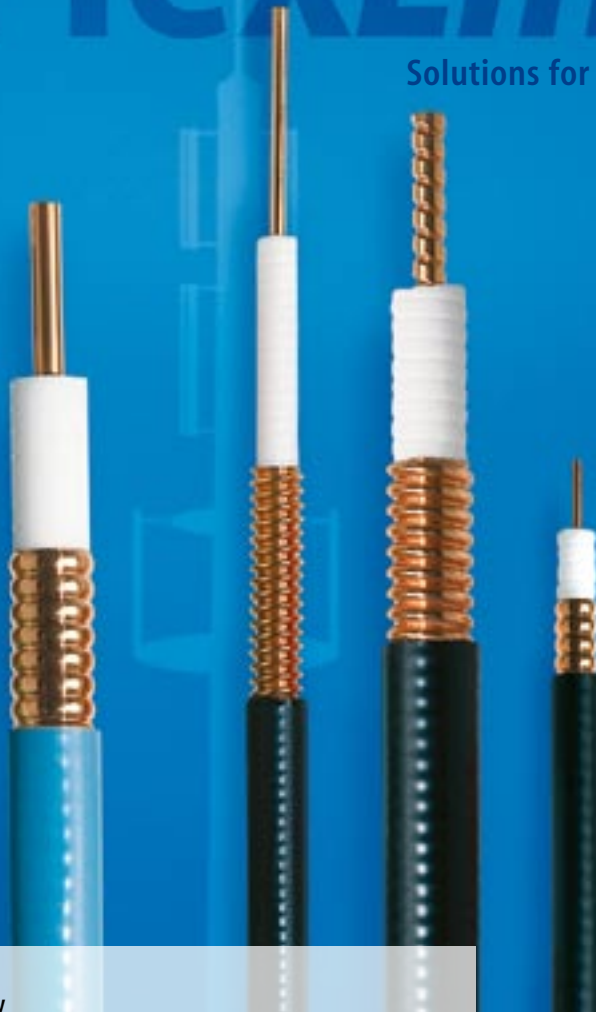
Frequency range	Return loss	Voltage standing wave ratio
400 – 500 MHz	26 dB	1.1
800 –1000 MHz	26 dB	1.1
1700 – 2700 MHz	26 dB	1.1

Passive intermodulation

FlexLine cable and connector combinations provide excellent passive 3rd order intermodulation performance. The 3rd order PIM values of assembled FlexLine cables and connectors are ≤ –117dBm (for 2 x 43 dBm carriers). The use of select materials and uniform processes in the production of FlexLine cables and connectors lays the foundation for installations that are free of interference caused by passive intermodulation.

FlexLine®

Solutions for mobile communication



Page

11	Overview	
12	FlexLine 1/6" S	Super flexible
13	FlexLine 1/6" S High power	Super flexible
14	FlexLine 1/5" S	Super flexible
15	FlexLine 1/4" S	Super flexible
16	FlexLine 1/4" S High power	Super flexible
17	FlexLine 1/4" R	Flexible
18	FlexLine 3/8" S	Super flexible
19	FlexLine 1/2" S	Super flexible
20	FlexLine 1/2" R	Flexible
21	FlexLine 7/8" S	Super flexible feeder cable
22	FlexLine 7/8" H	Super flexible feeder cable
23	FlexLine 7/8" R	Flexible
24	FlexLine 7/8" R	Low Loss
25	FlexLine 1 1/4" R	Flexible
26	FlexLine 1 1/4" R	Low Loss
27	FlexLine 1 5/8" R	Flexible
28	FlexLine 1 5/8" R	Low Loss

Cable Types

Flexible cable

FlexLine flexible cables are designed to provide low-loss connections between electronic transmission or reception units and antennas. The corrugated outer conductor construction guarantees optimal shielding, low attenuation and provides the flexibility for easy shipping, handling and installation.

With the high reliability and outstanding electrical values the FlexLine flexible cables guarantee trouble-free operation for the most demanding requirements. All FlexLine components are specifically designed to have outstanding mechanical and climatic properties that are ideal for outdoor installations.

The inner conductor consists of either copper-clad aluminium wire or a smooth or corrugated copper tube. The outer conductor of each cable is made of a welded copper tube with ring-shaped (annular) corrugations and marked accordingly with the letter "R". The dielectric consists of highly foamed polyethylene. FlexLine flexible cables are manufactured with outer jackets made of either polyethylene or flame-retardant, halogen-free materials.

Super flexible cable

FlexLine super flexible cables are designed for use in tight wiring spaces. Typical applications include connections inside mobile telephone base stations and jumpers for connecting transmission and reception antennas. Super flexible cables have superior electrical and mechanical performance and are ideal for applications requiring the smallest bending radii, high flexibility, low attenuation and high shielding. Super flexible cable assemblies offer excellent intermodulation performance and return loss specifications achieving the highest performance standards in the industry.

The inner conductor consists of copper-clad aluminium wire. The outer conductor of each cable is made of a welded copper tube with spiral corrugations and marked accordingly with the letter "S". The dielectric consists of highly foamed polyethylene. A special process used to extrude the dielectric makes it easy to strip the cables for an efficient assembly of the connectors. FlexLine super flexible cables are manufactured with outer jackets made of either polyethylene or flame-retardant, halogen-free materials.

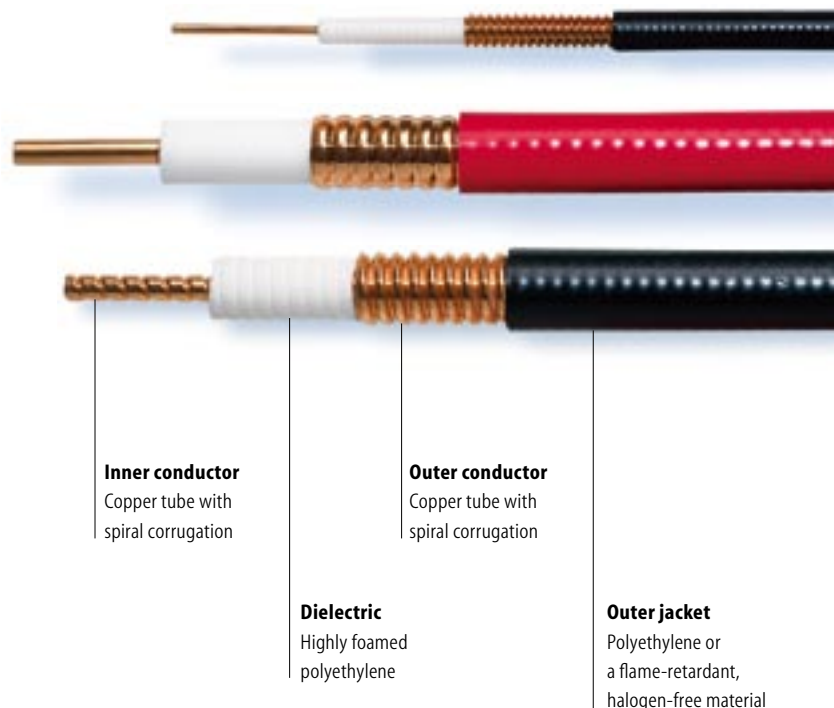
Super flexible feeder cable

FlexLine 7/8" S super flexible feeder cable offers a host of options for the construction of transmission and reception facilities. Dimensions and attenuation values similar to FlexLine 7/8" R, makes 7/8" S an ideal feeder cable for difficult installations. FlexLine 7/8" S is also a great choice for super flexible low loss jumper cables.

Installations are simplified and less expensive due to the cable's minimal bending radius, flexibility and low weight. In many cases it is possible to connect the base station directly to the antenna without the use of jumper cables.

The inner conductor and the outer conductor of the 7/8" S type are made of a copper tube with spiral corrugations. Highly foamed polyethylene forms the dielectric. The external halogen free outer jacket is available in polyethylene or a flame-retardant material. A special design between the outer conductor and the external jacket insures longitudinal waterproofness.

FlexLine 7/8" H is set to expand the range of coaxial cables for mobile communication. The inner conductor consists of a copper tube with spiral corrugation. The outer conductor is made of a welded copper tube with annular corrugation. The jacket is also available in polyethylene or flame-retardant material.



Cable Types

Low loss cable

FlexLine 7/8" R, 1 1/4" R and 1 5/8" R Low loss cables are especially designed to correspond to the requirements of the mobile, cellular and broadcast networks. They show excellent performance regarding connections between electronic transmission or reception units and antennas.

Offering attenuation values of e. g. up to 5.81 dB/100m (1.80 dB/100ft) at 2200 MHz with FlexLine 7/8" R Low loss, the transmission characteristics have been increased significantly while still assuring constant outer dimensions to suit to all installation material and connectors, which are offered within our FlexLine product range.

The inner conductors consist of a smooth copper tube for 7/8" R and 1 1/4" R Low loss and of a corrugated copper tube for 1 5/8" R Low loss. The outer conductor of each cable is made of a welded copper tube with ringshaped (annular) corrugations and marked accordingly with the letter "R" and "low loss". The dielectric consists of highly foamed polyethylene.

Comparison of different cable types with FlexLine 7/8"

	7/8" S	7/8" H	7/8" R	7/8" R Low Loss
Inner conductor	Spiral	Spiral	Smooth	Smooth
Outer conductor	Spiral	Ring (flex)	Ring	Ring
Attenuation for GSM 900 MHz (dB/100m (dB/100ft))	4.16 (1.27)	4.22 (1.29)	3.81 (1.16)	3.54 (1.10)
Attenuation for GSM 1800 MHz (dB/100m (dB/100ft))	6.13 (1.87)	6.23 (1.90)	5.63 (1.72)	5.19 (1.60)
Attenuation for GSM 2200 MHz (dB/100m (dB/100ft))	6.90 (2.10)	6.99 (2.13)	6.32 (1.93)	5.81 (1.80)
Flexibility	Super flexible	Highly flexible	Flexible	Flexible
Connector	Special	Standard	Standard	Standard
Accessories	Standard	Standard	Standard	Standard



Overview	Type	Inner conductor	Outer conductor	Jacket options	Order number
Superflexible cables	FlexLine 1/6" S	Bare copper wire	Helically corrugated copper tube	PE	L45466-B13-C116
	FlexLine 1/6" S High power	Silver plated copper wire	Helically corrugated copper tube	FEP	L45466-B13-G7
	FlexLine 1/5" S	Copper clad aluminium wire	Helically corrugated copper tube	FRNC	L45466- B14-C46
	FlexLine 1/4" S	Copper clad aluminium wire	Helically corrugated copper tube	PE	L45466-B15-C76
				FRNC	L45466-B15-C36
				FRNC - CMR	L45466-B15-C96
	FlexLine 1/4" S High power	Silver plated copper wire		FEP	L45466-B15-N7
	FlexLine 3/8" S	Copper clad aluminium wire	Helically corrugated copper tube	PE	V45466-B17-C146
				FRNC - UL listed	L45466-B17-C116
				FRNC - CMR/CATVR	V45466-B17-C156
	FlexLine 1/2" S	Copper clad aluminium wire	Helically corrugated copper tube	PE	V45466-B19-C56
				FRNC - UL listed	L45466-B20-C6
FRNC - CMR/CATVR				V45466-B19-C76	
Superflexible feeder cables	FlexLine 7/8" S	Helically corrugated copper tube	Helically corrugated copper tube	PE	L45466-B23-C46
				FRNC	L45466-B23-C56
				FRNC - CMR	L45466-B23-C136
	FlexLine 7/8" H	Helically corrugated copper tube	Annularly corrugated copper tube	PE	L45466-B23-C176
FRNC				L45466-B23-C186	
Flexible cables	FlexLine 1/4" R	Copper clad aluminium wire	Annularly corrugated copper tube	PE	L45466-B17-C216
				FRNC	L45466-B17-C226
				FRNC - CMR	L45466-B17-C206
	FlexLine 1/2" R	Copper clad aluminium wire	Annularly corrugated copper tube	PE	V45466-B21-C26
				FRNC	V45466-B21-C36
				FRNC - CMR/CATVR	V45466-B21-C66
	FlexLine 7/8" R	Copper tube	Annularly corrugated copper tube	PE	V45466-B23-C26
				FRNC	V45466-B23-C36
				FRNC - CMR/CATVR	V45466-B23-C126
	FlexLine 1 1/4" R	Copper tube	Annularly corrugated copper tube	PE	V45466-B24-C6
				FRNC	V45466-B24-C16
				FRNC - CMR	V45466-B24-C46
	FlexLine 1 5/8" R	Helically corrugated copper tube	Annularly corrugated copper tube	PE	V45466-B25-C16
				FRNC	V45466-B25-C26
				FRNC - CMR	V45466-B25-C66
Low Loss cables	FlexLine 7/8" R	Copper tube	Annularly corrugated copper tube	PE	V45466-B23-C226
				FRNC	V45466-B23-C236
	FlexLine 1 1/4" R	Copper tube	Annularly corrugated copper tube	PE	V45466-B24-C206
FRNC				V45466-B24-C216	
FlexLine 1 5/8" R	Helically corrugated copper tube	Annularly corrugated copper tube	PE	V45466-B25-C216	
			FRNC	V45466-B25-C226	

FRNC = Flame Retardant Non Corosive (halogene free)
S = Spiral (helical) corrugation of the outer conductor
R = Ring (annular) corrugation of the outer conductor

CATVR = Community Antenna Television System with Riser Flame Test, classified according to NEC
UL listed = Listed by UL (Underwriters Laboratories) for Wires, Miscellaneous



Standard polyethylene jacket

Type number
L45466-B13-C116

Mechanical characteristics

Inner conductor	bare copper wire	1.13 mm	0.044 in
Dielectric	foamed PE	2.95 mm	0.116 in
Diameter over outer conductor	corrugated copper tube	4.1 mm	0.161 in
Diameter over outer jacket	PE	4.9 mm	0.193 in
Cable weight		38 kg/km	26 lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		0.5 Nm	0.37 lbf*ft
Flat plate crush strength		3 N/mm	17.10 lbf/in
Min. bending radius, single		7 mm	0.28 in
Min. bending radius, repeated		13 mm	0.51 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		-40 °C to +60 °C	-40 °F to +140 °F
Permissible temperature range, operation		-50 °C to +70 °C	-67 °F to +158 °F

Electrical characteristics

Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	85 pF/m	25.9 pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	18 GHz	
Cut off frequency	40 GHz	
Peak power rating	2.5 kW	
Inner conductor DC-resistance	18 Ω/km	5.49 Ω/1000 ft
Outer conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Return loss 800 – 2200 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz					MHz	
			kW				kW
100	10.1	3.08	0.34	2000	51.2	15.6	0.06
108	10.5	3.21	0.32	2100	52.6	16.0	0.06
150	12.5	3.81	0.27	2200	54.1	16.5	0.06
174	13.5	4.11	0.25	2300	55.5	16.9	0.06
200	14.5	4.43	0.23	2500	58.2	17.7	0.06
300	18.0	5.49	0.18	2700	60.9	18.6	0.05
400	21.0	6.40	0.16	3000	64.8	19.7	0.05
450	22.4	6.82	0.15	3300	68.5	20.9	0.05
500	23.7	7.22	0.14	3400	69.7	21.3	0.05
512	24.0	7.31	0.14	4000	76.8	23.4	0.04
600	26.1	7.97	0.13	4900	86.8	26.5	0.04
700	28.4	8.66	0.12	5000	87.9	26.8	0.04
800	30.6	9.32	0.11	6000	98.3	30.0	0.04
824	31.1	9.48	0.11	6100	99.3	30.3	0.04
894	32.5	9.91	0.10	8000	118	35.8	0.03
900	32.6	9.95	0.10	8800	125	38.1	0.03
925	33.1	10.1	0.10	10000	135	41.3	0.03
960	33.8	10.3	0.10	10200	137	41.8	0.03
1000	34.6	10.5	0.09	12000	152	46.4	0.02
1250	39.2	11.9	0.08	13400	164	49.9	0.02
1500	43.4	13.2	0.08	14000	169	51.4	0.02
1700	46.6	14.2	0.07	16000	184	56.1	0.02
1800	48.2	14.7	0.07	18000	199	60.7	0.02
1900	49.7	15.1	0.07				

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Super flexible

FlexLine 1/6" S High Power



High Power, FEP jacket

Type number
L45466-B13-G7

Mechanical characteristics

Inner conductor	silver plated copper wire	1.00 mm	0.039 in
Dielectric	Perfluorethylenpropylen (FEP)	2.90 mm	0.114 in
Diameter over outer conductor	corrugated copper tube	4.1 mm	0.161 in
Diameter over outer jacket	FEP	4.9 mm	0.193 in
Cable weight		53 kg/km	35 lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		0.5 Nm	0.37 lbf*ft
Flat plate crush strength		3 N/mm	17.10 lbf/in
Min. bending radius, single		7 mm	0.28 in
Min. bending radius, repeated		13 mm	0.51 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		-40 °C to +60 °C	-40 °F to +140 °F
Permissible temperature range, operation		-50 °C to +205 °C	-58 °F to +401 °F

Electrical characteristics

Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	95 pF/m	28.69 pF/ft
Inductance	0.38 μH/m	0.12 μH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	40 GHz	
Peak power rating	2.8 kW	
Inner conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Outer conductor DC-resistance	23 Ω/km	7.01 Ω/1000 ft
Return loss 800 – 2200 MHz	20 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	kW			MHz	kW	
100	10.8	2.06		1500	56.6	0.38	
108	11.3	1.96		1700	61.5	0.35	
150	13.7	1.60		1800	63.9	0.34	
174	14.9	1.45		1900	66.3	0.33	
200	16.2	1.33		2000	68.6	0.32	
300	20.6	1.03		2100	70.9	0.31	
400	24.6	0.86		2200	73.2	0.30	
450	26.4	0.80		2300	75.4	0.29	
500	28.2	0.75		2500	79.8	0.27	
512	28.6	0.74		2700	84.2	0.26	
600	31.5	0.67		3000	90.5	0.24	
700	34.7	0.61		3300	96.8	0.23	
800	37.7	0.56		3400	98.8	0.23	
824	38.5	0.55		4000	111	0.20	
894	40.5	0.52		4900	128	0.18	
900	40.7	0.52		5000	130	0.18	
925	41.4	0.51		6000	149	0.16	
960	42.4	0.50		6100	150	0.16	
1000	43.5	0.49		8000	184	0.13	
1250	50.2	0.42					



Flame retardant, non corrosive jacket (FRNC)

Type number
L45466-B14-C46

Mechanical characteristics

Inner conductor	copper clad aluminium wire	1.57 mm	0.062 in
Dielectric	foamed PE	3.9 mm	0.154 in
Diameter over outer conductor	corrugated copper tube	5.7 mm	0.224 in
Diameter over outer jacket	FRNC	6.9 mm	0.272 in
Cable weight	FRNC	54.6 kg/km	36.6 lb/1000 ft
Tensile strength		250 N	56.2 lbf
Bending moment		1 Nm	0.73 lbf*ft
Flat plate crush strength		6 N/mm	34.3 lbf/in
Min. bending radius, single		8 mm	0.31 in
Min. bending radius, repeated		15 mm	0.412 in
Number of bends, minimum (typical)		15 (50)	
Permissible temperature range, installation		-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-25 °C to +85 °C	-13 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	25 GHz	
Peak power rating	4.2 kW	
Inner conductor DC-resistance	14 Ω/km	4.27 Ω/1000 ft
Outer conductor DC-resistance	10 Ω/km	3.05 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m			dB/100ft	MHz	
100	7.35	2.24	0.70	1500	30.8	9.38	0.17
108	7.65	2.33	0.67	1700	33.0	10.0	0.16
150	9.06	2.76	0.57	1800	34.0	10.4	0.16
174	9.79	2.98	0.53	1900	35.1	10.7	0.15
200	10.5	3.21	0.49	2000	36.1	11.0	0.15
300	13.0	3.96	0.40	2100	37.1	11.3	0.14
400	15.1	4.61	0.34	2200	38.0	11.6	0.14
450	16.1	4.90	0.32	2300	39.0	11.9	0.14
500	17.0	5.19	0.30	2500	40.9	12.5	0.13
512	17.2	5.25	0.30	2700	42.7	13.0	0.13
600	18.7	5.71	0.28	3000	45.3	13.8	0.12
700	20.4	6.20	0.26	3300	47.8	14.6	0.11
800	21.9	6.66	0.24	3400	48.7	14.8	0.11
824	22.2	6.77	0.24	4000	53.4	16.3	0.10
894	23.2	7.07	0.23	4900	60.1	18.3	0.09
900	23.3	7.10	0.22	5000	60.8	18.5	0.09
925	23.6	7.21	0.22	6000	67.7	20.6	0.08
960	24.1	7.35	0.22	6100	68.3	20.8	0.08
1000	24.7	7.52	0.21	8000	80.3	24.5	0.07
1250	27.8	8.49	0.19				

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Super flexible

FlexLine 1/4" S



Standard polyethylene jacket	Type number
Flame retardant, non corrosive jacket (FRNC)	L45466-B15-C76
Flame retardant, non corrosive jacket (FRNC), UL CMR	L45466-B15-C36
	L45466-B15-C96

Mechanical characteristics

Inner conductor	copper clad aluminium wire	1.88 mm	0.074 in
Dielectric	foamed PE	4.40 mm	0.173 in
Diameter over outer conductor	corrugated copper tube	6.50 mm	0.256 in
Diameter over outer jacket	PE	7.70 mm	0.303 in
	FRNC	7.70 mm	0.303 in
	FRNC, CMR	7.70 mm	0.303 in
Cable weight	PE (FRNC)	81(83) kg/km	54.3(56) lb/1000 ft
Tensile strength		350 N	78.6 lbf
Bending moment		1.5 Nm	1.1 lb*ft
Flat plate crush strength		8 N/mm	45.7 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	5.58	1.70	1.13	2100	28.72	8.76	0.23
108	5.80	1.77	1.09	2200	29.49	9.0	0.23
150	6.88	2.10	0.92	2300	30.25	9.23	0.22
174	7.44	2.27	0.86	2500	31.73	9.68	0.21
200	8.01	2.44	0.80	2700	33.2	10.1	0.20
300	9.92	3.03	0.65	3000	35.2	10.7	0.19
400	11.56	3.53	0.56	3300	37.24	11.36	0.18
450	12.3	3.76	0.52	3400	37.89	11.56	0.18
500	13.03	3.97	0.50	4000	41.67	12.71	0.16
512	13.2	4.03	0.49	4900	46.98	14.33	0.15
600	14.38	4.38	0.45	5000	47.55	14.5	0.14
700	15.63	4.77	0.42	6000	53.05	16.18	0.13
800	16.8	5.13	0.39	6100	53.58	16.34	0.13
824	17.08	5.21	0.38	8000	63.21	19.28	0.11
894	17.86	5.45	0.37	8800	67.04	20.45	0.10
900	17.9	5.47	0.37	10000	72.59	22.14	0.10
925	18.19	5.55	0.36	10200	73.5	22.42	0.10
960	18.57	5.66	0.35	12000	81.42	24.83	0.09
1000	19.0	5.79	0.35	13400	87.35	26.64	0.08
1250	21.48	6.55	0.31	14000	89.84	27.4	0.08
1500	23.77	7.25	0.28	16000	97.92	29.87	0.07
1700	25.49	7.78	0.26	18000	105.73	32.25	0.07
1800	26.3	8.03	0.25	19000	109.55	33.41	0.07
1900	27.2	8.28	0.25	20400	114.81	35.02	0.06
2000	27.94	8.52	0.24				

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	20.4 GHz	
Cut off frequency	25 GHz	
Peak power rating	8.2 kW	
Inner conductor DC-resistance	10.5 Ω/km	3.5 Ω/1000 ft
Outer conductor DC-resistance	6.6 Ω/km	2.01 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



High Power, FEP jacket

Type number
L45466-B15-N7

Mechanical characteristics

Inner conductor	silver plated copper wire	1.8 mm	0.071 in
Dielectric	foamed Fluorethylen	4.4 mm	0.173 in
Diameter over outer conductor	corrugated copper tube	6.4 mm	0.252 in
Diameter over outer jacket	Perfluoethylen-propylen (FEP)	7.4 mm	0.291 in
Cable weight		102 kg/km	68.4 lb/1000 ft
Tensile strength		100 N	22.5 lbf
Bending moment		1.5 Nm	1.10 lbf*ft
Flat plate crush strength		8 N/mm	45.60 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Permissible temperature range, installation		-40 °C to +60 °C	-40 °F to +140 °F
Permissible temperature range, operation		-200 °C to +205 °C	-328 °F to +401 °F

Electrical characteristics

Impedance	50 ± 2 Ω	
Relative velocity of propagation	82 %	
Capacitance	78 pF/m	23.8 pF/ft
Inductance	0.3 μH/m	0.09 μH/ft
Maximum operating frequency	8 GHz	
Cut off frequency	25.4 GHz	
Peak power rating	6.4 kW	
Inner conductor DC-resistance	6.9 Ω/km	2.10 Ω/1000 ft
Outer conductor DC-resistance	5.0 Ω/km	1.52 Ω/1000 ft
Return loss 800 – 2200 MHz	20 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	6.30	1.92	2.71	1500	31.4	9.58	0.83
108	6.58	2.01	2.62	1700	34.0	10.4	0.78
150	7.94	2.42	2.27	1800	35.3	10.8	0.76
174	8.65	2.64	2.13	1900	36.6	11.1	0.75
200	9.37	2.86	2.00	2000	37.8	11.5	0.73
300	11.9	3.61	1.67	2100	39.0	11.9	0.71
400	14.0	4.28	1.48	2200	40.2	12.3	0.70
450	15.1	4.59	1.40	2300	41.4	12.6	0.69
500	16.0	4.88	1.34	2500	43.7	13.3	0.66
512	16.3	4.95	1.32	2700	46.0	14.0	0.64
600	17.9	5.45	1.24	3000	49.3	15.0	0.61
700	19.6	5.98	1.15	3300	52.6	16.0	0.59
800	21.3	6.48	1.09	3400	53.6	16.3	0.58
824	21.7	6.60	1.08	4000	59.9	18.2	0.54
894	22.8	6.94	1.04	4900	68.8	21.0	0.49
900	22.9	6.97	1.03	5000	69.8	21.3	0.49
925	23.2	7.08	1.02	6000	79.3	24.2	0.45
960	23.8	7.25	1.01	6100	80.2	24.5	0.45
1000	24.4	7.43	0.99	8000	97.4	29.7	0.40
1250	28.0	8.54	0.90				

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket

Flame retardant, non corrosive jacket (FRNC), CATV (NEC)

Flame retardant, non corrosive jacket (FRNC), UL CMR

Type number

L45466-B17-C216

L45466-B17-C226

L45466-B17-C206

Mechanical characteristics

Inner conductor	copper wire	2.38 mm	0.094 in
Dielectric	foamed PE	6.4 mm	0.252 in
Diameter over outer conductor	corrugated copper tube	7.5 mm	0.295 in
Diameter over outer jacket	PE	8.8 mm	0.346 in
	FRNC	8.7 mm	0.343 in
	FRNC, CMR	8.7 mm	0.343 in
Cable weight	PE (FRNC)	102(110) kg/km	69(74.4) lb/1000 ft
Tensile strength		600 N	135 lbf
Bending moment		2 Nm	1.47 lbf*ft
Flat plate crush strength		10 N/mm	57 lbf/in
Min. bending radius, single		40 mm	1.57 in
Min. bending radius, repeated		120 mm	4.72 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	15.8 GHz	
Cut off frequency	19 GHz	
Peak power rating	13 kW	
Inner conductor DC-resistance	5.95 Ω/km	1.82 Ω/1000 ft
Outer conductor DC-resistance	3.5 Ω/km	1.07 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m			dB/100ft	kW	
100	4.2	1.30	1.79	2000	20.42	6.23	0.37
108	4.33	1.32	1.72	2100	22.98	6.40	0.36
150	5.13	1.56	1.45	2200	21.4	6.49	0.35
174	5.54	1.69	1.34	2300	22.07	6.73	0.34
200	5.95	1.82	1.25	2500	23.0	7.00	0.33
300	7.36	2.24	1.01	2700	24.0	7.3	0.31
400	8.56	2.61	0.87	3000	26	7.75	0.30
450	9.2	2.8	0.82	3300	27.07	8.26	0.29
500	9.63	2.94	0.77	3400	27.35	8.4	0.28
512	9.75	2.79	0.77	4000	32.23	9.22	0.25
600	11.61	3.24	0.71	4900	34	10.37	0.22
700	11.52	3.51	0.65	5000	34.4	10.49	0.22
800	12.4	3.78	0.61	6000	38.29	11.68	0.20
824	12.57	3.83	0.60	6100	38.69	11.79	0.20
894	13.14	4.01	0.57	8000	45.45	13.86	0.17
900	13.2	4.02	0.57	8800	48.14	14.68	0.16
925	13.38	4.08	0.56	10000	52.03	15.87	0.15
960	13.65	4.16	0.55	10200	52.67	16.06	0.15
1000	13.96	4.26	0.54	12000	58.21	17.75	0.13
1250	15.76	4.81	0.48	13400	62.34	19.01	0.12
1500	17.41	5.31	0.43	14000	64.07	19.54	0.12
1700	18.66	5.69	0.40	16000	69.69	21.25	0.11
1800	19.2	5.85	0.39	18000	75.1	22.91	0.10
1900	19.8	6.05	0.38	19000	77.74	23.71	0.10

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket	Type number
Flame retardant, non corrosive jacket (FRNC), UL listed	V45466-B17-C146
Flame retardant, non corrosive jacket (FRNC), UL CATVR + CMR	L45466-B17-C116
	V45466-B17-C156

Mechanical characteristics			
Inner conductor	copper clad aluminium wire	2.6 mm	0.102 in
Dielectric	foamed PE	6.5 mm	0.256 in
Diameter over outer conductor	corrugated copper tube	9.1 mm	0.358 in
Diameter over outer jacket	PE	10.3 mm	0.406 in
	FRNC	10.3 mm	0.406 in
	FRNC, CMR	10.6 mm	0.417 in
Cable weight	PE (FRNC)	125(130) kg/km	84.5(87.9) lb/1000 ft
Tensile strength		600 N	134.9 lbf
Bending moment		2.5 Nm	1.84 lbf*ft
Flat plate crush strength		15 N/mm	85.6 lbf/in
Min. bending radius, single		12.5 mm	0.492 in
Min. bending radius, repeated		25 mm	0.984 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.6 m	1.97 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics	
Impedance	50 ± 1 Ω
Relative velocity of propagation	82 %
Capacitance	80 pF/m 24.4 pF/ft
Inductance	0.195 μH/m 0.06 μH/ft
Maximum operating frequency	13.4 GHz
Cut off frequency	17.0 GHz
Peak power rating	13.5 kW
Inner conductor DC-resistance	5.4 Ω/km 1.65 Ω/1000 ft
Outer conductor DC-resistance	5.6 Ω/km 1.71 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB
Return loss 800 – 1000 MHz	26 dB
Return loss 1700 – 2700 MHz	26 dB

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	3.91	1.19	1.86	1800	18.6	5.67	0.41
108	4.06	1.24	1.79	1900	19.2	5.85	0.39
150	4.82	1.47	1.51	2000	19.8	6.03	0.38
174	5.20	1.59	1.40	2100	20.3	6.20	0.37
200	5.59	1.71	1.30	2200	20.9	6.37	0.36
300	6.93	2.11	1.05	2300	21.5	6.54	0.35
400	8.08	2.46	0.91	2500	22.5	6.87	0.34
450	8.61	2.62	0.85	2700	23.6	7.19	0.32
500	9.11	2.78	0.81	3000	25.1	7.65	0.31
512	9.23	2.81	0.80	3300	26.6	8.10	0.29
600	10.1	3.07	0.73	3400	27.0	8.25	0.28
700	10.9	3.34	0.68	4000	29.8	9.10	0.26
800	11.8	3.59	0.63	4900	33.8	10.3	0.23
824	12.0	3.65	0.62	5000	34.2	10.4	0.23
894	12.5	3.82	0.59	6000	38.3	11.7	0.21
900	12.6	3.83	0.59	6100	38.7	11.8	0.20
925	12.8	3.89	0.58	8000	45.9	14.0	0.17
960	13.0	3.97	0.57	8800	48.8	14.9	0.16
1000	13.3	4.06	0.56	10000	53.1	16.2	0.15
1250	15.1	4.61	0.49	10200	53.8	16.4	0.15
1500	16.8	5.11	0.45	12000	59.8	18.2	0.14
1700	18.0	5.49	0.42	13400	64.4	19.6	0.13

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Super flexible

FlexLine 1/2" S



Standard polyethylene jacket	Type number V45466-B19-C56
Flame retardant, non corrosive jacket (FRNC), UL listed	L45466-B20-C6
Flame retardant, non corrosive jacket (FRNC), UL CATVR+CMR	V45466-B19-C76

Mechanical characteristics

Inner conductor	copper clad aluminium wire	3.6 mm	0.142 in
Dielectric	foamed PE	9.1 mm	0.358 in
Diameter over outer conductor	corrugated copper tube	12.3 mm	0.484 in
Diameter over outer jacket	PE	13.5 mm	0.531 in
	FRNC	13.5 mm	0.531 in
	FRNC, CMR	13.9 mm	0.547 in
Cable weight	PE (FRNC)	203(226) kg/km	136.1(149.5) lb/1000 ft
Tensile strength		1000 N	225 lbf
Bending moment		3 Nm	2.21 lbf*ft
Flat plate crush strength		15 N/mm	85.6 lbf/in
Min. bending radius, single		15 mm	0.59 in
Min. bending radius, repeated		30 mm	1.18 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		0.8 m	2.6 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	82 %	
Capacitance	80 pF/m	24.4 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	10.2 GHz	
Cut off frequency	13.0 GHz	
Peak power rating	19 kW	
Inner conductor DC-resistance	3.0 Ω/km	0.92 Ω/1000 ft
Outer conductor DC-resistance	3.7 Ω/km	1.13 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	3.0	0.94	2.60	1700	14.1	4.3	0.57
108	3.21	0.98	2.50	1800	14.6	4.44	0.55
150	3.81	1.16	2.11	1900	15.0	4.58	0.54
174	4.11	1.25	1.95	2000	15.46	4.72	0.52
200	4.42	1.35	1.81	2100	15.9	4.85	0.51
300	5.48	1.67	1.46	2200	16.3	4.98	0.49
400	6.38	1.95	1.26	2300	16.75	5.11	0.48
450	6.8	2.07	1.18	2500	17.6	5.36	0.46
500	7.19	2.19	1.11	2700	18.38	5.6	0.44
512	7.28	2.22	1.10	3000	19.5	5.96	0.41
600	7.93	2.42	1.01	3300	20.66	6.3	0.39
700	9.63	2.63	0.93	3400	21.02	6.41	0.39
800	9.3	2.83	0.87	4000	23.14	7.06	0.35
824	9.43	2.88	0.85	4900	26.12	7.97	0.31
894	9.86	3.01	0.82	5000	26.44	8.07	0.31
900	9.9	3.02	0.81	6000	29.53	9.01	0.27
925	10.05	3.06	0.80	6100	29.86	9.1	0.27
960	10.25	3.13	0.79	8000	35.27	10.76	0.23
1000	10.5	3.2	0.77	8800	37.43	11.42	0.22
1250	11.87	3.62	0.68	10000	40.57	12.37	0.20
1500	13.14	4.01	0.61	10200	41.09	12.03	0.20

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket	Type number
Flame retardant, non corrosive jacket (FRNC)	V45466-B21-C26
Flame retardant, non corrosive jacket (FRNC), UL CATVR + CMR	V45466-B21-C36
	V45466-B21-C66

Attenuation values and power ratings

Mechanical characteristics

Inner conductor	copper clad aluminium wire	4.8 mm	0.189 in
Dielectric	foamed PE	12.1mm	0.476 in
Diameter over outer conductor	corrugated copper tube	13.7 mm	0.539 in
Diameter over outer jacket	PE	16.0 mm	0.630 in
	FRNC	16.0 mm	0.630 in
	FRNC, CMR	15.3 mm	0.602 in
Cable weight	PE (FRNC)	235(274) kg/km	157.5(183.6) lb/1000ft
Tensile strength		1200 N	269 lbf
Bending moment		5 Nm	3.68 lbf*ft
Flat Plate Crush Strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		70 mm	2.75 in
Min. bending radius, repeated		120 mm	4.72 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		0.8 m	2.62 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	8.8 GHz	
Cut off frequency	10.0 GHz	
Peak power rating	58 kW	
Inner conductor DC-resistance	1.6 Ω/km	0.49 Ω/1000 ft
Outer conductor DC-resistance	1.9 Ω/km	0.58 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	2.12	0.645	3.92	1500	8.99	2.74	0.90
108	2.20	0.672	3.77	1700	9.64	2.94	0.83
150	2.61	0.796	3.17	1800	9.96	3.04	0.81
174	2.82	0.860	2.93	1900	10.3	3.13	0.78
200	3.04	0.925	2.72	2000	10.6	3.22	0.76
300	3.76	1.15	2.19	2100	10.9	3.31	0.74
400	4.38	1.33	1.87	2200	11.2	3.40	0.72
450	4.66	1.42	1.76	2300	11.4	3.49	0.70
500	4.93	1.50	1.66	2500	12.0	3.66	0.66
512	4.99	1.52	1.64	2700	12.5	3.82	0.63
600	5.44	1.66	1.50	3000	13.3	4.06	0.59
700	5.91	1.80	1.38	3300	14.1	4.30	0.56
800	6.35	1.94	1.28	3400	14.3	4.37	0.55
824	6.46	1.97	1.25	4000	15.8	4.81	0.50
894	6.75	2.06	1.20	4900	17.8	5.42	0.44
900	6.78	2.07	1.19	5000	18.0	5.49	0.43
925	6.88	2.10	1.18	6000	20.1	6.13	0.39
960	7.02	2.14	1.15	6100	20.3	6.19	0.38
1000	7.18	2.19	1.12	8000	24.0	7.31	0.32
1250	8.12	2.48	0.99	8800	25.4	7.75	0.30

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature

Super flexible

FlexLine 7/8" S



Standard polyethylene jacket	Type number L45466-B23-C46
Flame retardant, non corrosive jacket (FRNC)	L45466-B23-C56
Flame retardant, non corrosive jacket (FRNC), UL CMR	L45466-B23-C136

Mechanical characteristics

Inner conductor	corrugated copper tube	9.3 mm	0.366 in
Dielectric	foamed PE	22.5 mm	0.886 in
Diameter over outer conductor	corrugated copper tube	25.6 mm	1.008 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
	FRNC, CMR	27.9 mm	1.098 in
Cable weight	PE (FRNC)	444(490) kg/km	297.6(328.4)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		9 Nm	6.63 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		70 mm	2.756 in
Min. bending radius, repeated		105 mm	4.134 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	78 pF/m	23.8 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.3 GHz	
Peak power rating	99.5 kW	
Inner conductor DC-resistance	3.0 Ω/km	0.91 Ω/1000 ft
Outer conductor DC-resistance	1.2 Ω/km	0.37 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	1.300	0.396	6.620	1000	4.430	1.350	1.940
108	1.360	0.415	6.360	1250	4.980	1.518	1.710
150	1.610	0.491	5.360	1500	5.540	1.689	1.540
174	1.740	0.530	4.960	1700	5.940	1.811	1.571
200	1.870	0.570	4.610	1800	6.130	1.868	1.390
300	2.340	0.713	3.720	1900	6.330	1.929	1.350
400	2.690	0.820	3.190	2000	6.530	1.990	1.310
450	2.850	0.869	2.990	2100	6.720	2.048	1.270
500	3.020	0.920	2.830	2200	6.900	2.103	1.240
512	3.080	0.939	2.790	2300	7.080	2.158	1.210
600	3.340	1.018	2.560	2500	7.510	2.289	1.160
700	3.640	1.109	2.360	2700	7.860	2.396	1.110
800	3.900	1.189	2.190	3000	8.260	2.518	1.040
824	3.970	1.210	2.160	3300	8.830	2.691	0.990
894	4.160	1.268	2.060	3400	8.990	2.740	0.960
900	4.164	1.268	2.060	4000	9.810	2.990	0.869
925	4.230	1.289	2.030	4900	11.200	3.414	0.770
960	4.330	1.320	1.980				

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket
Flame retardant, non corrosive jacket (FRNC)

Type number
L45466-B23-C176
L45466-B23-C186

Attenuation values and power ratings

Mechanical characteristics

Inner conductor	copper tube	9.3 mm	0.366 in
Dielectric	foamed PE	21.1 mm	0.831 in
Diameter over outer conductor	corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
Cable weight	PE (FRNC)	432 (495) kg/km	290(331.8) lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		14 Nm	10.3 lbf*ft
Flat plate crush strength		14 N/mm	79.6 lbf/in
Min. bending radius, single		90 mm	3.543 in
Min. bending radius, repeated		125 mm	4.921 in
Number of bends, minimum (typical)		20 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m	dB/100ft		kW	MHz	dB/100m
100	1.309	0.399	6.620	1000	4.477	1.365	1.940
108	1.362	0.415	6.360	1250	5.070	1.546	1.710
150	1.617	0.493	5.360	1500	5.618	1.713	1.540
174	1.748	0.533	4.960	1700	6.032	1.839	1.571
200	1.880	0.573	4.610	1800	6.232	1.900	1.390
300	2.330	0.710	3.720	1900	6.427	1.960	1.350
400	2.717	0.828	3.190	2000	6.619	2.018	1.310
450	2.894	0.882	2.990	2100	6.808	2.076	1.270
500	3.064	0.934	2.830	2200	6.993	2.132	1.240
512	3.103	0.946	2.790	2300	7.175	2.187	1.210
600	3.382	1.031	2.560	2500	7.530	2.296	1.160
700	3.678	1.121	2.360	2700	7.876	2.401	1.110
800	3.958	1.207	2.190	3000	8.378	2.554	1.040
824	4.023	1.226	2.160	3300	8.862	2.702	0.990
894	4.207	1.283	2.060	3400	9.020	2.750	0.960
900	4.223	1.288	2.060	4000	9.937	3.030	0.869
925	4.288	1.307	2.030	4900	11.231	3.424	0.770
960	4.377	1.334	1.980				

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	78 pF/m	23.8 pF/ft
Inductance	0.195 μH/m	0.06 μH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.3 GHz	
Peak power rating	90 kW	
Inner conductor DC-resistance	3.0 Ω/km	0.91 Ω/1000 ft
Outer conductor DC-resistance	1.2 Ω/km	0.37 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

*Attenuation values typical at 20 °C ambient temperature;
 Mean power rating at 40 °C ambient temperature*



	Type number
Standard polyethylene jacket	V45466-B23-C26
Flame retardant, non corrosive jacket (FRNC)	V45466-B23-C36
Flame retardant, non corrosive jacket (FRNC), UL CATVR + CMR	V45466-B23-C126

Mechanical characteristics

Inner conductor	copper tube	9.13 mm	0.359 in
Dielectric	foamed PE	22.5 mm	0.886 in
Diameter over outer conductor	corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
	FRNC, CMR	27.3 mm	1.075 in
Cable weight	PE (FRNC)	496 (554) kg/km	332.4(371.3)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		18 Nm	13.27 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		120 mm	4.724 in
Min. bending radius, repeated		240 mm	9.449 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.3 GHz	
Peak power rating	91 kW	
Inner conductor DC-resistance	1.65 Ω/km	0.5 Ω/1000 ft
Outer conductor DC-resistance	1.3 Ω/km	0.4 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	kW			MHz	kW	
100	1.17	9.17	1000	4.04	2.46		
108	1.21	8.80	1250	4.58	2.14		
150	1.45	7.35	1500	5.08	1.91		
174	1.57	6.78	1700	5.45	1.77		
200	1.69	6.27	1800	5.63	1.70		
300	2.10	4.99	1900	5.81	1.64		
400	2.45	4.24	2000	5.98	1.59		
450	2.61	3.96	2100	6.15	1.54		
500	2.76	3.72	2200	6.32	1.50		
512	2.80	3.67	2300	6.48	1.45		
600	3.05	3.34	2500	6.80	1.38		
700	3.32	3.05	2700	7.11	1.31		
800	3.57	2.82	3000	7.57	1.22		
824	3.63	2.77	3300	8.00	1.14		
894	3.80	2.63	3400	8.15	1.12		
900	3.81	2.62	4000	8.97	1.00		
925	3.87	2.58	4900	10.1	0.88		
960	3.95	2.52	5000	10.3	0.86		

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket
Flame retardant, non corrosive jacket (FRNC)

Type number
V45466-B23-C226
V45466-B23-C236

Attenuation values and power ratings

Mechanical characteristics

Inner conductor	copper tube	9.3 mm	0.366 in
Dielectric	foamed PE	22.5 mm	0.886 in
Diameter over outer conductor	corrugated copper tube	25.0 mm	0.984 in
Diameter over outer jacket	PE	27.7 mm	1.091 in
	FRNC	27.7 mm	1.091 in
Cable weight	PE (FRNC)	481 (520) kg/km	322.4(356.0)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		18 Nm	13.27 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		120 mm	4.724 in
Min. bending radius, repeated		240 mm	9.449 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.0 m	3.28 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	dB/100m	dB/100ft			kW	MHz	
100	1.11	0.34	9.17	1000	3.75	1.14	2.46
108	1.16	0.35	8.80	1250	4.24	1.29	2.14
150	1.37	0.42	7.35	1500	4.69	1.43	1.91
174	1.48	0.45	6.78	1700	5.03	1.53	1.77
200	1.59	0.48	6.27	1800	5.19	1.58	1.70
300	1.97	0.60	4.99	1900	5.35	1.63	1.64
400	2.29	0.70	4.24	2000	5.51	1.68	1.59
450	2.44	0.74	3.96	2100	5.66	1.73	1.54
500	2.58	0.79	3.72	2200	5.81	1.77	1.50
512	2.61	0.80	3.67	2300	5.97	1.82	1.45
600	2.84	0.87	3.34	2500	6.25	1.91	1.38
700	3.09	0.94	3.05	2700	6.53	1.99	1.31
800	3.32	1.01	2.82	3000	6.97	2.12	1.22
824	3.37	1.03	2.77	3300	7.35	2.24	1.14
894	3.52	1.07	2.63	3400	7.48	2.28	1.12
900	3.54	1.08	2.62	4000	8.22	2.51	1.00
925	3.59	1.09	2.58	4900	9.28	2.83	0.88
960	3.66	1.12	2.52	5000	9.39	2.86	0.86

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.190 μH/m	0.058 μH/ft
Maximum operating frequency	5.0 GHz	
Cut off frequency	5.2 GHz	
Peak power rating	90 kW	
Inner conductor DC-resistance	1.65 Ω/km	0.5 Ω/1000 ft
Outer conductor DC-resistance	1.3 Ω/km	0.4 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

*Attenuation values typical at 20 °C ambient temperature;
 Mean power rating at 40 °C ambient temperature*



Standard polyethylene jacket

Flame retardant, non corrosive jacket (FRNC)

Flame retardant, non corrosive jacket (FRNC), UL CMR

Type number

V45466-B24-C6

V45466-B24-C16

V45466-B24-C46

Mechanical characteristics

Inner conductor	copper tube	12.7 mm	0.500 in
Dielectric	foamed PE	32.5 mm	1.280 in
Diameter over outer conductor	corrugated copper tube	36.0 mm	1.417 in
Diameter over outer jacket	PE	38.3 mm	1.508 in
	FRNC	38.3 mm	1.508 in
	FRNC, CMR	38.3 mm	1.508 in
Cable weight	PE (FRNC)	779(848) kg/km	522.1(568.4)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		50 Nm	36.87 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		200 mm	7.87 in
Min. bending radius, repeated		380 mm	14.96 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	78 pF/m	23.2pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	3.3 GHz	
Cut off frequency	3.7 GHz	
Peak power rating	200 kW	
Inner conductor DC-resistance	1.25 Ω/km	0.38 Ω/1000 ft
Outer conductor DC-resistance	0.8 Ω/km	0.24 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	dB/100m			dB/100ft	MHz	
100	0.824	0.251	12.9	925	2.80	0.853	3.58
108	0.858	0.262	12.5	960	2.86	0.872	3.50
150	1.02	0.312	10.3	1000	2.93	0.892	3.40
174	1.11	0.337	9.42	1250	3.34	1.02	2.94
200	1.19	0.363	8.81	1500	3.72	1.13	2.61
300	1.49	0.453	7.17	1700	4.01	1.22	2.40
400	1.74	0.531	6.03	1800	4.15	1.26	2.31
450	1.86	0.567	5.62	1900	4.29	1.31	2.22
500	1.97	0.601	5.27	2000	4.42	1.35	2.15
512	2.00	0.609	5.19	2100	4.55	1.39	2.07
600	2.18	0.666	4.71	2200	4.69	1.43	2.01
700	2.38	0.727	4.27	2300	4.82	1.47	1.95
800	2.57	0.785	3.93	2500	5.07	1.55	1.84
824	2.62	0.798	3.85	2700	5.32	1.62	1.74
894	2.74	0.836	3.66	3000	5.68	1.73	1.62
900	2.75	0.840	3.64	3300	6.03	1.84	1.51

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket
Flame retardant, non corrosive jacket (FRNC)

Type number
V45466-B24-C206
V45466-B24-C216

Attenuation values and power ratings

Mechanical characteristics

Inner conductor	corrugated copper wire	12.9 mm	0.681 in
Dielectric	foamed PE	32.5 mm	1.713 in
Diameter over outer conductor	corrugated copper tube	36.0 mm	1.83 in
Diameter over outer jacket	PE	38.3 mm	1.508 in
	FRNC	38.3 mm	1.508 in
Cable weight	PE (FRNC)	771(841) kg/km	518(567.7)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		50 Nm	36.87 lbf*ft
Flat plate crush strength		14 N/mm	79.9 lbf/in
Min. bending radius, single		200 mm	7.87 in
Min. bending radius, repeated		380 mm	14.96 in
Number of bends, minimum (typical)		15(50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	kW			MHz	kW	
100	0.79	12.9		925	2.63	3.58	
108	0.83	12.5		960	2.69	3.50	
150	0.98	10.3		1000	2.75	3.40	
174	1.06	9.42		1250	3.12	2.94	
200	1.14	8.81		1500	3.47	2.61	
300	1.42	7.17		1700	3.73	2.40	
400	1.66	6.03		1800	3.86	2.31	
450	1.77	5.62		1900	3.98	2.22	
500	1.87	5.27		2000	4.10	2.15	
512	1.90	5.19		2100	4.22	2.07	
600	2.07	4.71		2200	4.34	2.01	
700	2.25	4.27		2300	4.46	1.95	
800	2.43	3.93		2500	4.69	1.84	
824	2.47	3.85		2700	4.91	1.74	
894	2.58	3.66		3000	5.23	1.62	
900	2.59	3.64		3300	5.54	1.51	

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	90 %	
Capacitance	78 pF/m	23.2pF/ft
Inductance	0.190 μH/m	0.06 μH/ft
Maximum operating frequency	3.3 GHz	
Cut off frequency	3.7 GHz	
Peak power rating	200 kW	
Inner conductor DC-resistance	1.25 Ω/km	0.38 Ω/1000 ft
Outer conductor DC-resistance	0.6 Ω/km	0.18 Ω/1000 ft
Return loss 400-500 MHz	26 dB	
Return loss 800-1000 MHz	26 dB	
Return loss 1700-2700 MHz	26 dB	

*Attenuation values typical at 20 °C ambient temperature;
 Mean power rating at 40 °C ambient temperature*



Standard polyethylene jacket

Flame Retardant, non corrosive jacket (FRNC)

Flame retardant, non corrosive jacket (FRNC), UL CMR

Type number

V45466-B25-C16

V45466-B25-C26

V45466-B25-C66

Mechanical characteristics

Inner conductor	copper tube	17.3 mm	0.681 in
Dielectric	foamed PE	43.5 mm	1.713 in
Diameter over outer conductor	corrugated copper tube	46.5 mm	1.83 in
Diameter over outer jacket	PE	49.5 mm	1.949 in
	FRNC	49.5 mm	1.949 in
	FRNC, CMR	49.5 mm	1.949 in
Cable weight	PE (FRNC)	1150(1270) kg/km	770.8(851.2)lb/1000 ft
Tensile strength		2000 N	449 lbf
Bending moment		68 Nm	50.15 lbf*ft
Flat plate crush strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		300 mm	11.81 in
Min. bending radius, repeated		510 mm	20 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics

Impedance	50 ± 1 Ω	
Relative velocity of propagation	88 %	
Capacitance	76 pF/m	23.2pF/ft
Inductance	0.19 μH/m	0.06 μH/ft
Maximum operating frequency	2.7 GHz	
Cut off frequency	3.0 GHz	
Peak power rating	300 kW	
Inner conductor DC-resistance	1.5 Ω/km	0.46 Ω/1000 ft
Outer conductor DC-resistance	0.5 Ω/km	0.15 Ω/1000 ft
Return loss 400 – 500 MHz	26 dB	
Return loss 800 – 1000 MHz	26 dB	
Return loss 1700 – 2700 MHz	26 dB	

Attenuation values and power ratings

Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz	kW			MHz	kW	
100	0.68	18.9		900	2.33	4.95	
108	0.71	18.0		925	2.36	4.86	
150	0.84	14.9		960	2.42	4.74	
174	0.91	13.7		1000	2.48	4.62	
200	0.99	12.6		1250	2.84	3.97	
300	1.23	9.92		1500	3.18	3.51	
400	1.45	8.32		1700	3.44	3.22	
450	1.55	7.73		1800	3.56	3.09	
500	1.65	7.24		1900	3.69	2.97	
512	1.67	7.13		2000	3.81	2.87	
600	1.83	6.45		2100	3.93	2.77	
700	2.00	5.84		2200	4.05	2.68	
800	2.17	5.35		2300	4.16	2.60	
824	2.21	5.25		2500	4.40	2.45	
894	2.32	4.97		2700	4.60	2.30	

Attenuation values typical at 20 °C ambient temperature;
Mean power rating at 40 °C ambient temperature



Standard polyethylene jacket
Flame Retardant, non corrosive jacket (FRNC)

Type number
V45466-B25-C216
V45466-B25-C226

Mechanical characteristics			
Inner conductor	corrugated copper wire	17.3 mm	0.681 in
Dielectric	foamed PE	43.5 mm	1.713 in
Diameter over outer conductor	corrugated copper tube	46.5 mm	1.83 in
Diameter over outer jacket	PE	49.5 mm	1.949 in
	FRNC	49.5 mm	1.949 in
Cable weight	PE (FRNC)	1150(1270) kg/km	770.8(851.2)lb/1000 ft
Tensile strength		2000 N	449.6 lbf
Bending moment		68 Nm	50.15 lbf*ft
Flat plate crush strength		20 N/mm	114.2 lbf/in
Min. bending radius, single		300 mm	11.81 in
Min. bending radius, repeated		510 mm	20 in
Number of bends, minimum (typical)		15 (50)	
Recommended hanger spacing		1.2 m	3.93 ft
Permissible temperature range, installation	PE	-40 °C to +60 °C	-40 °F to +140 °F
	FRNC	-25 °C to +60 °C	-13 °F to +140 °F
Permissible temperature range, operation		-55 °C to +85 °C	-67 °F to +185 °F

Electrical characteristics	
Impedance	50 ± 1 Ω
Relative velocity of propagation	88 %
Capacitance	76 pF/m 23.2pF/ft
Inductance	0.190 μH/m 0.058 μH/ft
Maximum operating frequency	2.7 GHz
Cut off frequency	3.0 GHz
Peak power rating	290 kW
Inner conductor DC-resistance	1.5 Ω/km 0.46 Ω/1000 ft
Outer conductor DC-resistance	0.5 Ω/km 0.15 Ω/1000 ft
Return loss 400-500 MHz	26 dB
Return loss 800-1000 MHz	26 dB
Return loss 1700-2700 MHz	26 dB

Attenuation values and power ratings

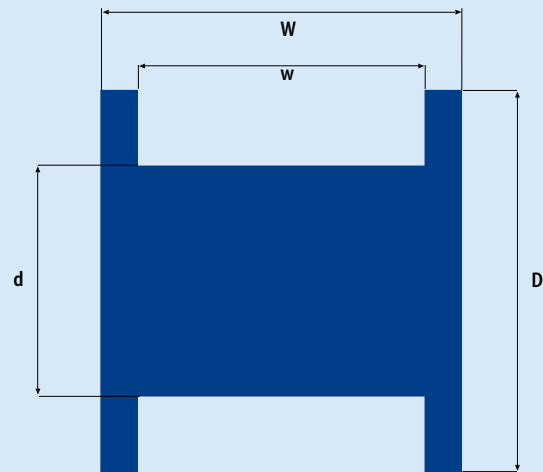
Frequency	Attenuation		Mean power rating	Frequency	Attenuation		Mean power rating
	MHz				MHz		
	dB/100m	dB/100ft	kW		dB/100m	dB/100ft	kW
100	0.64	0.20	18.9	900	2.12	0.65	4.95
108	0.67	0.20	18.0	925	2.15	0.66	4.86
150	0.79	0.24	14.9	960	2.20	0.67	4.74
174	0.86	0.26	13.7	1000	2.25	0.69	4.62
200	0.93	0.28	12.6	1250	2.56	0.78	3.97
300	1.15	0.35	9.92	1500	2.84	0.87	3.51
400	1.35	0.41	8.32	1700	3.06	0.93	3.22
450	1.44	0.44	7.73	1800	3.16	0.96	3.09
500	1.53	0.46	7.24	1900	3.26	0.99	2.97
512	1.55	0.47	7.13	2000	3.36	1.02	2.87
600	1.69	0.51	6.45	2100	3.46	1.05	2.77
700	1.84	0.56	5.84	2200	3.56	1.08	2.68
800	1.98	0.60	5.35	2300	3.65	1.11	2.60
824	2.02	0.61	5.25	2500	3.84	1.17	2.45
894	2.11	0.64	4.97	2700	4.02	1.23	2.30

Attenuation values typical at 20 °C ambient temperature;
 Mean power rating at 40 °C ambient temperature

Packaging and shipping information

FlexLine cables are manufactured and shipped on disposable wooden drums, which are fastened to pallets for transportation. These wooden drums provide optimal protection for the cables and are also easy to handle during loading and processing.

FlexLine cables can also be supplied pre assembled and cut to customer specified lengths. Cut-to-length cables are shipped either on drums or in special cable boxes.



Cable type	Max. cable length [m]	Outer dim. D [cm]	Drum dim. d [cm]	Outer width W [cm]	Inner width w [cm]	Drum weight [kg]	Drum freight [m ³]
FlexLine 1/6" S	500	40	15	23	18	1.85	0.03
FlexLine 1/5" S	1000	59	30	45	40	14	0.13
FlexLine 1/4" S	500	59	30	45	40	14	0.13
FlexLine 1/4" R	500	59	30	45	40	14	0.13
FlexLine 3/8" S	500	59	30	45	40	14	0.13
FlexLine 1/2" S	500	80	40	48	40	28	0.24
FlexLine 1/2" R	500	90	45	64	56	32	0.41
FlexLine 7/8" S	500	120	56	75	68	48	0.85
FlexLine 7/8" H	500	120	56	75	68	48	0.85
FlexLine 7/8" R	500	120	56	75	68	48	0.85
FlexLine 1 1/4" R	500	160	80	99	86	223	2.00
FlexLine 1 5/8" R	500	190	100	116	110	162	3.29

Cable type	Max. cable length [m]	Outer dim. D [cm]	Drum dim. d [cm]	Outer width W [cm]	Inner width w [cm]	Drum weight [kg]	Drum freight [m ³]
FlexLine 1/4" S	250	40	15	43	30	2.3	0.05
FlexLine 1/4" R	250	40	15	43	30	2.3	0.05
FlexLine 3/8" S	250	40	15	40	38	2.0	0.05
FlexLine 1/2" S	250	50	15	43	40	3.0	0.08
FlexLine 1/2" R	250	71	35	44	40	8.5	0.17
FlexLine 7/8" S	250	95	56	75	71	30	0.53
FlexLine 7/8" H	250	95	56	75	71	30	0.53
FlexLine 7/8" R	250	95	56	75	71	30	0.53
FlexLine 1 1/4" R	250	140	80	75	67	65	1.15
FlexLine 1 5/8" R	250	190	125	75	65	110	2.13

For planking of drum, add 6 cm to the outer diameter D



N connector series
 DIN 7-16 connector series
 Adaptors
 Terminations
 Attenuators

Connectors & Adaptors

FlexLine connectors and adaptors are available in N and DIN 7-16 series with both male and female interfaces for FlexLine cables from 1/4" to 1 5/8". All connectors are designed to guarantee excellent electrical characteristics with FlexLine cables.

The connectors and adaptors are coated with white bronze (e.g. OPTALLOY®) or flash white bronze over silver (OPTARGEN®) platings. Coatings are specifically selected to provide protection against oxidation while delivering exceptional IP3 intermodulation performance and excellent electrical conductivity.

All FlexLine connectors exceed the IP68 Ingress Protection standard. The excellent mechanical and climatic properties insure long-term durability and performance in outdoor installations. The FlexLine connector range is complemented by male and female terminations (1 W and 20 W types) and attenuators from 3 dB to 20 dB (5 W and 20 W).

*OPTALLOY® ternary CuSnZn alloy (white bronze) which has the appearance of stainless steel.
 OPTARGEN® highly conductive silver protected by a thin layer of OPTALLOY®.*

FlexLine® N Connectors



1 1/4" R
N male straight

1 5/8" R
N female straight

1/2" R
N male right angle

1/2" S
N male straight

FlexLine N connectors are extremely robust and waterproof with outstanding electrical, mechanical and climatic characteristics.

All FlexLine N connectors are designed in accordance with:
EC 60169-16; MIL C-39012; CECC 22210

Quality tested in accordance with: US MIL-Std 202

Technical characteristics

Nominal impedance	50 Ω
Frequency range	DC to 11 GHz
Insertion loss	0.1 dB
Intermodulation	≤ -117 dBm @ 2 x 43 dBm
Shielding effectiveness	≥ 128 dB @ 1 GHz
Operating temperature	- 45 °C to +85 °C

Waterproof	EN 60529	IP68 ¹ , 2.5 bar
	IEC 169-1	14.7 water immersion test
	IEC 169-1	16.5.1.3 sealing 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$
	EN 122190	4.6.8 water tightness of the connector 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$

Return loss²

1/4", 3/8", 1/2", 7/8", 1 1/4"	≥ 35 dB	DC to 1.0 GHz
	≥ 30 dB	1.0 to 2.7 GHz
1 5/8"	≥ 30 dB	DC to 2.7 GHz

Cable type	Connector type	Order number	Assembly instruction
1/4" S	male straight	V45250-Z5077-A 1-A	60 23
	female straight	V45250-Z5077-A 2-A	
	male right angle	V45250-Z5077-A 3-A	
1/4" R	male straight	V45250-Z5077-A 56-A	60 30
	female straight	V45250-Z5077-A 57-A	
	right angle	V45250-Z5077-A 58-A	
3/8" S	male straight male	V45250-Z5077-A 7-A	60 28
	female straight	V45250-Z5077-A 8-A	
	male right angle	V45250-Z5077-A 9-A	
1/2" S	male straight	V45250-Z5077-A 13-A	60 27
	female straight	V45250-Z5077-A 14-A	
	male right angle	V45250-Z5077-A 15-A	
1/2" R	male straight	V45250-Z5077-A 19-A	60 18
	female straight	V45250-Z5077-A 20-A	
	male right angle	V45250-Z5077-A 21-A	
7/8" S	male straight	V45250-Z5077-A 50-A	60 24
	female straight	V45250-Z5077-A 51-A	
	male right angle	V45250-Z5077-A 52-A	
7/8" R 7/8" H	male straight	V45250-Z5077-A 25-A	60 25
	female straight	V45250-Z5077-A 26-A	
1 1/4" R	male straight	V45250-Z5077-A 43-A	60 26
	female straight	V45250-Z5077-A 44-A	
1 5/8" R	male straight	V45250-Z5077-A 45-A	60 29
	female straight	V45250-Z5077-A 46-A	

¹ All FlexLine connectors exceed the IP68 Ingress Protection standard. Each connector is designed and tested to withstand 2.5 bars (36 psi) of pressure. The excellent mechanical and climatic properties of FlexLine connectors insure long-term durability and performance in outdoor installations.

² Magnitude in dB

FlexLine® connectors DIN 7-16 Series



FlexLine DIN 7-16 connectors are especially designed for high power applications in mobile radio base stations. They guarantee signal transmission with low attenuation and intermodulation.

All FlexLine DIN 7-16 connectors are designed in accordance with:
IEC 60169-4; DIN 47223; CECC 22190, VG 95250
Quality tested in accordance with: US MIL-Std 202

Technical characteristics

Nominal impedance	50 Ω
Frequency range	DC to 8.3 GHz
Insertion loss	0.05 dB
Intermodulation	≤ -117 dBm @ 2 x 43 dBm
Shielding effectiveness	≥ 128 dB @ 1 GHz
Operating temperature	- 45 °C to + 85 °C

Waterproof	EN 60529	IP68 ¹ , 2.5 bar
	IEC 169-1	14.7 water immersion test
	IEC 169-1	16.5.1.3 sealing 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$
	EN 122190	4.6.8 water tightness of the connector 2.5 bar leakage air rate: $< 2.77 \times 10^{-4} \frac{\text{mbar} \cdot \text{l}}{\text{sec}}$

Return loss²

1/4", 3/8", 1/2", 7/8"	≥ 35 dB	DC to 1.0 GHz
	≥ 30 dB	1.0 to 2.7 GHz
1 1/4", 1 5/8"	≥ 30 dB	DC to 2.7 GHz

Cable type	Connector type	Order number	Assembly instruction
1/4" S	male straight	V45250-Z5077-A 4-A	60 23
	female straight	V45250-Z5077-A 5-A	
	male right angle	V45250-Z5077-A 6-A	
1/4" R	male straight	V45250-Z5077-A 59-A	60 30
	female straight	V45250-Z5077-A 60-A	
	male right angle	V45250-Z5077-A 61-A	
3/8" S	male straight	V45250-Z5077-A 10-A	60 28
	female straight	V45250-Z5077-A 11-A	
	male right angle	V45250-Z5077-A 12-A	
1/2" S	male straight	V45250-Z5077-A 16-A	60 27
	female straight	V45250-Z5077-A 17-A	
	male right angle	V45250-Z5077-A 18-A	
1/2" R	male straight	V45250-Z5077-A 22-A	60 18
	female straight	V45250-Z5077-A 23-A	
	male right angle	V45250-Z5077-A 24-A	
7/8" S	male straight	V45250-Z5077-A 53-A	60 24
	female straight	V45250-Z5077-A 54-A	
	male right angle	V45250-Z5077-A 55-A	
7/8" R 7/8" H	male straight	V45250-Z5077-A 27-A	60 25
	female straight	V45250-Z5077-A 28-A	
	male right angle	V45250-Z5077-A 42-A	
1 1/4" R	male straight	V45250-Z5077-A 29-A	60 26
	female straight	V45250-Z5077-A 30-A	
1 5/8" R	male straight	V45250-Z5077-A 31-A	60 29
	female straight	V45250-Z5077-A 32-A	

¹ All FlexLine connectors exceed the IP68 Ingress Protection standard. Each connector is designed and tested to withstand 2.5 bars (36 psi) of pressure. The excellent mechanical and climatic properties of FlexLine connectors insure long-term durability and performance in outdoor installations.

² Magnitude in dB

Adaptors

Interface	Order number
N male - N male, straight	V45250-Z5077-A308
N female - N female, straight	V45250-Z5077-A307
N male - N female, straight	V45250-Z5077-A311
N male - N female, right angle	V45250-Z5077-A341
DIN 7-16 male – DIN 7-16 male, straight	V45250-Z5077-A309
DIN 7-16 female – DIN 7-16 female, straight	V45250-Z5077-A304
DIN 7-16 male – DIN 7-16 female, straight	V45250-Z5077-A312
DIN 7-16 male – DIN 7-16 female, right angle	V45250-Z5077-A342
N male, straight – DIN 7-16 male	V45250-Z5077-A306
N male, straight – DIN 7-16 female	V45250-Z5077-A313
N female, straight – DIN 7-16 male	V45250-Z5077-A310
N female, straight – DIN 7-16 female	V45250-Z5077-A314

*Adaptor DIN 7-16 male – DIN 7-16 male**Adaptor N male – DIN 7-16 female**Adaptor N female – DIN 7-16 female***Terminations, frequency range DC to 8 GHz**

Power rating	Interface	Order number
1 W	DIN 7-16 male	V45250-Z5077-A343
	DIN 7-16 female	V45250-Z5077-A344
	N male	V45250-Z5077-A345
	N female	V45250-Z5077-A346
20 W	DIN 7-16 male	V45250-Z5077-A347
	DIN 7-16 female	V45250-Z5077-A348
	N male	V45250-Z5077-A349
	N female	V45250-Z5077-A350

*DIN 7-16 male termination, 1 W**DIN 7-16 male termination, 20 W***Attenuators, frequency range DC to 8 GHz**

Attenuation	Interface	Power rating	Order number
3 dB	DIN 7-16 male-female	5 W	V45250-Z5077-A351
		20 W	V45250-Z5077-A352
	N male-female	5 W	V45250-Z5077-A353
		20 W	V45250-Z5077-A354
6 dB	DIN 7-16 male-female	5 W	V45250-Z5077-A355
		20 W	V45250-Z5077-A356
	N male-female	5 W	V45250-Z5077-A357
		20 W	V45250-Z5077-A358
10 dB	DIN 7-16 male-female	5 W	V45250-Z5077-A359
		20 W	V45250-Z5077-A360
	N male-female	5 W	V45250-Z5077-A361
		20 W	V45250-Z5077-A362
20 dB	DIN 7-16 male-female	5 W	V45250-Z5077-A363
		20 W	V45250-Z5077-A364
	N male-female	5 W	V45250-Z5077-A365
		20 W	V45250-Z5077-A366

*N attenuator**DIN 7-16 attenuator*



Tools

FlexLine assembly tools are easy to use and perfect for fast and reliable preparation of the cable to insure proper connector attachment. The stripping tools are designed to perform a smooth cut at the exact location on the outer and inner conductors.

New automatic stripping tools that attach to a cordless drill are available for all FlexLine cables from 1/4" to 1 5/8". These automatic stripping tools control the preparation dimensions of the cable jacket, outer conductor, foam and inner conductor for consistent and reliable connector attachment.

Stripping tools	Order number	Spare blades
Automatic tool for FlexLine 1/4" S	S45056-Z857-A28	PJ-2, PJ-4L, OC-97-706 (1 pc each)
Automatic tool for FlexLine 1/4" R	S45056-Z857-A29	PJ-2 (4 pcs)
Automatic tool for FlexLine 3/8" S	S45056-Z857-A30	PJ-2, PJ-4L, OC-97-706 (1 pc each)
Automatic tool for FlexLine 1/2" S	S45056-Z857-A31	PJ-2, PJ-4L, X17 (1 pc each)
Automatic tool for FlexLine 1/2" R	S45056-Z857-A32	PJ-2 (4 pcs)
Automatic tool for FlexLine 7/8" S	S45056-Z857-A33	PJ-2 (3 pcs)
Automatic tool for FlexLine 7/8" R	S45056-Z857-A34	PJ-2 (3 pcs)
Automatic tool for FlexLine 1 1/4" R	S45056-Z857-A26	PJ-2, PJ-3, PJ-222 (1 pc each)
Automatic tool for FlexLine 1 5/8" R	S45056-Z857-A27	PJ-3 (2 pcs), PJ-333 (1 pc)

Stripping tool for FlexLine 7/8" R	S45056-Z857-A6-A	large no.51, small no.78 (1 pc each)
Stripping tool for FlexLine 1 1/4" R	S45056-Z857-A7-A	–
Stripping tool for FlexLine 1 5/8" R	S45056-Z857-A8-A	–

Spare blades for stripping tools	Order number
Type PJ-2	S45056-Z857-A35
Type PJ-3	S45056-Z857-A36
Type PJ-4L	S45056-Z857-A37
Type PJ-222	S45056-Z857-A38
Type PJ-333	S45056-Z857-A39
Type X17	S45056-Z857-A40
Type OC-97-706	S45056-Z857-A54
7/8" R tool, large Nr. 51 (10 pcs)	S45056-Z857-A10
7/8" R tool, small Nr. 78 (10 pcs)	S45056-Z857-A11

Flaring tools	Order number
Flaring tool for FlexLine 1/4" R + 1/2" R	S45056-Z857-A55
Flaring tool for FlexLine 7/8" R	S45056-Z857-A16
Flaring tool for FlexLine 1 1/4" R	S45056-Z857-A17
Flaring tool for FlexLine 1 5/8" R	S45056-Z857-A18

Stripping tools for grounding kits

Cable type	Stripping dimension	Order number
FlexLine 1/2" S	15 mm and 26 mm	S45056-Z857-A41
FlexLine 1/2" R	15 mm and 26 mm	S45056-Z857-A42
FlexLine 7/8" R + S	20 mm and 26 mm	S45056-Z857-A43
FlexLine 1 1/4" R	20 mm and 30 mm	S45056-Z857-A44
FlexLine 1 5/8" R	20 mm and 30 mm	S45056-Z857-A45



Automatic stripping tool for FlexLine 7/8"



Automatic stripping tool for FlexLine 1 1/4"



Stripping tool for FlexLine 7/8"



Stripping tool for FlexLine 1 1/4" and 1 5/8"



Flaring tool



Stripping tool for grounding kits



FlexLine jumper cables are ideal for applications requiring durability, small bending radii, high flexibility, low attenuation, and high shielding. *FlexLine* jumper cables incorporate specially developed connectors using state of the art soldering technology that guarantees superior electrical performance.

FlexLine jumper cables are ideal for connections between the main feeder and antennas or between main feeder and the transmitting/receiving equipment.

Jumper Cables

***FlexLine* jumper cables are designed for outdoor use to withstand the harshest environmental conditions and are distinguished by the following features:**

- Long trouble-free field life as a result of tried and tested materials and production technologies
- Designed for outdoor applications under extreme climatic conditions
- High flexibility and small bending diameters
- Specially developed connectors using soldering technology that guarantees superior electrical characteristics
- High shielding effectiveness > 120 dB
- Low intermodulation product $IM3 \leq -160$ dBc (≤ -117 dBm @ 2 x 43 dBm carriers)
- Excellent return loss due to silver-plated connectors and attenuation-optimized cable materials
- Hot-polyamide moulding between connector and cable jacket
- Waterproof to safety class IP 68 (according to IEC 529)
- Cable jackets of flame retardant, halogen-free material (FRNC)
- 100 % factory tested for IM3 and VSWR
- Available in any cable length with a large variety of connector combinations

Technical specification

Electrical data

Type		1/4" S	3/8" S	1/2" S	1/2" R
Frequency range		DC to 2700 MHz			
Peak power rating		8 kW	13 kW	19 kW	58 kW
Nominal impedance		50 Ω			
Return loss ¹	30 – 1000 MHz	≥ 30 dB			
	1000 – 2200 MHz	≥ 28 dB			
	2200 – 2700 MHz	≥ 26 dB			
Insertion loss	900 MHz	0.18 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.13 dB/m (cable) 0.04 dB/ft + 0.10 dB (connectors)	0.10 dB/m (cable) 0.03 dB/ft + 0.10 dB (connectors)	0.07 dB/m (cable) 0.02 dB/ft + 0.10 dB (connectors)
		1800 MHz	0.26 dB/m (cable) 0.08 dB/ft + 0.10 dB (connectors)	0.20 dB/m (cable) 0.06 dB/ft + 0.10 dB (connectors)	0.16 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)
	2200 MHz	0.30 dB/m (cable) 0.09 dB/ft + 0.10 dB (connectors)	0.22 dB/m (cable) 0.07 dB/ft + 0.10 dB (connectors)	0.17 dB/m (cable) 0.05 dB/ft + 0.10 dB (connectors)	0.11 dB/m (cable) 0.03 dB/ft + 0.10 dB (connectors)
Relative velocity of propagation		82 % to – 84 %			
Intermodulation at 900 MHz + 1800 MHz + 2200 MHz		≤ – 117 dBm (3 rd order product with 2 x 43 dBm carriers)			

Mechanical data

Type		1/4" S	3/8" S	1/2" S	1/2" R
Bending radius, repeated bending		25 mm (0.98 in)	25 mm (0.98 in)	30 mm (1.18 in)	120 mm (4.72 in)
Bending radius, single bending		12.5 mm (0.49 in)	12.5 mm (0.49 in)	15 mm (0.59 in)	70 mm (2.76 in)
Max. tensile strength		max. 350 N	max. 600 N	max. 1000 N	max. 1200 N

Environment

Type		1/4" S	3/8" S	1/2" S	1/2" R
Waterproof to safety class (IEC 529)		IP 68 ² with coupled interface			
Max. operating temperature range		– 40 °C to + 80 °C (– 40 °F to +176 °F)			
Installation temperature range		– 15 °C to + 60 °C (+5 °F to +140 °F)			
Mechanical oscillation		MIL STD 202 Meth. 204/B			
Shock resistance		MIL STD 202 Meth. 213/B			
Corrosion resistance		MIL STD 202 Meth. 101			

Materials

Type		1/4" S	3/8" S	1/2" S	1/2" R
Cable	Inner conductor	copper clad aluminum wire			
	Dielectric	highly foamed polyethylene			
	Outer conductor	spiral corrugated copper tube	spiral corrugated copper tube	spiral corrugated copper tube	annular corrugated copper tube
	Jacket options	FRNC and PE, black and light grey (RAL 7004)			
Connector	Inner conductor	brass / CuBe, silver-plated			
	Outer conductor	brass, silver-plated			
	Insulator	PP / PE / PTFE			
	Sealing	hot-polyamide moulding			

¹ Magnitude in dB

² All FlexLine connectors exceed the IP68 Ingress Protection standard. Each connector is designed and tested to withstand 2.5 bars (36 psi) of pressure. The excellent mechanical and climatic properties of FlexLine connectors insure long-term durability and performance in outdoor installations.

Standard jumper cable FlexLine 1/4" S FRNC

Connector 1	Connector 2	Order number
N	N	V45594-A4015-A ...*
N	N	V45594-A4515-A ...
N	N	V45594-A4540-A ...
N	N	V45594-A4545-A ...
7-16	7-16	V45594-A8055-A ...
7-16	N	V45594-A8545-A ...
7-16	7-16	V45594-A8555-A ...
7-16	7-16	V45594-A8580-A ...
7-16	7-16	V45594-A8585-A ...

Standard jumper cable FlexLine 1/4" S PE

Connector 1	Connector 2	Order number
N	N	V45594-A4015-E ...*
N	N	V45594-A4515-E ...
N	N	V45594-A4540-E ...
N	N	V45594-A4545-E ...
7-16	7-16	V45594-A8055-E ...
7-16	N	V45594-A8545-E ...
7-16	7-16	V45594-A8555-E ...
7-16	7-16	V45594-A8580-E ...
7-16	7-16	V45594-A8585-E ...

Standard jumper cable FlexLine 1/4" R FRNC



















Connector 1	Connector 2	Order number
N	N	V45594-A4015-K ...*
N	N	V45594-A4515-K ...
N	N	V45594-A4540-K ...
N	N	V45594-A4545-K ...
7-16	7-16	V45594-A8055-K ...
7-16	N	V45594-A8545-K ...
7-16	7-16	V45594-A8555-K ...
7-16	7-16	V45594-A8580-K ...
7-16	7-16	V45594-A8585-K ...

Standard jumper cable FlexLine 1/4" R PE



















Connector 1	Connector 2	Order number
N	N	V45594-A4015-L ...*
N	N	V45594-A4515-L ...
N	N	V45594-A4540-L ...
N	N	V45594-A4545-L ...
7-16	7-16	V45594-A8055-L ...
7-16	N	V45594-A8545-L ...
7-16	7-16	V45594-A8555-L ...
7-16	7-16	V45594-A8580-L ...
7-16	7-16	V45594-A8585-L ...

* Please insert assembly length in cm



















Standard jumper cable FlexLine 3/8" S FRNC

Connector 1	Connector 2	Order number
N 	N 	V45594-A4015-B ...*
N 	N 	V45594-A4515-B ...
N 	N 	V45594-A4540-B ...
N 	N 	V45594-A4545-B ...
7-16 	7-16 	V45594-A8055-B ...
7-16 	N 	V45594-A8545-B ...
7-16 	7-16 	V45594-A8555-B ...
7-16 	7-16 	V45594-A8580-B ...
7-16 	7-16 	V45594-A8585-B ...



















Standard jumper cable FlexLine 3/8" S PE

Connector 1	Connector 2	Order number
N 	N 	V45594-A4015-F ...*
N 	N 	V45594-A4515-F ...
N 	N 	V45594-A4540-F ...
N 	N 	V45594-A4545-F ...
7-16 	7-16 	V45594-A8055-F ...
7-16 	N 	V45594-A8545-F ...
7-16 	7-16 	V45594-A8555-F ...
7-16 	7-16 	V45594-A8580-F ...
7-16 	7-16 	V45594-A8585-F ...

Standard jumper cable FlexLine 1/2" S FRNC

Connector 1	Connector 2	Order number
N 	N 	V45594-A4015-C ...*
N 	N 	V45594-A4515-C ...
N 	N 	V45594-A4540-C ...
N 	N 	V45594-A4545-C ...
7-16 	7-16 	V45594-A8055-C ...
7-16 	N 	V45594-A8545-C ...
7-16 	7-16 	V45594-A8555-C ...
7-16 	7-16 	V45594-A8580-C ...
7-16 	7-16 	V45594-A8585-C ...

Standard jumper cable FlexLine 1/2" S PE

Connector 1	Connector 2	Order number
N 	N 	V45594-A4015-G ...*
N 	N 	V45594-A4515-G ...
N 	N 	V45594-A4540-G ...
N 	N 	V45594-A4545-G ...
7-16 	7-16 	V45594-A8055-G ...
7-16 	N 	V45594-A8545-G ...
7-16 	7-16 	V45594-A8555-G ...
7-16 	7-16 	V45594-A8580-G ...
7-16 	7-16 	V45594-A8585-G ...

* Please insert assembly length in cm

Standard jumper cable FlexLine 1/2" R FRNC

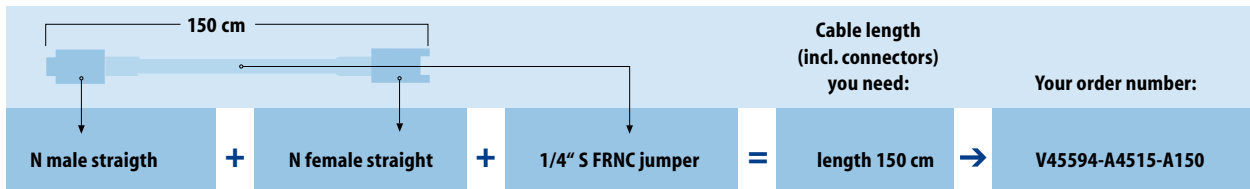
Connector 1	Connector 2	Order number
N	N	V45594-A4015-D ...*
N	N	V45594-A4515-D ...
N	N	V45594-A4540-D ...
N	N	V45594-A4545-D ...
7-16	7-16	V45594-A8055-D ...
7-16	N	V45594-A8545-D ...
7-16	7-16	V45594-A8555-D ...
7-16	7-16	V45594-A8580-D ...
7-16	7-16	V45594-A8585-D ...

Standard jumper cable FlexLine 1/2" R PE

Connector 1	Connector 2	Order number
N	N	V45594-A4015-H ...*
N	N	V45594-A4515-H ...
N	N	V45594-A4540-H ...
N	N	V45594-A4545-H ...
7-16	7-16	V45594-A8055-H ...
7-16	N	V45594-A8545-H ...
7-16	7-16	V45594-A8555-H ...
7-16	7-16	V45594-A8580-H ...
7-16	7-16	V45594-A8585-H ...

* Please insert assembly length in cm

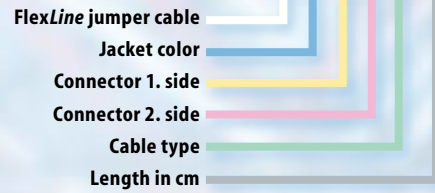
For example:



Order number generator for custom made jumper cables

Your order number:

Color	+	Connector 1	+	Connector 2	+	Cable	+	Length	=	V45594
		N female		N female						-A
black	A	straight	15	straight	15	FlexLine 1/4" S FRNC	A	50 cm	50	85
		N male		N male		FlexLine 3/8" S FRNC	B	100 cm	100	55
light grey	B	right angle	40	right angle	40	FlexLine 1/2" S FRNC	C	150 cm	150	-B
		straight	45	straight	45	FlexLine 1/2" R FRNC	D	250 cm	250	150
		DIN 7-16 female		DIN 7-16 female		FlexLine 1/4" S PE	E	300 cm	300	
		right angle	50	right angle	50	FlexLine 3/8" S PE	F	Customer's need	?	
		straight	55	straight	55	FlexLine 1/2" S PE	G			
		DIN 7-16 male		DIN 7-16 male		FlexLine 1/2" R PE	H			
		right angle	80	right angle	80	FlexLine 1/4" R FRNC	K			
		straight	85	straight	85	FlexLine 1/4" R PE	L			



Custom Made Jumper Cables





Lightning & EMP Protection

Lightning strikes can lead to voltage surges of up to 50 kV/m – within a few microseconds. These high voltage spikes produce enormous loads on electronic systems, e.g. mobile base stations – and can lead to serious damage, extremely high repair costs and, above all, “loss of air time”.

To protect the whole system (antenna, cable connections and base station) against overvoltage damage, safe and effective lightning and EMP protection is an absolute must.

FlexLine provides coaxial surge arresters with N and DIN 7-16 interfaces.

Two different functional types of FlexLine surge arresters are available:

- Wideband surge arresters
Applications for a broad frequency range from 800 to 2500 MHz
- Gas-capsule surge arresters
Applications from DC to 2500 MHz, with replaceable gas discharge capsules

Technical characteristics

Wideband surge arresters		DIN 7-16		N	
Characteristic impedance	50 Ω				
Frequency range	800 – 2500 MHz				
Return loss ¹	800 to 880 MHz	≥ 20 dB	≥ 23 dB		
	880 to 2400 MHz	≥ 26 dB	≥ 26 dB		
	2400 to 2500 MHz	≥ 20 dB	≥ 23 dB		
Insertion loss	≤ 0.05 dB		≤ 0.1 dB		
Temperature range	– 45 °C to + 85 °C				
Design based on specifications	IEC 60169-4; DIN 47223; CECC 22190; VG 95250		IEC 60169-16; MIL C-39012; CECC 22210		
Quality tested in accordance with	US MIL-Std 202		US MIL-Std 202		
Residual voltage	1 V (50 kA, wave 8/20 μs)				

Gas-capsule surge arresters		DIN 7-16		N	
Characteristic impedance	50 Ω				
Frequency range	DC to 2 GHz	DC to 3 GHz			
Return loss ¹	DC to 1 GHz	≥ 30 dB	≥ 30 dB		
	1 to 2 GHz	≥ 20 dB	≥ 17 dB		
	2 to 3 GHz	–	≥ 10 dB		
Insertion loss	≤ 0.2 dB		≤ 0.1 dB		
Temperature range	– 45 °C to + 85 °C				
Design in accordance with	IEC 60169-4; DIN 47223; CECC 22190; VG 95250		IEC 60169-16; MIL C-39012; CECC 22210		
Quality tested in accordance with	US MIL-Std 202		US MIL-Std 202		
Residual voltage	in corresponsence with gas-capsule				

Wideband surge arresters

Connector configuration	N series		
Antenna side	N female	N male	N female
RxTx side (protected)	N female	N female	N male
Order number	S45055-Z61-A451	S45055-Z61-A441	S45055-Z61-A440



N female – N female

Connector configuration	DIN 7-16 series		
Antenna side	DIN 7-16 female	DIN 7-16 male	DIN 7-16 female
RxTx side (protected)	DIN 7-16 female	DIN 7-16 female	DIN 7-16 male
Order number	S45055-Z61-A258	S45055-Z61-A439	S45055-Z61-A500



DIN 7-16 male – DIN 7-16 female

Gas-capsule surge arresters

Connector configuration	N Series	
Interface 1	N female	N male
Interface 2	N female	N female
Order number	S45055-Z61-A128	S45055-Z61-A448



N female – N male

Connector configuration	DIN 7-16 Series	
Interface 1	DIN 7-16 female	DIN 7-16 male
Interface 2	DIN 7-16 female	DIN 7-16 female
Order number	S45055-Z61-A449	S45055-Z61-A122



DIN 7-16 female – DIN 7-16 male

Spare parts

Type	gas-capsule 90 V	gas-capsule 230 V	gas-capsule 350 V
Order number	S45055-Z61-A123	S45055-Z61-A124	S45055-Z61-A452

¹ Magnitude in dB



Power Splitters

Rosenberger LEONI Site Solutions offers a new series of Wideband Power Splitters, available with N and DIN 7-16 interface. They are used to combine various antenna systems to radio base stations for mobile communication. The product range covers 2-way, 3-way and 4-way types for both male and female interfaces.

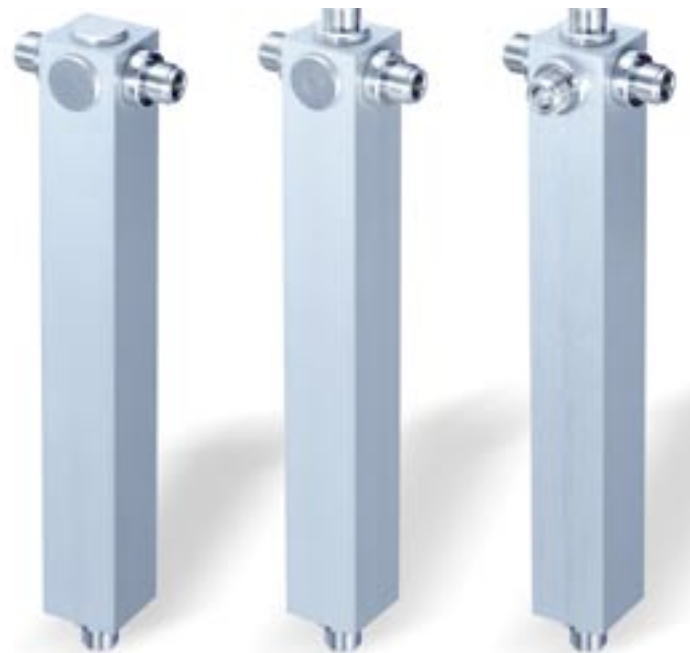
- Applications for a broad frequency range from 800 to 2200 MHz
- Indoor and outdoor use

Technical characteristics

Frequency	800 to 2200 MHz
Insertion loss	≤ 0.05 dB
Intermodulation (3 rd order)	≤ -110 dBm @ 2 x 43 dBm carrier
Power	max. 1000 W for DIN 7-16 type max. 800 W for N type

Broadband power splitter N type

Description	Order number
2-way	S45055-Z61-A456
3-way	S45055-Z61-A457
4-way	S45055-Z61-A458



2-way

3-way

4-way

Broadband power splitter DIN 7-16 type

Description	Order number
2-way	S45055-Z61-A459
3-way	S45055-Z61-A460
4-way	S45055-Z61-A461



2-way

3-way

4-way



Grounding Kits

FlexLine grounding kits are used for the low-induction connection of cable systems to the antenna site ground. They discharge any lightning strikes that occur to ground. For equipotential bonding on site, the grounding kits are installed in the upper cable ends, in the vicinity of the mast foundation and at the building entrances. In longer feeder systems, additional ground connections are recommended at distances of every 60 m.

FlexLine grounding kits demonstrate the following features:

- Simple, rapid and safe installation
- Compact version with no loose component parts
- High security against lightning strikes
- Contact resistance < 1 m Ω
- Installation time of approx. 3 min
- Waterproof to IP 68
- Weather-resistant due to the use of stainless steel
- DIN EN 50164-1, VDE 0185 part 201:2000-4
- max. current 100 kA +/- 10 %

Grounding kit QEM

	Cable type	Order number
QEM - 14 - P	FlexLine 1/4" S	S45055-Z61-A427
QEM - 38 - P	FlexLine 1/4"R + 3/8"S	S45055-Z61-A428
QEM - 12 - P	FlexLine 1/2" S + R	S45055-Z61-A429
QEM - 78 - P	FlexLine 7/8" S + R	S45055-Z61-A430
QEM - 114 - P	FlexLine 1 1/4" R	S45055-Z61-A431
QEM - 158 - P	FlexLine 1 5/8" R	S45055-Z61-A432

Grounding kit QEM

**Grounding kit KMT**

Normal exit	Cable type	Order number
KMT 7-N, Ø 7-8mm	FlexLine 1/4" S	S45055-Z61-A1
KMT 9-N, Ø 8-9mm	FlexLine 1/4" R	S45055-Z61-A560
KMT 11-N, Ø 10-11mm	FlexLine 3/8" S	S45055-Z61-A2
KMT 14-N, Ø 13-14mm	FlexLine 1/2" S	S45055-Z61-A463
KMT 1/2"-N, Ø 16-17mm	FlexLine 1/2" R	S45055-Z61-A3
KMT 7/8"-N, Ø 26-28mm	FlexLine 7/8" R + S	S45055-Z61-A4
KMT 1.1/4"-N, Ø 38-40mm	FlexLine 1 1/4" R	S45055-Z61-A5
KMT 1.5/8"-N, Ø 50-52mm	FlexLine 1 5/8" R	S45055-Z61-A6

Grounding kit KMT-N

**Grounding kit KMT**

Parallel exit	Cable type	Order number
KMT 7-P, Ø 7-8mm	FlexLine 1/4" S	S45055-Z61-A7
KMT 9-P, Ø 8-9mm	FlexLine 1/4" R	S45055-Z61-A561
KMT 11-P, Ø 10-11mm	FlexLine 3/8" S	S45055-Z61-A8
KMT 14-P, Ø 13-14mm	FlexLine 1/2" S	S45055-Z61-A464
KMT 1/2"-P, Ø 16-17mm	FlexLine 1/2" R	S45055-Z61-A9
KMT 7/8"-P, Ø 26-28mm	FlexLine 7/8" R + S	S45055-Z61-A10
KMT 1.1/4"-P, Ø 38-40mm	FlexLine 1 1/4" R	S45055-Z61-A11
KMT 1.5/8"-P, Ø 50-52mm	FlexLine 1 5/8" R	S45055-Z61-A12

Grounding kit KMT-P

**Grounding kit KMT**

45° exit	Cable type	Order number
KMT 7-Y, Ø 7-8mm	FlexLine 1/4" S	S45055-Z61-A707
KMT 9-Y, Ø 8-9mm	FlexLine 1/4" R	S45055-Z61-A708
KMT 11-Y, Ø 10-11mm	FlexLine 3/8" S	S45055-Z61-A709
KMT 14-Y, Ø 13-14mm	FlexLine 1/2" S	S45055-Z61-A710
KMT 1/2"-Y, Ø 16-17mm	FlexLine 1/2" R	S45055-Z61-A711
KMT 7/8"-Y, Ø 26-28mm	FlexLine 7/8" R + S	S45055-Z61-A712
KMT 1.1/4"-Y, Ø 38-40mm	FlexLine 1 1/4" R	S45055-Z61-A713
KMT 1.5/8"-Y, Ø 50-52mm	FlexLine 1 5/8" R	S45055-Z61-A714

Grounding kit KMT-Y

**Universal earthing kit**

	Cable type	Order number
UEK 1	1/4" S+R, 3/8" S	S45055-Z61-A601
UEK 2	3/8" R, 1/2" S+R, 7/8" S+R	S45055-Z61-A602
UEK 3	1 1/4" R, 1 5/8" R	S45055-Z61-A603

Universal earthing kit UEK





Installation Material

The FlexLine installation materials are simple and easy to assemble.

Quality components are used to provide the reliability for years of trouble-free installations. FlexLine high-grade clamps will not slip or become deformed when installed on FlexLine cables. Installation is made easy by the extremely simple operation of the clamps. The cable is laid in the clamp and the clamping trough is inserted. The trough automatically attaches to the clamp thus securing the cable. All FlexLine clamping troughs are made of reinforced fibreglass and UV-resistant plastic. The metal parts of the clamps are made of stainless steel.

There are various models of clamps available depending on the number of cables to be secured and the type of mounting required. A swing-out clamp is available that enables attachment to non-horizontal and non-vertical profiles.



RF A3-cable clamps, hooking on angular 30 x 30 mm

Cable type	Description	Order number
1/4" S	RF A3/ 1x8	S45055-Z61-A490
	RF A3/ 2x8	S45055-Z61-A498
	RF A3/ 3x8	S45055-Z61-A508
	RF A3/ 4x8	S45055-Z61-A518
	RF A3/ 8x8	S45055-Z61-A523
3/8" S	RF A3/ 1x11	S45055-Z61-A493
	RF A3/ 2x11	S45055-Z61-A502
	RF A3/ 3x11	S45055-Z61-A511
	RF A3/ 4x11	S45055-Z61-A520
	RF A3/ 6x11	S45055-Z61-A680
	RF A3/ 8x11	S45055-Z61-A525
1/2" S	RF A3/ 1x1/2"S (14)	S45055-Z61-A495
	RF A3/ 2x1/2"S (14)	S45055-Z61-A504
	RF A3/ 3x1/2"S (14)	S45055-Z61-A513
1/2" R	RF A3/ 1x1/2" (17)	S45055-Z61-A494
	RF A3/ 2x1/2" (17)	S45055-Z61-A503
	RF A3/ 3x1/2" (17)	S45055-Z61-A512
	RF A3/ 4x1/2" (17)	S45055-Z61-A521
	RF A3/ 6x1/2" (17)	S45055-Z61-A681
	RF A3/ 8x1/2" (17)	S45055-Z61-A526
7/8" R + S	RF A3/ 1x7/8" (28)	S45055-Z61-A496
	RF A3/ 2x7/8" (28)	S45055-Z61-A506
	RF A3/ 3x7/8" (28)	S45055-Z61-A515
	RF A3/ 4x7/8" (28)	S45055-Z61-A522
	RF A3/ 6x7/8" (28)	S45055-Z61-A682
	RF A3/ 8x7/8" (28)	S45055-Z61-A527
1 1/4" R	RF A3/ 1x1.1/4" (40)	S45055-Z61-A487
	RF A3/ 2x1.1/4" (40)	S45055-Z61-A488
	RF A3/ 3x1.1/4" (40)	S45055-Z61-A516
1 5/8" R	RF A3/ 1x1.5/8" (52)	S45055-Z61-A497
	RF A3/ 2x1.5/8" (52)	S45055-Z61-A507
	RF A3/ 3x1.5/8" (52)	S45055-Z61-A517

RF A4-cable clamps, hooking on angular 40 x 40 mm

Cable type	Description	Order number
1/4" S	RF A4/ 1x8	S45055-Z61-A59
	RF A4/ 2x8	S45055-Z61-A65
	RF A4/ 3x8	S45055-Z61-A71
	RF A4/ 4x8	S45055-Z61-A224
	RF A4/ 8x8	S45055-Z61-A729
3/8" S	RF A4/ 1/11	S45055-Z61-A60
	RF A4/ 2x11	S45055-Z61-A66
	RF A4/ 3x11	S45055-Z61-A72
	RF A4/ 4x11	S45055-Z61-A115
	RF A4/ 6x11	S45055-Z61-A683
	RF A4/ 8x11	S45055-Z61-A730
1/2" S	RF A4/ 1x1/2"S (14)	S45055-Z61-A218
	RF A4/ 2x1/2"S (14)	S45055-Z61-A220
	RF A4/ 3x1/2"S (14)	S45055-Z61-A222
1/2" R	RF A4/ 1x1/2" (17)	S45055-Z61-A61
	RF A4/ 2x1/2" (17)	S45055-Z61-A67
	RF A4/ 3x1/2" (17)	S45055-Z61-A73
	RF A4/ 4x1/2" (17)	S45055-Z61-A116
	RF A4/ 6x1/2" (17)	S45055-Z61-A684
	RF A4/ 8x1/2" (17)	S45055-Z61-A731
7/8" R + S	RF A4/ 1x7/8" (28)	S45055-Z61-A62
	RF A4/ 2x7/8" (28)	S45055-Z61-A68
	RF A4/ 3x7/8" (28)	S45055-Z61-A74
	RF A4/ 4x7/8" (28)	S45055-Z61-A117
	RF A4/ 6x7/8" (28)	S45055-Z61-A685
	RF A4/ 8x7/8" (28)	S45055-Z61-A732
1 1/4" R	RF A4/ 1x1.1/4" (40)	S45055-Z61-A63
	RF A4/ 2x1.1/4" (40)	S45055-Z61-A69
	RF A4/ 3x1.1/4" (40)	S45055-Z61-A75
1 5/8" R	RF A4/ 1x1.5/8" (52)	S45055-Z61-A64
	RF A4/ 2x1.5/8" (52)	S45055-Z61-A70
	RF A4/ 3x1.5/8" (52)	S45055-Z61-A76



RF A5-cable clamps, hooking on angular 50 x 50 mm

Cable type	Description	Order number
1/4" S	RF A5/ 1x8	S45055-Z61-A77
	RF A5/ 2x8	S45055-Z61-A83
	RF A5/ 3x8	S45055-Z61-A89
	RF A5/ 4x8	S45055-Z61-A231
	RF A5/ 8x8	S45055-Z61-A733
3/8" S	RF A5/ 1x11	S45055-Z61-A78
	RF A5/ 2x11	S45055-Z61-A84
	RF A5/ 3x11	S45055-Z61-A90
	RF A5/ 4x11	S45055-Z61-A95
	RF A5/ 6x11	S45055-Z61-A686
	RF A5/ 8x11	S45055-Z61-A734
1/2" S	RF A5/ 1x1/2"S(14)	S45055-Z61-A225
	RF A5/ 2x1/2"S(14)	S45055-Z61-A227
	RF A5/ 3x1/2"S(14)	S45055-Z61-A229
1/2" R	RF A5/ 1x1/2"(17)	S45055-Z61-A79
	RF A5/ 2x1/2"(17)	S45055-Z61-A85
	RF A5/ 3x1/2"(17)	S45055-Z61-A91
	RF A5/ 4x1/2"(17)	S45055-Z61-A96
	RF A5/ 6x1/2"(17)	S45055-Z61-A687
	RF A5/ 8x1/2"(17)	S45055-Z61-A735
7/8" R	RF A5/ 1x7/8"(28)	S45055-Z61-A80
	RF A5/ 2x7/8"(28)	S45055-Z61-A86
	RF A5/ 3x7/8"(28)	S45055-Z61-A92
	RF A5/ 4x7/8"(28)	S45055-Z61-A97
	RF A5/ 6x7/8"(28)	S45055-Z61-A688
	RF A5/ 8x7/8"(28)	S45055-Z61-A736
1 1/4" R	RF A5/ 1x1.1/4"(40)	S45055-Z61-A81
	RF A5/ 2x1.1/4"(40)	S45055-Z61-A87
	RF A5/ 3x1.1/4"(40)	S45055-Z61-A93
1 5/8" R	RF A5/ 1x1.5/8"(52)	S45055-Z61-A82
	RF A5/ 2x1.5/8"(52)	S45055-Z61-A88
	RF A5/ 3x1.5/8"(52)	S45055-Z61-A94

RF B-cable clamps, hooking on flat and round 3 – 12 mm

Cable type	Description	Order number
1/4" S	RF B/ 1x8	S45055-Z61-A98
	RF B/ 2x8	S45055-Z61-A17
	RF B/ 3x8	S45055-Z61-A23
	RF B/ 4x8	S45055-Z61-A238
	RF B/ 8x8	S45055-Z61-A737
	3/8" S	RF B/ 1x11
RF B/ 2x11		S45055-Z61-A18
RF B/ 3x11		S45055-Z61-A24
RF B/ 4x11		S45055-Z61-A118
RF B/ 6x11		S45055-Z61-A689
RF B/ 8x11		S45055-Z61-A738
1/2" S	RF B/ 1x1/2"S (14)	S45055-Z61-A232
	RF B/ 2x1/2"S (14)	S45055-Z61-A234
	RF B/ 3x1/2"S (14)	S45055-Z61-A236
1/2" R	RF B/ 1x1/2" (17)	S45055-Z61-A100
	RF B/ 2x1/2" (17)	S45055-Z61-A19
	RF B/ 3x1/2" (17)	S45055-Z61-A25
	RF B/ 4x1/2" (17)	S45055-Z61-A119
	RF B/ 6x1/2" (17)	S45055-Z61-A690
	RF B/ 8x1/2" (17)	S45055-Z61-A739
7/8" R + S	RF B/ 1x7/8" (28)	S45055-Z61-A101
	RF B/ 2x7/8" (28)	S45055-Z61-A20
	RF B/ 3x7/8" (28)	S45055-Z61-A26
	RF B/ 4x7/8" (28)	S45055-Z61-A120
	RF B/ 6x7/8" (28)	S45055-Z61-A691
	RF B/ 8x7/8" (28)	S45055-Z61-A740
1 1/4" R	RF B/ 1x1.1/4" (40)	S45055-Z61-A102
	RF B/ 2x1.1/4" (40)	S45055-Z61-A21
	RF B/ 3x1.1/4" (40)	S45055-Z61-A27
1 5/8" R	RF B/ 1x1.5/8" (52)	S45055-Z61-A103
	RF B/ 2x1.5/8" (52)	S45055-Z61-A22
	RF B/ 3x1.5/8" (52)	S45055-Z61-A121



RF C-cable clamps, hooking on section 40 x 22 mm

Cable type	Description	Order number
1/4" S	RF C/ 1x8	S45055-Z61-A28
	RF C/ 2x8	S45055-Z61-A34
	RF C/ 3x8	S45055-Z61-A40
	RF C/ 4x8	S45055-Z61-A252
	RF C/ 8x8	S45055-Z61-A741
3/8" S	RF C/ 1x11	S45055-Z61-A29
	RF C/ 2x11	S45055-Z61-A35
	RF C/ 3x11	S45055-Z61-A41
	RF C/ 4x11	S45055-Z61-A46
	RF C/ 6x11	S45055-Z61-A692
	RF C/ 8x11	S45055-Z61-A742
1/2" S	RF C/ 1x1/2"S (14)	S45055-Z61-A246
	RF C/ 2x1/2"S (14)	S45055-Z61-A248
	RF C/ 3x1/2"S (14)	S45055-Z61-A250
1/2" R	RF C/ 1x1/2" (17)	S45055-Z61-A30
	RF C/ 2x1/2" (17)	S45055-Z61-A36
	RF C/ 3x1/2" (17)	S45055-Z61-A42
	RF C/ 4x1/2" (17)	S45055-Z61-A47
	RF C/ 6x1/2" (17)	S45055-Z61-A693
	RF C/ 8x1/2" (17)	S45055-Z61-A743
7/8" R + S	RF C/ 1x7/8" (28)	S45055-Z61-A31
	RF C/ 2x7/8" (28)	S45055-Z61-A37
	RF C/ 3x7/8" (28)	S45055-Z61-A43
	RF C/ 4x7/8" (28)	S45055-Z61-A48
	RF C/ 6x7/8" (28)	S45055-Z61-A694
	RF C/ 8x7/8" (28)	S45055-Z61-A744
1 1/4" R	RF C/ 1x1.1/4" (40)	S45055-Z61-A32
	RF C/ 2x1.1/4" (40)	S45055-Z61-A38
	RF C/ 3x1.1/4" (40)	S45055-Z61-A44
1 5/8" R	RF C/ 1x1.5/8" (52)	S45055-Z61-A33
	RF C/ 2x1.5/8" (52)	S45055-Z61-A39
	RF C/ 3x1.5/8" (52)	S45055-Z61-A45

RF D-cable clamps, hooking on section PCI 35 x 18 mm

Cable type	Description	Order number
1/4" S	RF D/ 1x8	S45055-Z61-A750
	RF D/ 2x8	S45055-Z61-A751
	RF D/ 3x8	S45055-Z61-A752
	RF D/ 4x8	S45055-Z61-A753
	RF D/ 8x8	S45055-Z61-A754
3/8" S	RF D/ 1x11	S45055-Z61-A755
	RF D/ 2x11	S45055-Z61-A756
	RF D/ 3x11	S45055-Z61-A757
	RF D/ 4x11	S45055-Z61-A758
	RF D/ 6x11	S45055-Z61-A759
	RF D/ 8x11	S45055-Z61-A760
1/2" S	RF D/ 1x1/2"S (14)	S45055-Z61-A761
	RF D/ 2x1/2"S (14)	S45055-Z61-A762
	RF D/ 3x1/2"S (14)	S45055-Z61-A763
1/2" R	RF D/ 1x1/2" (17)	S45055-Z61-A764
	RF D/ 2x1/2" (17)	S45055-Z61-A765
	RF D/ 3x1/2" (17)	S45055-Z61-A766
	RF D/ 4x1/2" (17)	S45055-Z61-A767
	RF D/ 6x1/2" (17)	S45055-Z61-A768
	RF D/ 8x1/2" (17)	S45055-Z61-A769
7/8" R + S	RF D/ 1x7/8" (28)	S45055-Z61-A770
	RF D/ 2x7/8" (28)	S45055-Z61-A771
	RF D/ 3x7/8" (28)	S45055-Z61-A772
	RF D/ 4x7/8" (28)	S45055-Z61-A773
	RF D/ 6x7/8" (28)	S45055-Z61-A774
	RF D/ 8x7/8" (28)	S45055-Z61-A775
1 1/4" R	RF D/ 1x1.1/4" (40)	S45055-Z61-A776
	RF D/ 2x1.1/4" (40)	S45055-Z61-A777
	RF D/ 3x1.1/4" (40)	S45055-Z61-A778
1 5/8" R	RF D/ 1x1.5/8" (52)	S45055-Z61-A779
	RF D/ 2x1.5/8" (52)	S45055-Z61-A780
	RF D/ 3x1.5/8" (52)	S45055-Z61-A781



**RF E-cable clamps,
hooking on section PCI 40 x 22, flat and round 3 – 12 mm**

Cable type	Description	Order number
1/4" S	RF E/ 1x8	S45055-Z61-A782
	RF E/ 2x8	S45055-Z61-A783
	RF E/ 3x8	S45055-Z61-A784
	RF E/ 4x8	S45055-Z61-A785
	RF E/ 8x8	S45055-Z61-A786
3/8" S	RF E/ 1x11	S45055-Z61-A787
	RF E/ 2x11	S45055-Z61-A788
	RF E/ 3x11	S45055-Z61-A789
	RF E/ 4x11	S45055-Z61-A790
	RF E/ 6x11	S45055-Z61-A791
	RF E/ 8x11	S45055-Z61-A792
1/2" S	RF E/ 1x1/2"S (14)	S45055-Z61-A793
	RF E/ 2x1/2"S (14)	S45055-Z61-A794
	RF E/ 3x1/2"S (14)	S45055-Z61-A795
1/2" R	RF E/ 1x1/2" (17)	S45055-Z61-A796
	RF E/ 2x1/2" (17)	S45055-Z61-A797
	RF E/ 3x1/2" (17)	S45055-Z61-A798
	RF E/ 4x1/2" (17)	S45055-Z61-A799
	RF E/ 6x1/2" (17)	S45055-Z61-A800
	RF E/ 8x1/2" (17)	S45055-Z61-A801
7/8" R + S	RF E/ 1x7/8" (28)	S45055-Z61-A802
	RF E/ 2x7/8" (28)	S45055-Z61-A803
	RF E/ 3x7/8" (28)	S45055-Z61-A804
	RF E/ 4x7/8" (28)	S45055-Z61-A805
	RF E/ 6x7/8" (28)	S45055-Z61-A806
	RF E/ 8x7/8" (28)	S45055-Z61-A807
1 1/4" R	RF E/ 1x1.1/4" (40)	S45055-Z61-A809
	RF E/ 2x1.1/4" (40)	S45055-Z61-A810
	RF E/ 3x1.1/4" (40)	S45055-Z61-A811
1 5/8" R	RF E/ 1x1.5/8" (52)	S45055-Z61-A812
	RF E/ 2x1.5/8" (52)	S45055-Z61-A813
	RF E/ 3x1.5/8" (52)	S45055-Z61-A814



**RF M-cable clamps,
hooking on round 8-25mm and flat 3 – 25 mm**

Cable type	Description	Order number
1/4" S	RF M/ 1x8	S45055-Z61-A49
	RF M/ 2x8	S45055-Z61-A55
	RF M/ 3x8	S45055-Z61-A106
	RF M/ 4x8	S45055-Z61-A245
	RF M/ 8x8	S45055-Z61-A745
3/8" S	RF M/ 1x11	S45055-Z61-A50
	RF M/ 2x11	S45055-Z61-A56
	RF M/ 3x11	S45055-Z61-A107
	RF M/ 4x11	S45055-Z61-A112
	RF M/ 6x11	S45055-Z61-A695
	RF M/ 8x11	S45055-Z61-A746
1/2" S	RF M/ 1x1/2"S (14)	S45055-Z61-A239
	RF M/ 2x1/2"S (14)	S45055-Z61-A241
	RF M/ 3x1/2"S (14)	S45055-Z61-A243
1/2" R	RF M/ 1x1/2" (17)	S45055-Z61-A51
	RF M/ 2x1/2" (17)	S45055-Z61-A57
	RF M/ 3x1/2" (17)	S45055-Z61-A108
	RF M/ 4x1/2" (17)	S45055-Z61-A113
	RF M/ 6x1/2" (17)	S45055-Z61-A696
	RF M/ 8x1/2" (17)	S45055-Z61-A747
7/8" R + S	RF M/ 1x7/8" (28)	S45055-Z61-A52
	RF M/ 2x7/8" (28)	S45055-Z61-A58
	RF M/ 3x7/8" (28)	S45055-Z61-A109
	RF M/ 4x7/8" (28)	S45055-Z61-A114
	RF M/ 6x7/8" (28)	S45055-Z61-A697
	RF M/ 8x7/8" (28)	S45055-Z61-A748
1 1/4" R	RF M/ 1x1.1/4" (40)	S45055-Z61-A53
	RF M/ 2x1.1/4" (40)	S45055-Z61-A104
	RF M/ 3x1.1/4" (40)	S45055-Z61-A110
1 5/8" R	RF M/ 1x1.5/8" (52)	S45055-Z61-A54
	RF M/ 2x1.5/8" (52)	S45055-Z61-A105
	RF M/ 3x1.5/8" (52)	S45055-Z61-A111



Single calibrated saddles for RF cables clamps and RF Q collars

Cable type	Description	Order number
1/4" S	SAS 8	S45055-Z61-A815
3/8" S	SAS 11	S45055-Z61-A816
1/2" S	SAS 1/2"S (14)	S45055-Z61-A817
1/2" R	SAS 1/2" (17)	S45055-Z61-A818
7/8" R + S	SAS 7/8" (28)	S45055-Z61-A819
1 1/4" R	SAS 1 1/4" (40)	S45055-Z61-A820
1 5/8" R	SAS 1 5/8" (52)	S45055-Z61-A821



Twin calibrated saddles for RF cables clamps and RF Q collars

Cable type	Description	Order number
1/4" S	SAT 8x2	S45055-Z61-A822
3/8" S	SAT 11x2	S45055-Z61-A823
1/2" S	SAT 1/2"Sx2 (14)	S45055-Z61-A824
1/2" R	SAT 1/2"x2 (17)	S45055-Z61-A825
7/8" R + S	SAT 7/8"x2 (28)	S45055-Z61-A826



Universal cable clamps with calibrated saddles

Cable type	Description	Order number
1/4" R	UC/ 2x9	S45055-Z61-A483
	UC/ 4x9	S45055-Z61-A548
	UC/ 6x9	S45055-Z61-A549
	UC/ 8x9	S45055-Z61-A550
3/8" S	UC/ 2x11	S45055-Z61-A133
	UC/ 4x11	S45055-Z61-A134
	UC/ 6x11	S45055-Z61-A135
	UC/ 8x11	S45055-Z61-A196
1/2" S	UC/ 2x1/2" (14)	S45055-Z61-A139
	UC/ 4x1/2" (14)	S45055-Z61-A140
	UC/ 6x1/2" (14)	S45055-Z61-A141
	UC/ 8x1/2" (14)	S45055-Z61-A198
1/2" R	UC/ 2x1/2" (17)	S45055-Z61-A142
	UC/ 4x1/2" (17)	S45055-Z61-A143
	UC/ 6x1/2" (17)	S45055-Z61-A144
	UC/ 8x1/2" (17)	S45055-Z61-A199
7/8" R + S	UC/ 2x7/8" (28)	S45055-Z61-A129
	UC/ 4x7/8" (28)	S45055-Z61-A130
	UC/ 6x7/8" (28)	S45055-Z61-A131
	UC/ 8x7/8" (28)	S45055-Z61-A201
1 1/4" R	UC/ 2x1 1/4" (40)	S45055-Z61-A148
	UC/ 4x1 1/4" (40)	S45055-Z61-A149
	UC/ 6x1 1/4" (40)	S45055-Z61-A486
1 5/8" R	UC/ 2x1 5/8" (52)	S45055-Z61-A194
	UC/ 4x1 5/8" (52)	S45055-Z61-A195
	UC/ 6x1 5/8" (52)	S45055-Z61-A485



**Universal cable clamps
with calibrated saddles complete with MCM compact clamp**

Cable type	Description	Order number
1/4" R	UCC/ 2x9	S45055-Z61-A551
	UCC/ 4x9	S45055-Z61-A552
	UCC/ 6x9	S45055-Z61-A553
	UCC/ 8x9	S45055-Z61-A554
3/8" S	UCC/ 2x11	S45055-Z61-A150
	UCC/ 4x11	S45055-Z61-A151
	UCC/ 6x11	S45055-Z61-A152
	UCC/ 8x11	S45055-Z61-A204
1/2" S	UCC/ 2x1/2" (14)	S45055-Z61-A154
	UCC/ 4x1/2" (14)	S45055-Z61-A155
	UCC/ 6x1/2" (14)	S45055-Z61-A156
	UCC/ 8x1/2" (14)	S45055-Z61-A206
1/2" R	UCC/ 2x1/2" (17)	S45055-Z61-A157
	UCC/ 4x1/2" (17)	S45055-Z61-A158
	UCC/ 6x1/2" (17)	S45055-Z61-A159
	UCC/ 8x1/2" (17)	S45055-Z61-A207
7/8" R + S	UCC/ 2x7/8" (28)	S45055-Z61-A163
	UCC/ 4x7/8" (28)	S45055-Z61-A164
	UCC/ 6x7/8" (28)	S45055-Z61-A165
	UCC/ 8x7/8" (28)	S45055-Z61-A209
1 1/4" R	UCC/ 2x1 1/4" (40)	S45055-Z61-A166
	UCC/ 4x1 1/4" (40)	S45055-Z61-A167
	UCC/ 6x1 1/4" (40)	S45055-Z61-A678
1 5/8" R	UCC/ 2x1 5/8" (52)	S45055-Z61-A202
	UCC/ 4x1 5/8" (52)	S45055-Z61-A203
	UCC/ 6x1 5/8" (52)	S45055-Z61-A466



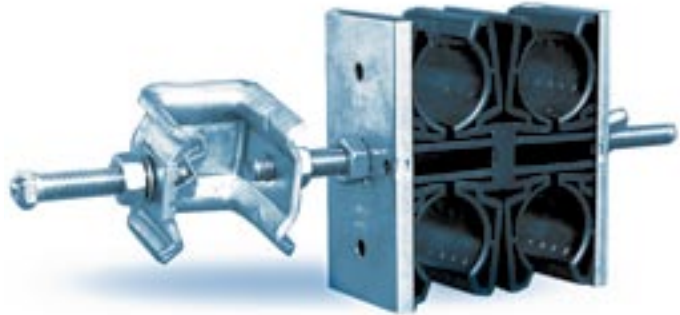
**Universal cable clamps with calibrated saddles complete
with ISL8 insert for PCI 40 x 22 C profile rail**

Cable type	Description	Order number
1/4" R	UCP/ 2x9	S45055-Z61-A555
	UCP/ 4x9	S45055-Z61-A556
	UCP/ 6x9	S45055-Z61-A557
	UCP/ 8x9	S45055-Z61-A559
3/8" S	UCP/ 2x11	S45055-Z61-A168
	UCP/ 4x11	S45055-Z61-A169
	UCP/ 6x11	S45055-Z61-A170
	UCP/ 8x11	S45055-Z61-A212
1/2" S	UCP/ 2x1/2" (14)	S45055-Z61-A174
	UCP/ 4x1/2" (14)	S45055-Z61-A175
	UCP/ 6x1/2" (14)	S45055-Z61-A176
	UCP/ 8x1/2" (14)	S45055-Z61-A214
1/2" R	UCP/ 2x1/2" (17)	S45055-Z61-A177
	UCP/ 4x1/2" (17)	S45055-Z61-A178
	UCP/ 6x1/2" (17)	S45055-Z61-A179
	UCP/ 8x1/2" (17)	S45055-Z61-A215
7/8" R + S	UCP/ 2x7/8" (28)	S45055-Z61-A183
	UCP/ 4x7/8" (28)	S45055-Z61-A184
	UCP/ 6x7/8" (28)	S45055-Z61-A185
	UCP/ 8x7/8" (28)	S45055-Z61-A217
1 1/4" R	UCP/ 2x1 1/4" (40)	S45055-Z61-A186
	UCP/ 4x1 1/4" (40)	S45055-Z61-A187
	UCP/ 6x1 1/4" (40)	S45055-Z61-A749
1 5/8" R	UCP/ 2x1 5/8" (52)	S45055-Z61-A210
	UCP/ 4x1 5/8" (52)	S45055-Z61-A211
	UCP/ 6x1 5/8" (52)	S45055-Z61-A558



Calibrated double saddles

Cable type	Description	Order number
1/4" R	SAB/ 2x9	S45055-Z61-A661
3/8" S	SAB/ 2x11	S45055-Z61-A662
1/2" S	SAB/ 2x1/2"S (14)	S45055-Z61-A664
1/2" R	SAB/ 2x1/2" (17)	S45055-Z61-A666
7/8" R + S	SAB/ 2x7/8 (28)	S45055-Z61-A667
1 1/4" R	SAB/ 2x1.1/4" (40)	S45055-Z61-A668
1 5/8" R	SAB/ 2x1.5/8" (52)	S45055-Z61-A669



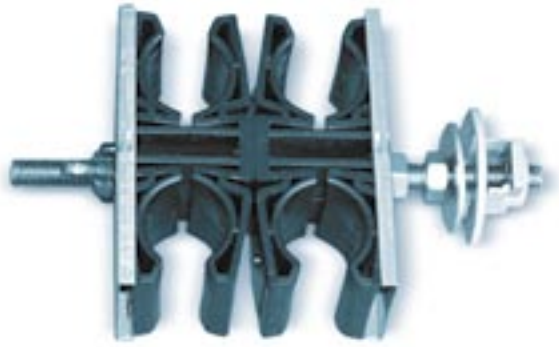
Universal quick-fit fasteners for lateral insertion of cables

Cable type	Description	Order number
1/2" R	LC/ 2x1/2"	S45055-Z61-A625
	LC/ 4x1/2"	S45055-Z61-A629
	LC/ 6x1/2"	S45055-Z61-A633
7/8" R + S	LC/ 2x7/8"	S45055-Z61-A626
	LC/ 4x7/8"	S45055-Z61-A630
	LC/ 6x7/8"	S45055-Z61-A634
1 1/4" R	LC/ 2x1.1/4"	S45055-Z61-A627
	LC/ 4x1.1/4"	S45055-Z61-A631
	LC/ 6x1.1/4"	S45055-Z61-A635
1 5/8" R	LC/ 2x1.58"	S45055-Z61-A628
	LC/ 4x1.58"	S45055-Z61-A632
	LC/ 6x1.58"	S45055-Z61-A636

Universal quick-fit fasteners

for lateral insertion complete with MCM 8 fastening clamp

Cable type	Description	Order number
1/2" R	LCC/ 2x1/2"	S45055-Z61-A637
	LCC/ 4x1/2"	S45055-Z61-A641
	LCC/ 6x1/2"	S45055-Z61-A645
7/8" R + S	LCC/ 2x7/8"	S45055-Z61-A638
	LCC/ 4x7/8"	S45055-Z61-A642
	LCC/ 6x7/8"	S45055-Z61-A646
1 1/4" R	LCC/ 2x1.1/4"	S45055-Z61-A639
	LCC/ 4x1.1/4"	S45055-Z61-A643
	LCC/ 6x1.1/4"	S45055-Z61-A647
1 5/8" R	LCC/ 2x1.58"	S45055-Z61-A640
	LCC/ 4x1.58"	S45055-Z61-A644
	LCC/ 6x1.58"	S45055-Z61-A648



Universal quick-fit fasteners for lateral insertion complete with quick fixing sliding insert ISL8

Cable type	Description	Order number
1/2" R	LCP/ 2x1/2"	S45055-Z61-A649
	LCP/ 4x1/2"	S45055-Z61-A653
	LCP/ 6x1/2"	S45055-Z61-A657
7/8" R + S	LCP/ 2x7/8"	S45055-Z61-A650
	LCP/ 4x7/8"	S45055-Z61-A654
	LCP/ 6x7/8"	S45055-Z61-A658
1 1/4" R	LCP/ 2x1.1/4"	S45055-Z61-A651
	LCP/ 4x1.1/4"	S45055-Z61-A655
	LCP/ 6x1.1/4"	S45055-Z61-A659
1 5/8" R	LCP/ 2x1.58"	S45055-Z61-A652
	LCP/ 4x1.58"	S45055-Z61-A656
	LCP/ 6x1.58"	S45055-Z61-A660



Elastic double saddles

Cable type	Description	Order number
1/2" R	SAL/ 2x1/2"	S45055-Z61-A670
7/8" R + S	SAL/ 2x7/8"	S45055-Z61-A671
1 1/4" R	SAL/ 2x1.1/4"	S45055-Z61-A672
1 5/8" R	SAL/ 2x1.5/8"	S45055-Z61-A673



Compensating bush

Cable type	Description	Order number
1/2" R	BCO/ 1/2"	S45055-Z61-A674
7/8" R + S	BCO/ 7/8"	S45055-Z61-A675
1 1/4" R	BCO/ 1.1/4"	S45055-Z61-A676
1 5/8" R	BCO/ 1.5/8"	S45055-Z61-A677



**Snap-in Hangers,
hooking on flat or angular 3 – 8 mm, 360° revolving**

Cable type	Description	Order number
1/4" R	EMC-A13 - 1/4"R	S45055-Z61-A1000
1/2" S + R	EMC-A20 - 1/2" S + R	S45055-Z61-A1001
7/8" S + H + R	EMC-A30 - 7/8" S + H + R	S45055-Z61-A1002
1 1/4" R + 1 5/8" R	EMC-A52 - 1 1/4" + 1 5/8"	S45055-Z61-A1003



**Snap-in Hangers,
hooking on round 16 – 22 mm, 360° revolving**

Cable type	Description	Order number
1/4" R	EMC-M-13 - 1/4"R	S45055-Z61-A1012
1/2" S + R	EMC-M-20 - 1/2" S + R	S45055-Z61-A1013
7/8" S + H + R	EMC-M-30 - 7/8" S + R	S45055-Z61-A1014
1 1/4" R + 1 5/8" R	EMC-M-52 - 1 1/4" + 1 5/8"	S45055-Z61-A1015



**Snap-in Hangers,
hooking on PSI 30 x 12 profiles, 360° revolving**

Cable type	Description	Order number
1/4" R	EMC-C2-13 - 1/4"R	S45055-Z61-A1008
1/2" S + R	EMC-C2-20 - 1/2" S + R	S45055-Z61-A1009
7/8" S + H + R	EMC-C2-30 - 7/8" S + R	S45055-Z61-A1010
1 1/4" R + 1 5/8" R	EMC-C2-52 - 1 1/4" + 1 5/8"	S45055-Z61-A1011
1/4" R	EMC-S1-13 - 1/4"R	S45055-Z61-A1004
1/2" S + R	EMC-S1-20 - 1/2" S + R	S45055-Z61-A1005
7/8" S + H + R	EMC-S1-30 - 7/8" S + R	S45055-Z61-A1006
1 1/4" R + 1 5/8" R	EMC-S1-52 - 1 1/4" + 1 5/8"	S45055-Z61-A1007



**Snap-in Hangers, hooking on poles various structures by FAS,
FAU clamps and BIT19 strip, 360° revolving**

Cable type	Description	Order number
1/4" R	EMC-U-13 - 1/4"R	S45055-Z61-A1016
1/2" S + R	EMC-U-20 - 1/2" S + R	S45055-Z61-A1017
7/8" S + H + R	EMC-U-30 - 7/8" S + R	S45055-Z61-A1018
1 1/4" R + 1 5/8" R	EMC-U-52 - 1 1/4" + 1 5/8"	S45055-Z61-A1019



MAM



MBM



APM



MIM



GO

Fastening devices

Description	Order number
MAM 8	S45055-Z61-A15
MBM 8	S45055-Z61-A16
MCM 8 – Compact Clamp	S45055-Z61-A132
MCM 8V – Compact Clamp	S45055-Z61-A702
MIM 8/25 – M8 Mini Clamp	S45055-Z61-A593
MIM 8/35 – M8 Mini Clamp	S45055-Z61-A703
STM 105	S45055-Z61-A13
STM 200	S45055-Z61-A14
APM 22 – 1/4", 3/8", 1/2"	S45055-Z61-A188
APM 22/34 – 1/2", 7/8"	S45055-Z61-A189
APM 46 – 1 1/4"	S45055-Z61-A190
APM 46/58 – 1 5/8"	S45055-Z61-A191
BIT 19 – stainless steel strip – 30 m	S45055-Z61-A474
GIT 19 – clips stainless steel	S45055-Z61-A455
UIT 19 – fastening tool	S45055-Z61-A475
GO 38, round collar, inner Ø 38 mm	S45055-Z61-A562
GO 50, round collar, inner Ø 50 mm	S45055-Z61-A563
GO 62, round collar, inner Ø 62 mm	S45055-Z61-A564
GO 80, round collar, inner Ø 80 mm	S45055-Z61-A565
GO 90, round collar, inner Ø 90 mm	S45055-Z61-A566
GO 100, round collar, inner Ø 100 mm	S45055-Z61-A567



Sectorial cushions with round internal profile

Description	Order number
GSR 1x1/4" - (11)	S45055-Z61-A291
GSR 1x1/2" - (17)	S45055-Z61-A290
GSR 1x7/8" - (28)	S45055-Z61-A261
GSR 2x1/4" - (11)	S45055-Z61-A293
GSR 2x1/2" - (17)	S45055-Z61-A292
GSR 2x7/8" + 1x1/4"	S45055-Z61-A294
GSR 2x7/8" + 1x1/2"	S45055-Z61-A295
GSR 3x1/4" - (11)	S45055-Z61-A482

Blind sectorial cushions

GST 90	S45055-Z61-A262
GST 180	S45055-Z61-A375



Round blind cushions for capping unused round holes

GTR -11 (1/4") d.11	S45055-Z61-A286
GTR -17 (1/2") d.17	S45055-Z61-A287
GTR -28 (7/8") d.28	S45055-Z61-A288
GTR -6 d.62	S45055-Z61-A289



Round cushions, round internal profile for coaxials cables

Description	Order number
GR 1x1.1/4" - Ø 90	S45055-Z61-A304
GR 1x1.5/8" - Ø 90	S45055-Z61-A306
GR 4x 7/8" - Ø 90	S45055-Z61-A317
GR 1x 62 - Ø 90	S45055-Z61-A309
GR 1x 1/2" - Ø 62	S45055-Z61-A297
GR 1x 1/4" - Ø 62	S45055-Z61-A299
GR 1x 7/8" - Ø 62	S45055-Z61-A301
GR 1x1.1/4" - Ø 62	S45055-Z61-A303
GR 1x1.5/8" - Ø 62	S45055-Z61-A305
GR 2x 1/2" - Ø 62	S45055-Z61-A310
GR 2x 1/4" - Ø 62	S45055-Z61-A312
GR 2x 7/8" - Ø 62	S45055-Z61-A313
GR 3x 1/2" - Ø 62	S45055-Z61-A314
GR 3x 7/8" - Ø 62	S45055-Z61-A315
GR 4x 1/4" - Ø 62	S45055-Z61-A316



Monobloc wall entries waterproof and fire resistant

Description	Order number
PPS 0 (1 x Ø 90)	S45055-Z61-A615
PPS 1 (1 x Ø 90)	S45055-Z61-A616
PPS 2 (2 x Ø 90)	S45055-Z61-A617
PPS 3 (3 x Ø 90)	S45055-Z61-A618
PPS 2x2 (4 x Ø 90)	S45055-Z61-A619
PPS 2x3 (6 x Ø 90)	S45055-Z61-A620
PPS 2X4 (8 x Ø 90)	S45055-Z61-A621
PPS 2X5 (10 x Ø 90)	S45055-Z61-A622
PMS 2X6 (12 x Ø 90)	S45055-Z61-A623



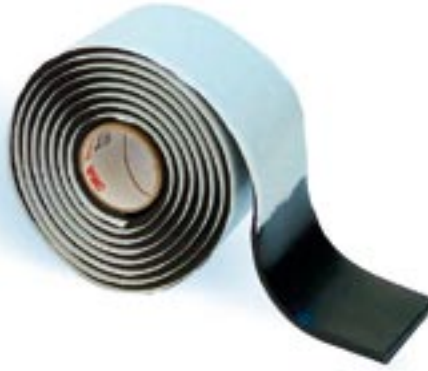
Insulation & Weatherproofing

3M™ Cold shrink kit

The cold shrink sealing kits are specially designed for cable installations. Cold shrink is the fastest way to secure water-proof protection for connectors, splices and jumper-antenna interfaces. Installation is quick and easy and no tools are required. The shrinking process is performed by removing (unwinding) the core from inner side of the cold shrink kit.

Weatherproofing tapes

Weatherproofing tapes are used for protection of connectors, splices and interfaces that are exposed to corrosive environmental conditions. They also help to prevent the loosening of connectors at interfaces that are subjected to vibration.



3M Cold shrink™	Supported cable types	Application diameter	Length	Order number
Cold Shrink™ jumper/antenna 1/2"	1/2" – Antenna connector	39.0 mm – 13.5 mm	150 mm (5.9 in)	S45055-Z61-A433
Cold Shrink Coax-Kit 1/2" to 7/8"	1/2" to 7/8"	49.3 mm – 13.5 mm	220 mm (8.7 in)	S45055-Z61-A434
Cold Shrink Coax-Kit 1/2" to 1 5/8"	1/2" to 1 1/4" and 1/2" to 1 5/8"	67.8 mm – 13.5 mm	280 mm (11 in)	S45055-Z61-A435

3M Insulating material	Dimensions	Length per roll	Operating temperature	Order number
Scotchfil, Electrical insulation putty	38 mm x 3.20 mm (1.5 in x 0.125 in)	1.5 m (4.9 ft)	up to +80 °C (176 °F)	S45055-Z61-A436
Scotch 23, All voltage splicing tape	19 mm x 0.75 mm (0.75 in x 0.03 in)	9 m (29.5 ft)	up to +90 °C (194 °F)	S45055-Z61-A437
Scotch 710, Vinyl electrical tape	19 mm x 0.17 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	-10 °C to +90 °C (14 °F to 194 °F)	S45055-Z61-A438
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	6 m (19.7 ft)	up to +105 °C (221 °F)	S45055-Z61-A604
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	up to +105 °C (221 °F)	S45055-Z61-A605
Scotch 33+, Vinyl electrical tape, bk	19 mm x 0.18 mm (0.75 in x 0.01 in)	33 m (9.8 ft)	up to +105 °C (221 °F)	S45055-Z61-A607
Scotch 33+, Vinyl electrical tape, gy	19 mm x 0.18 mm (0.75 in x 0.01 in)	20 m (65.6 ft)	up to +105 °C (221 °F)	S45055-Z61-A829

Insulating material	Dimensions	Length per roll	Operating temperature	Order number
SCAPA 34 Electrical insulation putty	38 mm x 3.00 mm (1.5 in x 0.125 in)	1.5 m (4.9 ft)	-30 °C to +90 °C (-22 °F to 194 °F)	S45055-Z61-A728
NAS 1 Self agglomerating silicon rubber tape	25 mm x 0.50 mm (0.98 in x 0.02 in)	1.0 m (3.3 ft)	-50 °C to +150 °C (-58 °F to 302 °F)	S45055-Z61-A444
NAS 10 Self agglomerating silicon rubber tape	25 mm x 0.50 mm (0.98 in x 0.02 in)	10 m (32.8 ft)	-50 °C to +150 °C (-58 °F to 302 °F)	S45055-Z61-A445
NEP 19 Self agglomerating tape	19 mm x 0,75 mm (0.75 in x 0.03)	10 m (32.8 ft)	-40 °C to + 70 °C (-40 °F to 158 °F)	S45055-Z61-A705

Heat-shrinking tubes for the protection of cable joints

	Supported cable types	Application diameter	Length	Order number
MWT-M 25/ 8, Heat shrinking tubes	1/2" to 3/8"	25 mm (shrunked 8 mm)	1 m (3.3 ft)	S45055-Z61-A574
MWT-M 35/ 12, Heat shrinking tubes	7/8"	35 mm (shrunked 12 mm)	1 m (3.3 ft)	S45055-Z61-A575
MWT-M 50/ 16, Heat shrinking tubes	1 1/4"	50 mm (shrunked 16 mm)	1 m (3.3 ft)	S45055-Z61-A576
MWT-M 63/ 19, Heat shrinking tubes	1 5/8"	63 mm (shrunked 19 mm)	1 m (3.3 ft)	S45055-Z61-A577



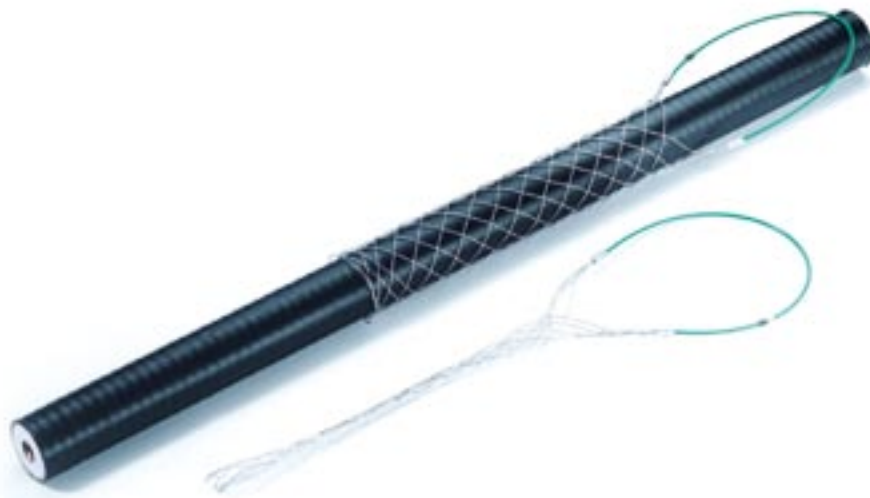
Hoisting Grips

Hoisting grips are important tools for the installation of FlexLine RF-cables.

In use for many years, hoisting grips insure a smooth and safe distribution of tensile forces from the pulling member onto the cable.

Only with a suitable hoisting grip, can the maximum cable pull force be applied without elongation, deformation or damage. A wide range of hoisting grips are offered.

The assortment of hoisting grips includes both open and closed versions. The closed version is used at the end of a standard feeder cable. The open version is typically used on feeder cables with attached connectors and can be applied at any point along the cable. Open and closed versions are offered in either galvanized steel or stainless steel.



Cable type	Description	Application diameter		Order number
1/2" R	Cable grip, closed, galvanized steel	15 – 18 mm	(0.59 – 0.71 in)	S45055-Z61-A568
	Cable grip, closed, stainless steel	16 – 18 mm	(0.59 – 0.71 in)	S45055-Z61-A588
	Cable grip, lace-up, galvanized steel	15 – 25 mm	(0.59 – 0.98 in)	S45055-Z61-A715
	Cable grip, lace-up, stainless steel	16 – 25 mm	(0.59 – 0.98 in)	S45055-Z61-A718
7/8" R + S	Cable grip, closed, galvanized steel	22 – 28 mm	(0.87 – 1.10 in)	S45055-Z61-A569
	Cable grip, closed, stainless steel	23 – 28 mm	(0.87 – 1.10 in)	S45055-Z61-A589
	Cable grip, lace-up, galvanized steel	25 – 45 mm	(0.98 – 1.77 in)	S45055-Z61-A716
	Cable grip, lace-up, stainless steel	25 – 45 mm	(0.98 – 1.77 in)	S45055-Z61-A719
1 1/4" R	Cable grip, closed, galvanized steel	37 – 44 mm	(1.46 – 1.73 in)	S45055-Z61-A570
	Cable grip, closed, stainless steel	37 – 44 mm	(1.46 – 1.73 in)	S45055-Z61-A590
	Cable grip, lace-up, galvanized steel	25 – 45 mm	(0.98 – 1.77 in)	S45055-Z61-A716
	Cable grip, lace-up, stainless steel	25 – 45 mm	(0.98 – 1.77 in)	S45055-Z61-A719
1 5/8" R	Cable grip, closed, galvanized steel	50 – 55 mm	(1.97 – 2.17 in)	S45055-Z61-A571
	Cable grip, closed, stainless steel	50 – 55 mm	(1.97 – 2.17 in)	S45055-Z61-A591
	Cable grip, lace-up, galvanized steel	45 – 60 mm	(0.98 – 2.36 in)	S45055-Z61-A717
	Cable grip, lace-up, stainless steel	45 – 60 mm	(0.98 – 2.36 in)	S45055-Z61-A720



Performance Guarantee

Performance guarantee

At Rosenberger LEONI Site Solutions we warranty the technical characteristics of FlexLine cable systems for 12 years. This long-term warranty underlines our dedication to providing the highest quality FlexLine components. Stable manufacturing methods using innovative technologies and strict quality assurance insures reliable and consistent performance of FlexLine cable systems. This is our commitment to deliver the very best value to our customers for their RF communication cable system applications today and tomorrow.



Quality & Environment

LEONI quality management

A consistently high level of quality is vital for our products. This means that the entire process at LEONI – from a product’s planning to its completion – is constantly monitored. Our quality management system is certified in accordance with DIN/ISO 9001:2000 and is continuously updated.

Numerous successful quality audits and the award as „Supplier of the year 2002“ by the Customer Services Department of Siemens AG Medical Solutions bear witness to the success of our quality efforts.

LEONI environmental management

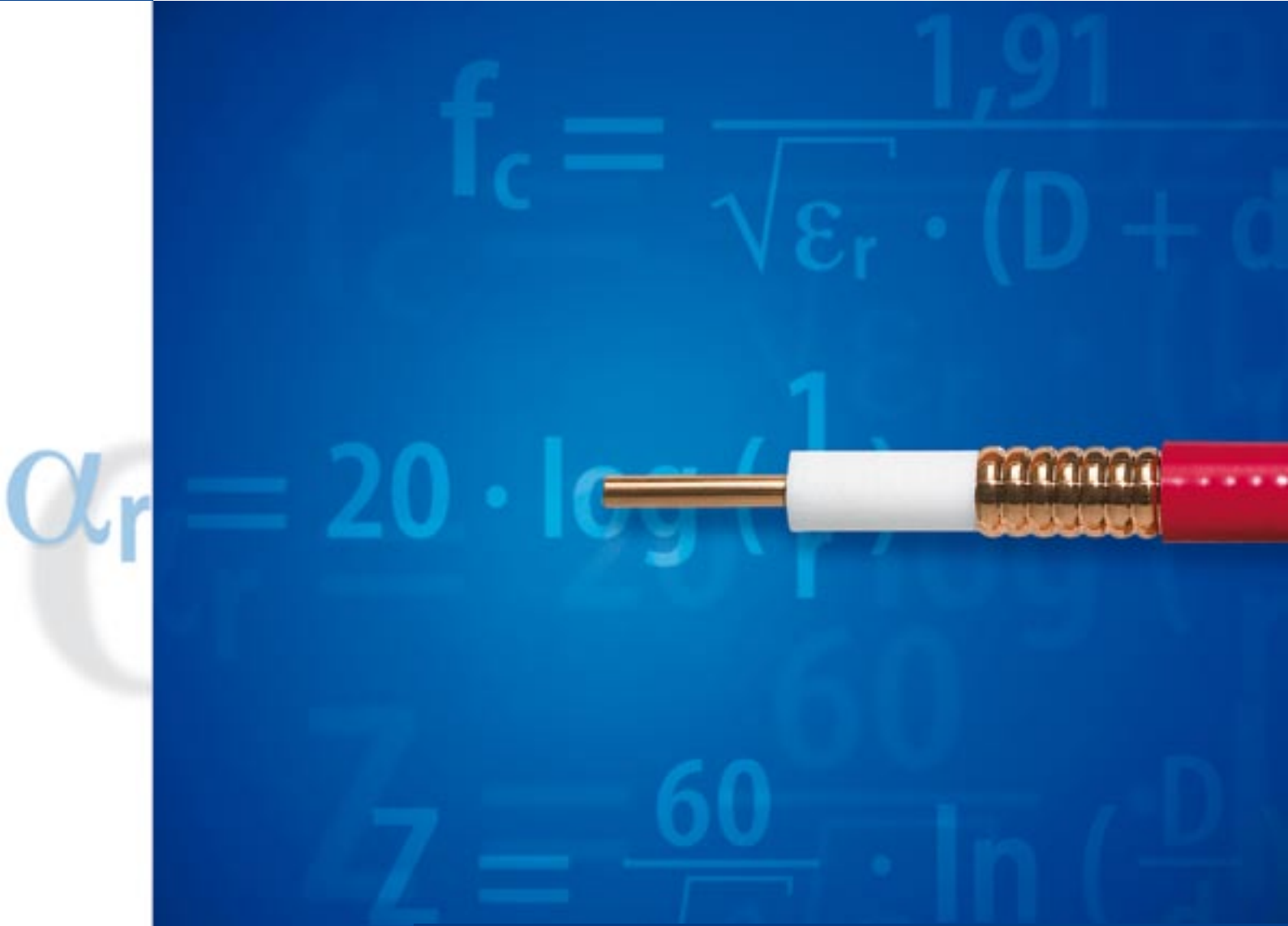
Business success along with ecological responsibility and environmental protection is an intrinsic element of our corporate activities. Our environment management system is certified as complying with DIN EN ISO 14001:1996, confirming that our environmental policy is effectively implemented.

Rosenberger quality and environmental management

Product quality and service is an essential part of our corporate strategy. Rosenberger’s quality philosophy is not just to optimize coaxial connectors, but to continuously improve and optimize all processes. These processes include product development, planning, purchasing, production, sales, logistics and attention to our environmental policy.

Our quality responsibility includes being proactive in protecting our environment and our natural resources. We endeavor to avoid environmental pollution or to limit it to a minimum – even beyond the requirements of legal regulations.

Continuous improvement of processes and consistent application of quality management systems resulted in many certificates, e.g. DIN EN ISO 14001:1996, ISO 9001 or ISO/TS 16949:2002 – the very high-level quality system based on the strict directives of the international automotive industries. Rosenberger was the first coax manufacturer to be certified by ISO/TS 16949 in the year 2001.



Technical Data

Mechanical characteristics

Inner conductor

The inner conductors of FlexLine cables consist of copper-clad aluminium wire or a copper tube. For cables with small dimensions wires are used to guarantee sufficient flexibility. The inner conductors of cables with larger dimensions are made of copper tubes. This ensures low weight as well as the necessary flexibility. Spiral corrugation of the inner conductor tube lends the cable additionally flexibility.

Outer conductor

The outer conductor of FlexLine cables is formed by a welded copper tube with either spiral or ring-shaped (annular) corrugations. The welded copper tube guarantees RF shielding with screening attenuation values in excess of 120 dB. Spiral corrugations are used for highly flexible cable versions. The deep and tightly spaced corrugations result in the smallest possible bending radii and highest flexibility. These cables are often used for jumper cables.

FlexLine cables with larger dimensions have an outer conductor with ring-shaped (annular) corrugations. The ring corrugated FlexLine cables provide excellent attenuation values and very good flexibility. These cables are typically used as feeder cables.

Dielectric

Highly foamed polyethylene ensures excellent attenuation to be achieved with the smallest possible dimensions. A thin layer of unfoamed polyethylene is applied directly to the inner conductor so that the dielectric can be stripped with ease. A physical foaming process produces up to 80% of the polyethylene with a fine-pore, non-hygroscopic cell structure that lays the foundation for the cable's electrical performance. High foaming means a high proportion of air in the dielectric which results in lower weight, and attenuation characteristics approaching those of air dielectric cables of similar size.

Jacket options

Black polyethylene is the standard outer jacket for FlexLine cables. This material is suitable for indoor and outdoor use (also underground). It is UV-resistant and halogen-free, and develops no corrosive gases in case of fire.

For applications which demand flame-retardant cables an outer cable jacket made of FRNC material (Flame Retardant Non Corrosive) is available. The FRNC-material is also halogen-free and enables the cable to comply with the various listed IEC, NEC and UL flame tests. FRNC material is used as the standard outer jacket for FlexLine jumper cables. All FlexLine cable jackets are available in various colors for both polyethylene and FRNC material.

Specifications according to IEC, NEC and UL

IEC 60754-1

Test on gases evolved during combustion of materials from cables part 1: Determination of the amount of halogen acid gas

IEC 60754-2

Test on gases evolved during combustion of electric cables part 2: Determination of degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity

IEC 61034

Measurement of smoke density of electric cables burning under defined conditions

IEC 60332-1

Tests on electric cables under fire conditions part 1: Test on a single vertical insulated wire or cable

IEC 60332-3.C

Tests on electric cables under fire conditions part 3: Tests on bunched wires or cables category C

UL 1581, sec. 1080

Vertical wire flame test ,VW-1

CATV

Community Antenna Television Systems compliant with the NEC (National Electric Code) require a flame test in accordance with UL (Underwriters Laboratories) 1685 vertical tray (UL1581 sec.1160).

Tensile strength

The tensile strength of a cable defines the maximum permissible tensile force which may be applied to the cable during installation or handling. The unit of measurement is Newton (N) and takes into account all the materials used in the cable. Exceeding the quoted values may result in impairment of the cable's mechanical or electrical characteristics. The values are determined by technical measuring instruments and include an additional safety factor.

Bending radius

Specific minimal bending radii are defined for all FlexLine cable sizes. A distinction is drawn between single bending and repeated bending. In the case of single bending, the cable should not be bent back again after reaching its minimal bending radius. Repeated bending allows the cable to be bent to the minimal bending radius at least 15 times. It is typical for a cable to be bent between 40 and 50 times without any impairment of its transmission characteristics. A cable's behavior and stability when subjected to repeated bending is very important during installation and assembly.

Tests are conducted parallel to production by subjecting a cable specimen to repeated alternating bends up to the minimal permissible bending radius and then checking the cable's characteristics.

Temperature ranges

Temperature ranges are defined for cables in storage, during installation and operation. The following table shows the temperature ranges which apply for cables with a standard polyethylene jacket or FRNC jacket:

	Polyethylene jacket	FRNC jacket
Storage:	– 70 °C to +85 °C	– 70 °C to +85 °C
Installation:	– 40 °C to +60 °C	– 40 °C to +60 °C
Operation:	– 55 °C to +85 °C	– 55 °C to +85 °C

The cables are approved for continuous duty within these temperature ranges.

Recommended hanger spacing

Various aspects need to be considered when fastening corrugated cables. Hangers must be spaced in accordance with specific values that are dependent on the location, the environmental conditions and the choice of installation materials. Extreme loads to the cable due to icing or strong winds must be taken into account when calculating the distance between the hangers.

The recommended maximum hanger spacings for the various cable sizes are shown in the following table:

FlexLine								
1/4"S	3/8"S	1/2"S	1/2"R	5/8"R	7/8"S	7/8"R	1 1/4"R	1 5/8"R
0.6 m	0.6 m	0.8 m	0.8 m	1.0 m	1.0 m	1.0 m	1.2 m	1.5 m

Electrical characteristics

DC resistance

The direct current resistance denotes the ohmic value of the inner or outer conductor based on a length of 1 km and expressed in Ω/km. It is dependent on the cross section of the conductor and on the conductor materials (specific conductance).

DC breakdown voltage

The DC breakdown voltage is determined between the inner conductor and the outer conductor. It is defined as the voltage at which the insulation between two conductors will fail and allow electricity to conduct or 'arc'. The DC breakdown voltage depends on the type of dielectric used and its dimensions. This value is established for each cable size and forms the basis for determining and calculating the permissible peak power rating.

Capacitance

For coaxial cables the capacitance is calculated directly from the dimensions of the cable and the dielectric constant "r" of the dielectric. The relative dielectric constant depends on the material used and the degree of foaming. The capacitance value depends on the length of the cable and is expressed in farad /unit of length.

$$C' = \frac{\epsilon_r \cdot 10^3}{18 \cdot \ln\left(\frac{D}{d}\right)} \quad [\text{in } \rho\text{F} / \text{m}]$$

Relative velocity of propagation

This defines the velocity of propagation of a wave along the cable in relation to the speed of light in a vacuum. The relative velocity of propagation depends essentially on the dielectric constant "r", which is derived from the type of material used and its degree of foaming. High foaming of the dielectric results in values of 88 % for FlexLine corrugated cables.

$$v_r = \frac{100}{\sqrt{\epsilon_r}} \quad [\text{in } \%]$$

Impedance

Impedance is defined by the ratio of wave voltages to wave currents at each point along the transmission path. This ratio of voltage to current is constant for the superimposed waves (going and reflected/returning) and thus represents a characteristic parameter of the cable. The impedance is dependent on the frequency but approximates to a defined value for high frequencies. This property enables coaxial cables to be divided into defined impedance classes. Typical examples are 50 Ω cables for antenna systems and 75 Ω cables for television systems. Corrugated cables are normally used for antenna systems

and have an impedance of 50Ω. Tolerances are held very low at +/- 1 Ω for excellent adaptation.

The following formula is used for calculating impedance values:

$$Z = \frac{60}{\sqrt{\epsilon_r}} \cdot \ln \left(\frac{D}{d} \right) \quad [\text{in } \Omega]$$

Attenuation

Attenuation is one of the main criterion for selecting a suitable type of cable. Attenuation is the decrease in signal level over a distance in the direction of propagation. Attenuation is expressed as a ratio (dB) over distance in either feet or meters. The higher the frequency, the greater a cable's attenuation. Every transmission systems attenuates the signal when the various components are connected. In addition to frequency, the main factors that influence attenuation are the cross section of the conductors and the dimensions and characteristics of the materials. Attenuation is defined by the following equation:

$$\alpha = 10 \cdot \log \left(\frac{P_{in}}{P_{out}} \right) \quad [\text{in dB / unit of length}]$$

A cable 's attenuation is quoted for an ambient temperature of 20 °C. The higher the ambient temperature values and the hotter the cable becomes due to the power transmitted, the higher the attenuation.

Return loss – voltage standing wave ratio (VSWR)

Irregularities along the path of a cable and the fluctuations of impedance can result in reflections of the transmitted waves. The outcome can be interfering signals over the complete frequency spectrum of the transmission system. Periodic deviations will cause immense interference at a specific frequency through accumulation. The fact that all manufacturing processes are subject to certain fluctuations, means that reflections are to be found on every cable transmission path. Reflections can also arise at all cable to connector junctions.

Return loss is defined as the ratio in decibels (dB) of the input signal power level to the signal power level that is reflected from the irregularities along the path of the cable or cable system. FlexLine corrugated cables and FlexLine connectors are specifically designed to provide return loss values of 26dB in the respective frequency ranges of the transmission system.

These reflections are also defined by VSWR (voltage standing wave ratio). The VSWR is a measure of the ratio of the maximum voltage to the minimum voltage in the standing wave. The larger the imped-

ance mismatch (fluctuations in impedance along the path of the cable system) the larger the amplitude of the standing wave. How well the cable and connectors are matched in impedance have a major impact on the VSWR performance of the cable system. When the impedances are improperly matched, reflections occur (increasing the amplitude of the standing wave) resulting in signal loss, which results in attenuation of the transmissions, poor reception or both. FlexLine corrugated cables and FlexLine connectors are specifically designed to provide VSWR values of 1.105 in the respective frequency ranges of the transmission system

Relationships between the various values are as follows:

$$\alpha_r = 20 \cdot \log \left(\frac{1}{r} \right) \quad r = \frac{Z_1 - Z_2}{Z_1 + Z_2} \quad s = \frac{1+r}{1-r} \quad [\text{in dB}]$$

The following conversion table provides an over view of the most important values:

Return loss	Voltage standing wave ratio
20.0	1.220
21.0	1.196
22.0	1.173
23.0	1.152
24.0	1.133
25.0	1.118
26.0	1.105
27.0	1.094
28.0	1.082
29.0	1.073
30.0	1.065
31.0	1.056
32.0	1.051
33.0	1.045
34.0	1.040
35.0	1.036
36.0	1.032
37.0	1.028
38.0	1.025
39.0	1.022
40.0	1.020

[Subject to error and change]

P_{in} = power input into a cable of a specific length in W
 P_{out} = power at the other end of the cable in W

α_r = return loss in dB
 r = reflection factor
 s = voltage standing wave ratio (VSWR)
 Z_1 = input impedance of the cable in Ω

Z_2 = impedance of the reflection wave in Ω

Passive intermodulation

Passive intermodulation represents a further potential source of interference in the frequency range for transmission. It arises when two transmission signals form intermodulation products as the result of component nonlinearities (in this case cables and connectors). In particular the product of the third order is critical because it lies in the transmission range and can therefore interfere with the transmission signals.

Passive intermodulation mainly depends on the characteristics of the materials and on the quality of contact between the cable and the connector.

Resulting intermodulation products are measured by imputing two signals with defined frequencies into the transmission system. The degree of intermodulation is expressed as a signal level in either dBm or dBc (dBc = in relation to the carrier signal).

The measurement is conducted using carrier signals at levels of +43 dBm (20 W) and a frequency based on the range of application, e.g. GSM 900 or GSM 1800. Typical measured values for FlexLine cable systems are < -117 dBm (< -160 dBc).

Cutoff frequency

Cutoff frequency is defined as the highest radio frequency that will pass through the cables. Above this frequency there is a risk of undefined modes (waves) arising and exerting a negative influence (increased attenuation) on the transmission. The cutoff frequency for each cable depends on the dimensions and materials.

The cutoff frequency can be calculated with the following equation:

$$f_c = \frac{1,91}{\sqrt{\epsilon_r} \cdot (D + d)} \cdot 100 \quad [\text{in GHz}]$$

ϵ_r = relative dielectric constant

D = effective inner diameter of the outer conductor in mm

d = effective outer diameter of the inner conductor in mm

Maximum operating frequency

The maximum operating frequency is normally based on the cutoff frequency and includes a defined safety factor.

Peak power rating

The peak power rating is the input power achieved when operating the cable with the maximum RF operating voltage (peak value). The measurement is limited by the DC breakdown voltage between the cable's inner conductor and outer conductor. The peak power rating is a calculated value which is independent of the frequency.

Mean power rating

FlexLine corrugated cables permit a continuous maximum temperature of 85 °C at the inner conductor, i.e. the heat generated by the continuous power must not exceed this value. The crucial factor is the material of the dielectric. The values quoted for the maximum continuous power rating are based on an ambient temperature of 40 °C and a voltage standing wave ratio of 1.0. The higher the ambient temperature, the lower the maximum permissible continuous power rating. Increasing the voltage standing wave ratio has the same effect. The continuous power rating is also affected by other ambient conditions, e.g. direct sunlight.

Shielding effectiveness

Shielding effectiveness is quoted as a measure of the shielding effect of a cable's construction. It defines the logarithmic ratio of the power which is input into the cable to the power that is radiated from the cable. On FlexLine corrugated cables the shielding attenuation is greater than 120 dB as a result of using a solid copper tube outer conductor with an RF-tight weld. Braided cables that contain a shielding foil typically achieve shielding effectiveness values of only 90 dB.

Argentina

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