



Draka



Receiving success: Draka RF Solution

Mobile Radio Cables, 50 Ohm cables, Antenna cables and special solutions transmitted by Draka

RF cables: Radio Frequency cables for general and wireless application

We are your partner for high-quality data transmission cables, control cables for audio/video signals, switching cables for central office and high-performance Radio Frequency cables for general and wireless application. Our comprehensive product scope combined with quick and flexible logistic services is your link to the digital future.

Radio Frequency cables:

Beside some general information, this brochure contains our standard programme in flexible coaxial braided cables according to US Military Specification MIL-C-17F and mainly 50 Ohm Transmitter and Receiver cables according to EN and IEC standards for wireless telecommunication application. From more than 100 RG types we have selected the most

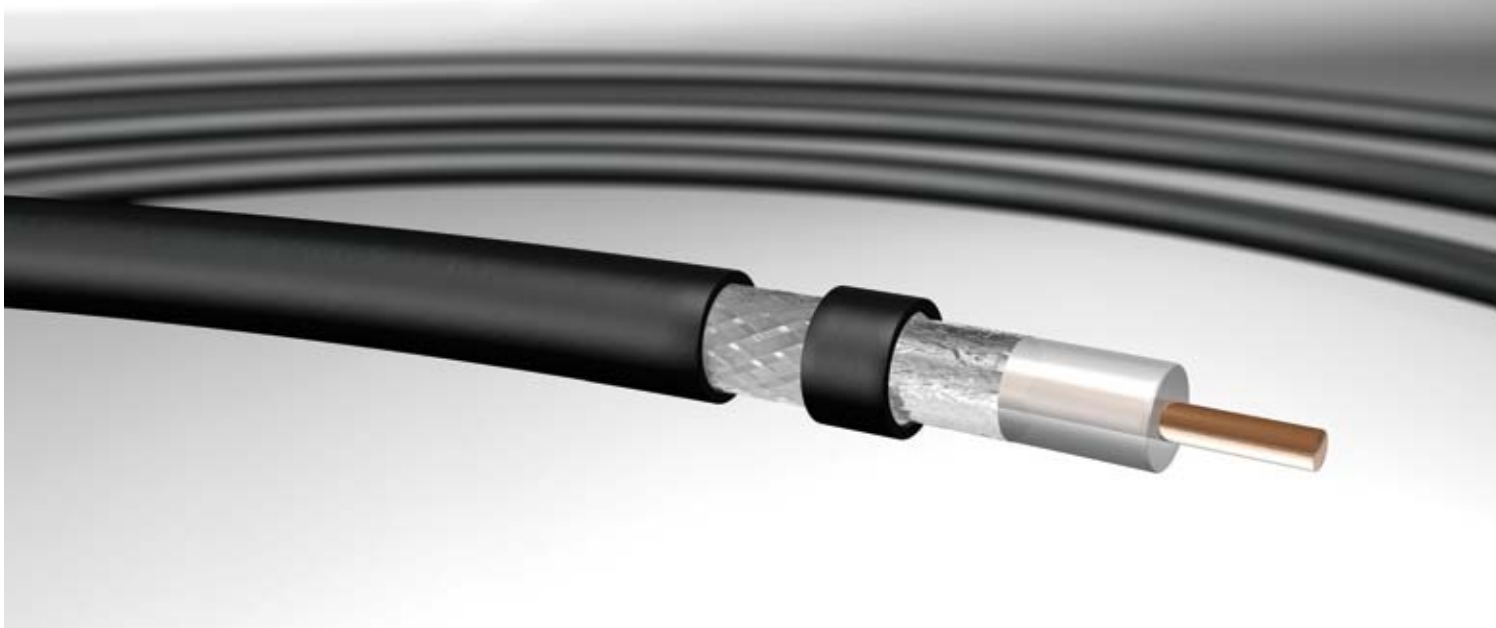
common cables for various fields of application.

A special feature of cables in accordance with Military specifications is their very high quality. All criteria regarding material, construction and electrical properties are specified in MIL-C-17F. We guarantee that the quality of our products conforms with these specifications.

New telecommunication standards are released in shorter intervals; WLAN technology, UMTS and further implementation of "Hot Spots" are the basis of permanent mobility and higher bandwidth for more information. Due to these developments the frequency range increases more and more. Dependent on this, the requirements as to the performance of RF cables will also increase.



Beside the standard range of 50 Ohm cables according to EN and IEC Standards, Draka Communications has developed a new range of Mobile Radio cables (MRC) for the above mentioned application.



RG cables according to MIL-C17F and MIL-C17G

RG cables are used in the whole field of commercial electronics and radio frequency engineering where high quality is required.

RG cables with PE insulation

Cable type		RG6	RG11	RG11-Triax	RG58	RG59	RG174	RG213	RG214	RG216	RG223
Construction											
Inner conductor		Copperclad steel wire bare	Stranded copper wires tinned	Stranded copper wires tinned	Stranded copper wires tinned	Copperclad steel wire bare	Stranded copperclad steel wires bare	Stranded copper wires tinned	Stranded copper wires tinned	Stranded copper wires tinned	Stranded copper wires silver-plated
	Ø mm	0.73 ± 0.01	7 x 0.39 1.2	7 x 0.39 1.2	19 x 0.18 0.9	0.59 ± 0.01	7 x 0.16 0.48	7 x 0.75 2.25	7 x 0.75 2.25	7 x 0.39 1.2	0.90 ± 0.01
Insulation	Ø mm	PE, 4.7 ± 0.05	PE, 7.25 ± 0.05	PE, 7.25 ± 0.05	PE, 2.95 ± 0.05	PE, 3.70 ± 0.05	PE, 1.52 ± 0.05	PE, 7.25 ± 0.05	PE, 7.25 ± 0.1	PE, 7.25 ± 0.05	PE, 2.95 ± 0.05
Outer conductor		Copper braid, silver-plated	Copper braid, bare	Copper braid, bare	Copper braid, tinned	Copper braid, bare	Copper braid, tinned	Copper braid, bare	Copper braid, silver-plated	Copper braid, bare	Copper braid, silver-plated
Shielding		Copper braid, bare		Copper braid, bare					Copper braid, silver-plated	Copper braid, bare	Copper braid, silver-plated
Sheath material		PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC	PVC
Sheath material	Ø mm	8.4 ± 0.15	10.1 ± 0.20	13.5 ± 0.50	4.95 ± 0.10	6.15 ± 0.10	2.7 ± 0.10	10.3 ± 0.15	10.8 ± 0.15	10.8 ± 0.15	5.4 ± 0.1
Sheath colour		black	black	black	black	black	black	black	black	black	black
Weight	kg/km	115	134	270	37	54	11.2	153	200	185	60
Electrical Properties											
Impedance	Ω	75 ± 3	75 ± 3	75 ± 3	50 ± 2	75 ± 3	50 ± 2	50 ± 2	50 ± 2	75 ± 3	50 ± 2
Attenuation (dB/100m) nom.	10 MHz	3.0	1.8	1.8	4.2	3.5	9.8	1.8	2.0	1.8	4.4
	100 MHz	9.8	6.5	6.5	15.7	11.0	31.0	6.8	6.9	6.5	13.9
	400 MHz	20.0	14.1	14.1	34.5	24.0	74.0	14.4	15.1	14.1	29.3
	1000 MHz	32.0	25.2	25.2	60.0	38.0	120.0	24.7	26.5	25.2	50.1
	2000 MHz	47.0	43.0	43.0	90.0	60.0	170.0	36.4	38.1	43.0	80.0
	3000 MHz	60.0	59.0	59.0	120.0	78.0	210.0	46.6	48.6	59.0	98.0
Max. Power rating at 40°C	10 MHz	1600	2800	2800	750	1100	240	2300	2200	2800	765
	100 MHz	500	810	810	230	340	68	920	875	810	240
	400 MHz	220	370	370	110	180	32	380	360	370	115
	1000 MHz	150	200	200	65	90	18	210	200	200	70
	2000 MHz	70	120	120	40	58	11	140	135	120	45
	3000 MHz	50	100	100	30	45	9	100	95	100	35
Mutual capacitance	pF/m	67	67	67	100	67	100	100	100	67	100
Velocity ratio	%	66	66	66	66	66	66	66	66	66	66
DC resistance											
Inner conductor	Ω/km	105.0	21.0	21.0	36.7	158	315.0	5.7	5.7	21.0	29.1
Outer conductor	Ω/km	6.5	4.0	4.0	12.9	8.5	37.3	6.2	10	4.4	13.5
Return loss at 1000 MHz	dB	> 22	> 24	> 24	> 23.5	> 26	> 19.5	> 23	> 25	> 22	> 23
Operating voltage	kV.rms.	2.4	3.6	3.6	1.8	1.7	1.1	3.7	3.7	3.7	1.4

Connectors and grounding kits are also supplied by DRAKA.



Construction

Construction, material and tolerances of the inner conductor are the determining factors for the mechanical and electrical properties of a cable. The individual wires are drawn from electrolytic copper with very close tolerances and are used bare, tinned or silver-plated as solid or stranded inner conductor. Cables with a stranded inner conductor are highly flexible.

Due to the higher tensile strength, copper-clad steel wires are used for very thin inner conductors. Temperature behaviour, attenuation, voltage strength and flexibility of a cable are essentially determined by material and construction. Polyethylene (PE) is preferably used due to its good cold-bending resistance and dielectric properties.

Polytetrafluorethylene (PTFE) is a particular high-grade cable insulating material with a high temperature resistance and excellent dielectric properties.

Air-space insulated cables have a lower attenuation. The outer conductors of all RG cables consist of bare, silver-plated or tinned copper wires. They are designed in accordance with MIL-C-17F and achieve a high coverage and screening efficiency.

Cable types with particularly stringent screening requirements must be provided with a double braid. RG cables have a weatherproof sheath as outer protection which is classified into quality groups according to MIL-C-17F. Cables with PVC sheaths according to MIL-C-17F, i.e. PVC with plasticisers of a low migration degree, are very resistant to aging, i.e. the attenuation increase through aging is negligible. The sheath materials applied here correspond

to sheath type IIa for PVC and to sheath type IX for FEP (according to MIL-C-17).

Properties

Temperature range for cables with PE insulation and PVC sheath

-40°C up to +85°C

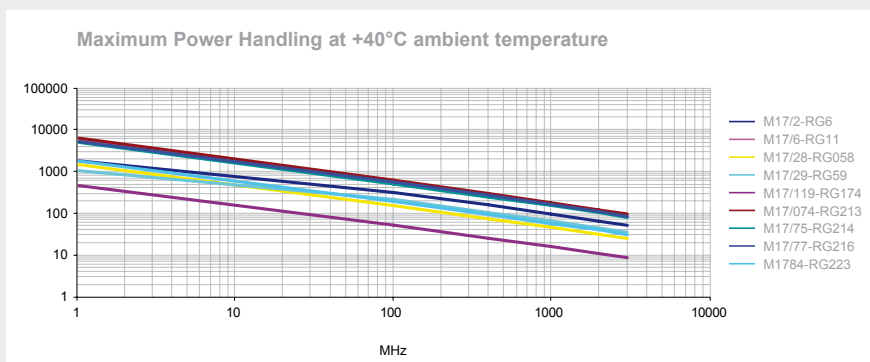
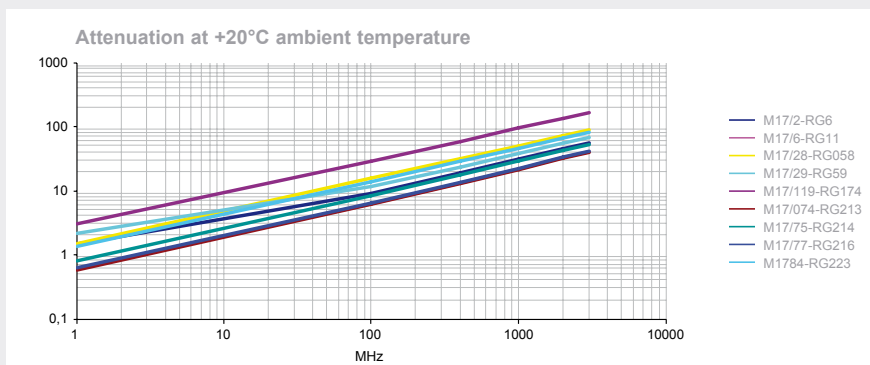
With PTFE insulation and FEP sheath

-55°C up to +250°C

Fire propagation test

acc. to IEC 60332-1 and VDE

0472 part 804 class B



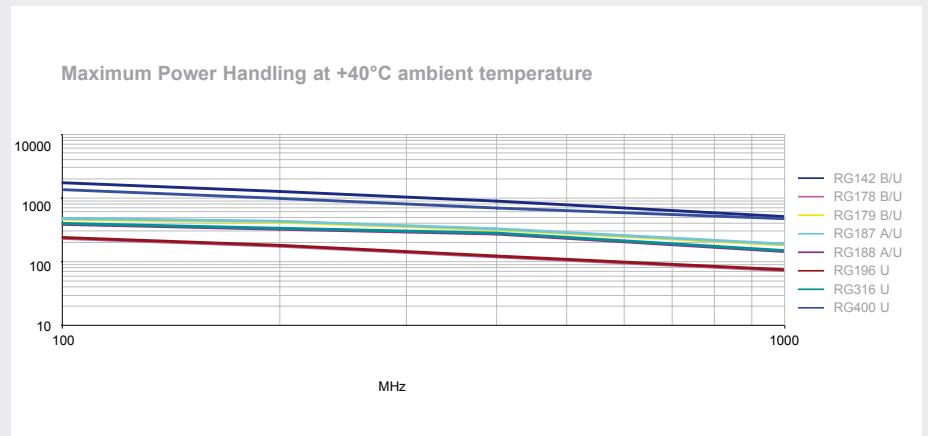
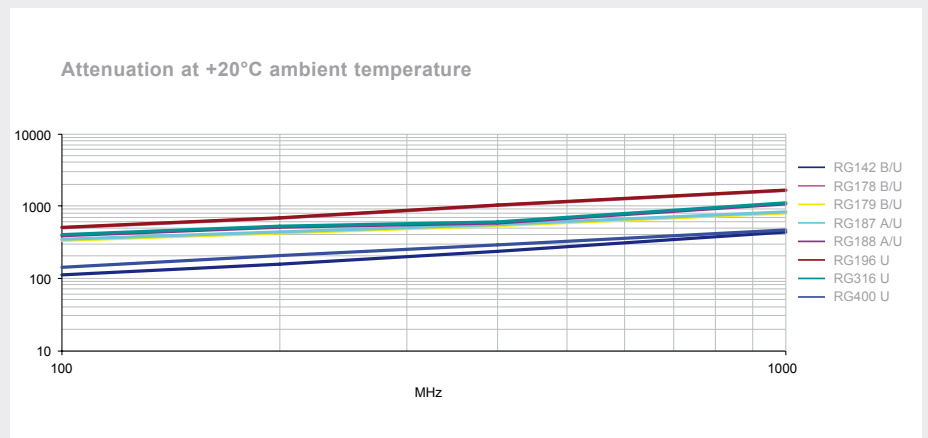
RG cables according to MIL-C17F and MIL-C17G

RG cables are used in the whole field of commercial electronics and radio frequency engineering where high quality is required.

RG cables with PTFE insulation

Cable type		RG142 B/U	RG178 B/U	RG179 B/U	RG187 A/U	RG188 A/U	RG316 U	RG196 U	RG400 U
Standard		MIL-C-17F	MIL-C-17F/17G	MIL-C-17F/17G	MIL-C-17F/17G	MIL-C-17F/17G	MIL-C-17F/17G	MIL-C-17F/17G	MIL-C-17F/17G
Construction									
Inner conductor		Copper-clad steel wire, silver coated,	Stranded copper-clad steel wires, silver coated	Stranded copper-clad steel wires, silver coated	Stranded copper-clad steel wires, silver coated	Stranded copper-clad steel wires, silver coated	Stranded copper-clad steel wires, silver coated	Stranded copper-clad steel wires, silver coated	Stranded copper wires, silver coated
Ø mm		0.94 ± 0.01	7 x 0.102	7 x 0.102	7 x 0.102	7 x 0.17	7 x 0.17	7 x 0.102	19 x 0.203
Insulation		PTFE,	PTFE,	PTFE,	PTFE,	PTFE,	PTFE,	PTFE,	PTFE,
Ø mm		2.95 ± 0.05	0.84 ± 0.05	1.60 ± 0.05	1.60 ± 0.05	1.52 ± 0.05	1.52 ± 0.05	0.84 ± 0.05	2.95 ± 0.05
Outer conductor		Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated	Copper braid, silver coated
Screen		+Copper braid, silver coated							+Copper braid, silver coated
Sheath material		FEP	FEP	FEP	PTFE	PTFE	FEP	PTFE	FEP
Sheath		Ø mm	4.95 ± 0.13	1.80 ± 0.10	2.54 ± 0.13	2.54 ± 0.13	2.49 ± 0.10	2.49 ± 0.10	1.80 ± 0.10
Weight		kg/km	68	9.0	16.5	17.0	17.5	16.0	9.5
Electrical Properties									
Characteristic impedance		Ω	50 ± 2	50 ± 2	75 ± 1.5	75 ± 1.5	50 ± 2	50 ± 2	50 ± 2
Attenuation (dB/100m) nom.		100 MHz	11	46	33	33	37	37	46
		200 MHz	15	62	41	41	47	47	62
		400 MHz	23	92	52	52	55	55	92
		1000 MHz	43	151	79	79	102	102	151
Max. Power rating at 40°C (Watts)		100 MHz	1800	240	480	480	400	400	240
		200 MHz	1300	180	420	420	325	325	180
		400 MHz	900	120	320	320	275	275	120
		1000 MHz	530	75	190	190	150	150	75
Mutual capacitance		pF/m	96	96	64	64	96	96	96
Velocity ratio		%	70	70	70	70	70	70	70
DC resistance									
Inner conductor		Ω/km	± 638	± 800	± 800	± 800	± 275	± 275	± 800
Operating voltage		kV Peak	1.9	1.0	1.0	1.0	1.2	1.2	1.0

Connectors and grounding kits are also supplied by DRAKA.



Coaxial RF cables according to IEC 61196-1

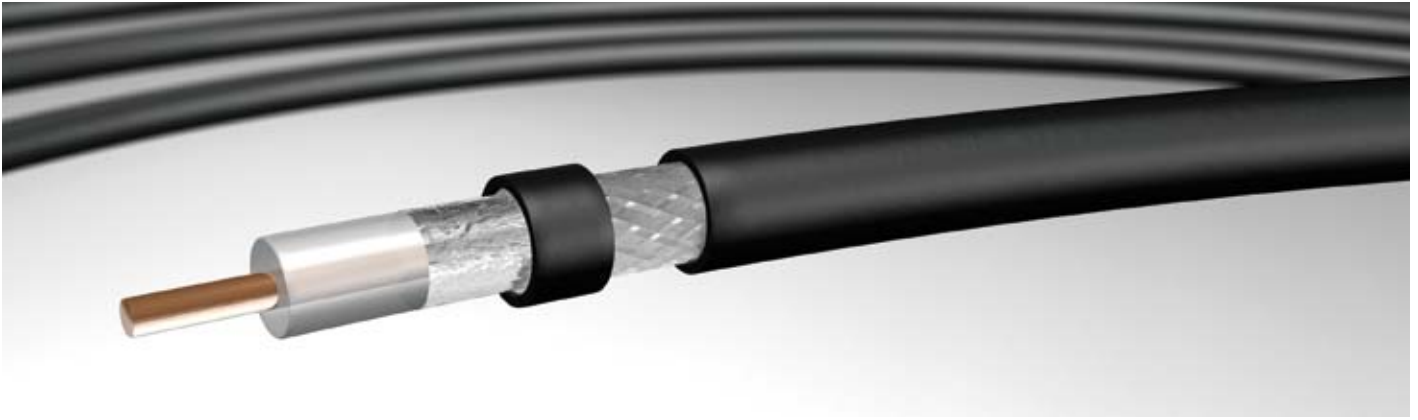
The Radio Frequency cables are used in transmitter and receiver installations in radio communication as well as in the entire field of commercial radio frequency technology and electronics. This product family includes only 50Ω cables.

50Ω cables with PE insulation

Cable type		MRC 200	MRC 240	MRC 300	MRC 400	MRC 600	1.0/2.95 AF	1.35L/3.6AF	1.85L/5.0 CF	2.7/7.3 CF	2.6/7.3 AF	2.7/7.3 AF
Construction												
Inner conductor		Copper wire bare	Copper wire bare	Copper wire bare	Copper wire bare	Copper wire bare	Copper wire bare	Stranded copper wires bare 7x0.45	Stranded copper wires bare 19x0.37	Copper wire bare	Copper wire bare	Copper wire bare
	Ø mm	1.12 ± 0.01	1.42 ± 0.01	1.78 ± 0.01	2.74 ± 0.01	4.42 ± 0.01	1.05 ± 0.01	1.35	1.35	2.715 ± 0.005	2.61 ± 0.01	2.71 ± 0.005
Insulation		Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,	Foam-PE,
	Ø mm	2.95 ± 0.05	3.81 ± 0.05	4.83 ± 0.05	7.24 ± 0.05	11.56 ± 0.05	2.95 ± 0.05	3.6 ± 0.05	5.0 ± 0.05	7.25 ± 0.1	7.3 ± 0.05	7.25 ± 0.1
Outer conductor		Al-PET-foil, bonded to the dielectric + copper braid, tinned	Al-PET-foil, bonded to the dielectric + copper braid, tinned	Al-PET-foil, bonded to the dielectric + copper braid, tinned	Al-PET-foil, bonded to the dielectric + copper braid, tinned	Al-PET-Al-foil + copper braid, tinned	Al-PET-Al-foil + copper braid, tinned	Al-PET-Al-foil + copper braid, tinned	Cu-PET Cu foil + copper braid, bare	Cu-PET Cu foil + copper braid, bare	Al-PET-Al-Folie + copper braid, tinned	Al-PET-Al-foil + copper braid, tinned
Sheath material		PE	PE	PE	PE	PE	PVC alt. FRNC	PVC alt. PE	PE	PE	FRNC	PE
Sheath material		4.95 ± 0.15	6.1 ± 0.2	7.6 ± 0.2	10.3 ± 0.2	15.0 ± 0.3	5.00 ± 0.2	5.40 ± 0.2	7.3 ± 0.2	10.3 ± 0.2	10.3 ± 0.2	10.3 ± 0.2
Sheath colour		black	black	black	black	black	black	black or white	black	black	black	black
	Ø mm											
Weight	kg/km	33	47	65	133	283	42 / 46	42 / 40	80	136	166	136

Electrical Properties												
Impedance	Ω	50 ± 2	50 ± 2	50 ± 2	50 ± 2	50 ± 2	50 ± 1,5	50 ± 2	50 ± 2	50 ± 2	50 ± 2	50 ± 2
Attenuation (dB/100m) nom.	30 MHz	5.8	4.4	3.5	2.2	1.4	6.2	5.0	3.5	2.1	2.4	2.4
	900 MHz	32.6	24.8	19.7	12.8	8.2	34.2	28.6	23.5	12.0	15.5	14.6
	1800 MHz	46.6	35.6	28.4	18.6	12.1	49.8	41.3	33.2	17.9	21.7	18.6
	2500 MHz	55.4	42.4	33.9	22.2	14.5	58.2	49.6	39.0	21.4	25.6	22.2
	5200 MHz	81.9	63.3	51.3	33.6	22.5	85.2	75.3	59.0	32.9	38.7	34.1
	5800 MHz	86.5	66.8	54.2	35.5	23.8	89.9	80.2	62.3	35.4	40.8	36.1
Max. Power rating at 40°C	30 MHz	1020	1140	2100	3330	5510	939	980	2100	4907	2997	3000
	900 MHz	180	260	360	580	930	167	221	292	839	457	499
	1800 MHz	130	180	250	400	630	122	151	217	558	333	400
	2500 MHz	110	150	210	330	520	104	124	175	475	280	330
	5200 MHz	74	105	137	222	338	71	86	116	226	188	218
	5800 MHz	70	100	130	210	320	67	80	110	311	178	207
Mutual capacitance	pF/m	80	79.5	79	79	77	82	80	80	79	80	79
Velocity ratio	%	83	84	85	85	86	80	81	84	84	81	84
DC resistance												
Inner conductor	Ω/km	17.6	10.5	7.0	4.6	1.2	20.3	16.5	8.9	3.1	3.2	3.1
Outer conductor	Ω/km	14	12.8	8.6	5.4	3.9	12.0	22.5	7.3	5.5	3.9	4.7
Return loss at 1000 MHz	dB	> 23	> 23	> 23	> 23	> 23	> 18	> 23	> 23	> 23	> 23	> 23
Operating voltage	kV.rms	0.8	1.0	1.0	1.2	1.5	0.8	1.0	1.0	1.2	1.2	1.2

Connectors and grounding kits are also supplied by DRAKA.



Construction

The inner conductors which essentially determine the mechanical and electrical properties of the cables are drawn from electrolytic copper with very close tolerances and can be supplied bare, tinned or silver-plated. Highly flexible cables are manufactured with stranded inner conductors. For very thin inner conductors, copper-weld wires are used due to their higher tensile strength.

As insulation material, stabilised polyethylene is almost exclusively used. Foam-PE insulation is only required for cables with exceptionally low attenuation and capacity.

The outer conductors of Radio Frequency cables are almost exclusively made of a copper braid with a high coverage or of longitudinal double Al-PET foil and a tinned copper braid.

As recommended in the IEC standard, the cable sheaths are manufactured in the standard design with a highly resistant, flame retardant PVC sheath or a flame retardant, non-corrosive sheath of copolymer (FRNC).

Properties

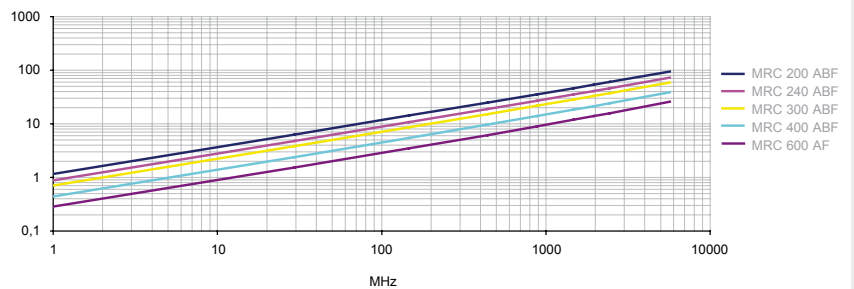
Temperature range
-30°C up to +70°C

Fire propagation test for FRNC cables
≤ 4,5 mm acc. to IEC 60332-1

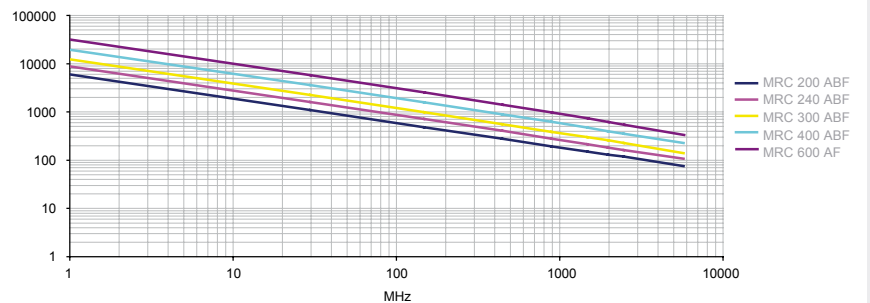
≥ 4,5 mm acc. to IEC 60332-3-24

Corrosivity for FRNC cables acc. to
IEC 60754-2

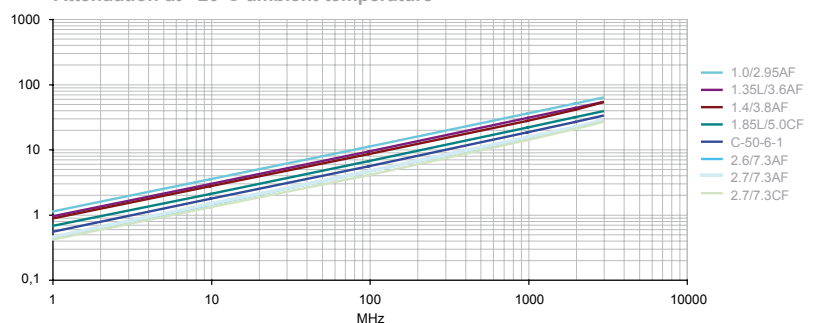
Attenuation at +25°C



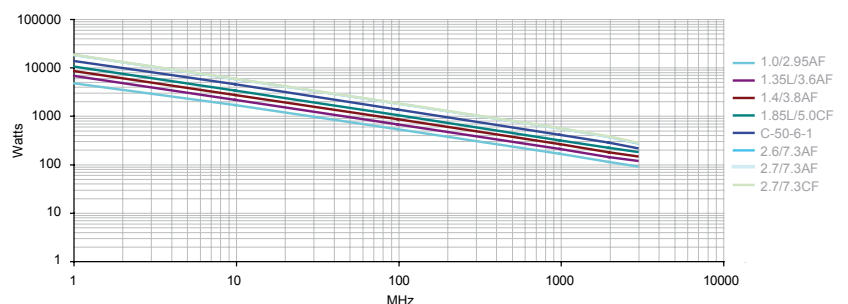
Power Handling at +40°C



Attenuation at +20°C ambient temperature



Maximum Power Handling at +40°C ambient temperature



Mobile Network Cables

Antenna Line Products
Draka - Your Reliable Partner
Mobile Network Products



Jumper cable



Feeder cable + connector



Cable Clamp



Grounding kit

Feeder Cables

- RFA 1/4 "
- RFA 3/8 "
- RFA 1/2 "
- RFA 7/8 "
- RFA 7/8 " AL
- RFA 1 1/4 "
- RFA 1 5/8 "
- RFA 1 5/8 " AL
- RFA 2 1/4 "

Superflexible and Extraflexible Cables

- RFF 1/4 "
- RFF 3/8 "
- RFF 1/2 "
- RFE 7/8 "
- RFE 1 1/4 "
- RFE 1 5/8 "

Coaxial Antennas

- RFX 1/2 "
- RFX 7/8 "
- RFX 1 1/4 "
- RFX 1 5/8 "
- RFX 7/8 "
- RFXT 1 1/4 "

Jumpers

Accessories



Draka Mobile Networks Division

Draka Mobile Networks Division offers a wide range of products with guaranteed compatibility and reliability. Furthermore, they supply feeder cables, coaxial antennas, superflexible cables and jumpers.

Draka provides a product range of leading connector and accessory manufacturers through an extensive network of partners. Draka feeder cables, flexible cables and coaxial antennas have an excellent performance

in mobile telecommunication applications, such as GSM, WCDMA (UMTS), TDMA, D-AMPS, PCN, CDMA, TETRA and WiMAX.

Draka Mobile Network cables have been designed to transmit signal power between the transmission equipment and the antenna even in most demanding environmental conditions and thus meet the highest technical and environmental standards.

Coaxial Antennas



Draka coaxial antennas include two product families: RFX / RF2X and RFXT. RFX and RF2X cables are the best choice for multi- and broadband systems.

RFXT cables are ideal when certain selected frequencies are required; the performance of RFXT cables is optimised for antennas and provide a reliable way to build indoor coverage

networks in buildings and tunnels. RFX and RF2X cables are coupled mode cables with a corrugated and milled outer conductor. RFX cables have slots in one line on the outer conductor, and RF2X have slots in two lines on the outer conductor.

These cables are also available with a suspension wire: RFXK and RF2XK. RFXT cables are radiating mode cables

with a periodically slotted and overlapped copper tape outer conductor.

The most important electrical characteristics of coaxial antennas are the longitudinal attenuation and the coupling loss. The excellent electrical performance of our RFX, RF2X and RFXT cables is achieved by continuous development and an extensive test program.