RF-CABLES 50 Ω

RF Feeder Cables and Accessories

Edition 05 / 2015

Kabelwerk EUPEN AG

cable

The foundation of the cable factory Kabelwerk ***EUPEN*** AG as manufacturer of electrical cables goes back to the beginning of the 20th century. Today the company has a staff of 850 people producing power cables, telecommunication cables and RF-Cables.

Since broadband transmission became possible, Kabelwerk ***EUPEN*** AG has been involved in the design and manufacture of coaxial cables.
The introduction of Cable Television in 1962 was decisive for the start of producing coaxial cables on a larger scale.
With the increasing demand for coaxial cables and the intensive R&D to improve cable construction and transmission characteristics, Kabelwerk ***EUPEN*** AG has become today ***one of the leading manufacturer for coaxial cables in the World***.

Over 50 years of experience in the field of RF-Cables, the company constantly developed its extensive manufacturing processes bearing in mind the improvement of quality.

Technical data, designs and specifications presented in this catalogue are not binding and are subject to change without prior notice.

Since 1993 ***the company is ISO 9001 certified for all its products***. The environmental policy of Kabelwerk ***EUPEN*** AG is also illustrated by its ISO 14001 certification.

Today the cables and connectors from Kabelwerk ***EUPEN*** AG, together is an unbeatable match to guarantee superior performances and long service life.

Kabelwerk *EUPEN* AG the specialist in cables

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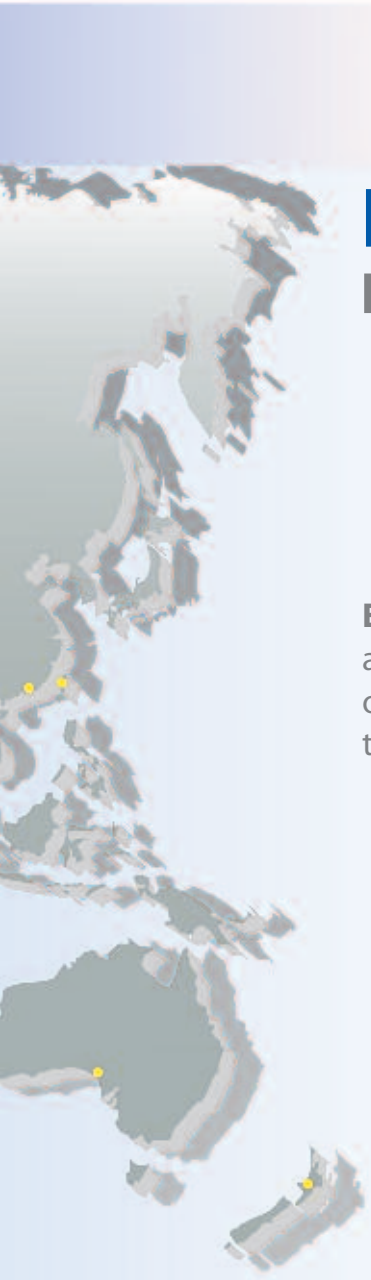


EC³:
Eupen Corrugated Copper Cables

Antenna stations in mobile, cellular, microwave and broadcast communication systems require high quality coaxial cables and connectors for very low loss and high power signal transmission.

EUPEN cables and cable accessories are specifically designed for the needs of modern radio communication systems.

EC³ Cable from ***EUPEN*** offers better electrical performance and greater durability than conventional corrugated copper cables. It is the best choice for LTE and other wireless communication applications requiring a cable with the lowest loss and best long term durability. The more durable construction of the EC³ Cable allows us to offer the best warranty in the industry – 12 years.

The electrical specifications of the EC³ Cable are unsurpassed. Every reel is swept for attenuation and return loss before it leaves the factory. Return loss is typically 30 dB and guaranteed to be at least 23 dB over the cellular and PCS bands, when the cable is terminated with EC³ Connectors. Attenuation specifications are the best in the industry.

EC³ Connectors are the easiest attaching corrugated copper cable connectors made. No soldering is required for the attachment of any of the connectors. High quality silver plating is used on all parts in the electrical path, with electroless nickel plating on all mechanical parts.
They feature superior electrical performances.

EC³ Cables are offered in sizes ranging from 1/4" to 1-5/8". A full range of type N, DIN and EIA EC³ Connectors are available to complete the package, including hanging and grounding accessories, as well as other accessories needed to complete installation.

In addition to the cables in this catalogue we can provide:

- **Phase stabilised, phase measured cable**
- **Low VSWR microwave versions**
- **Special colours**
- **Cable assemblies**

Our quality products are delivered fast and on time, saving time and money. Eupen has a staff of engineers to provide complete technical support for our products and to help you to select the best cable for your application. We can provide training to assure the best installation of your system.

EC³
FOAM DIELECTRIC

EUPEN cables feature innovative design, careful choice of raw materials, consistent manufacturing and quality assurance techniques.
The result is a coaxial cable with superior launched electrical and mechanical performances.

Our coaxial cable design with low density cellular polyethylene foam dielectric and ring-corrugated copper outer conductor and our 50 years of experience in manufacturing these cables are your guarantee of the supply of a technically optimal construction, featuring:

- ***lowest loss***
- ***excellent flexibility***
- ***excellent RF shielding***
- ***very low VSWR***
- ***easy and reliable installation of connectors***

Thanks to intensive R&D, ***Eupen*** improved in 2006 the attenuation of its most common sections and launch the ***ultra low loss "A" version*** for 7/8", 1-1/4" and 1-5/8".

The cable ***inner conductor*** is constructed from copperclad aluminium wire, copper tube or corrugated copper tube, depending on the cable size.
The ***dielectric*** is a cellular polyethylene foam manufactured by a proprietary process using ozone friendly expansion gas. A high foaming ratio guarantees low attenuation.

The foam dielectric is bonded to the inner conductor by a precoating layer. This layer ensures good adhesion of the dielectric to the inner conductor. It also permits easy, clean removal of the dielectric during connector installation.
The ring-corrugation of the copper ***outer conductor*** captures the dielectric mechanically and ensures good adhesion to the dielectric. This construction prevents relative movement between the inner and the outer conductor due to bending, pulling and temperature variations.

The standard cable construction uses an all-weather and UV-resistant black (or grey) ***PE jacket,*** suitable for indoor, outdoor or underground installation.

For applications requiring flame-retardance, coaxial cables are available with a flame retardant and halogen free jacket. This construction meets international standards for flame propagation, such as IEC 60332-1-2, smoke density IEC 61034-1+2 and acidity of evolved gases IEC 60754-2.

HALOGEN FREE and FLAME RETARDANT features

Test on flammability

a) Test on flammability of single cables

Test in accordance with: IEC 60332-1-2
EN 60332-1-2

b) Test on flammability of cable bundles

Test in accordance with: IEC 60332-3 Cat. C
EN 50266-2-4 Cat. C

Test on smoke density

Test in accordance with: IEC 61034-1 and -2
EN 61034-1 and -2

Test on corrosive gas emissions

Test in accordance with: IEC 60754-2
EN 50267-2-2

Test on insulation integrity (HLFR/M jacket only - consult us)

Test in accordance with: IEC 60331-23
VDE 0472 Part 814

LTE & 4G ready

		1/4" Hiflex	3/8" Hiflex*	1/2" Hiflex	7/8" Hiflex	1-1/4" Hiflex
STANDARD						
Cable type		**5042**	**5082**	**5092**	**5228X**	**5328X**
Product reference		EC1-50-HF	EC2-50-HF	EC4-50-HF	EC5-50-HF	EC6-50-HF
						Cable with stan
HLFR						
Cable type		**5042-HLFR**	**5082-HLFR**	**5092-HLFR**	**5228X-HLFR**	**5328X-HLFR**
Product reference		EC1-50-HF-FR	EC2-50-HF-FR	EC4-50-HF-FR	EC5-50-HF-FR	EC6-50-HF-FR
						Cable with halogen free and flame ret
Construction						
Outer diameter	(mm)	7.5	10.3	13.6	27.8	39.0
Mechanical						
Minimum bending radius						
single bending	(cm)	2.5	2.5	3	9	15
Electrical						
· Relative prop. velocity	(%)	82	82	82	88	88
· Nominal attenuation at 20 °C						
30 MHz	(dB/100m)	3.06	2.28	1.76	0.66	0.46
450 MHz	(dB/100m)	12.20	9.19	7.03	2.67	1.92
960 MHz	(dB/100m)	18.16	13.76	10.47	4.01	2.92
1880 MHz	(dB/100m)	26.00	19.85	15.02	5.79	4.29
2170 MHz	(dB/100m)	28.10	21.49	16.24	6.27	4.67
2400 MHz	(dB/100m)	29.68	22.73	17.16	6.63	4.95
2700 MHz	(dB/100m)	31.65	24.27	18.31	7.09	5.31
· Mean power rating at 40 °C ambient temperature						
30 MHz	(kW)	2.26	3.48	5.43	14.62	23.28
450 MHz	(kW)	0.57	0.86	1.36	3.62	5.60
960 MHz	(kW)	0.38	0.58	0.91	2.41	3.68
1880 MHz	(kW)	0.27	0.40	0.63	1.67	2.50
2170 MHz	(kW)	0.25	0.37	0.59	1.54	2.30
2400 MHz	(kW)	0.23	0.35	0.56	1.46	2.17
2700 MHz	(kW)	0.22	0.33	0.52	1.36	2.02
· RF peak power	(kW)	3.6	7.2	12.8	90	180
· Cut-off frequency	(GHz)	22	15.6	13.2	5.1	3.3

* Please consult us for availability, as minimum order quantities may apply.

1/4"	3/8" *	1/2"	5/8" *	7/8" A	1-1/4" A	1-5/8" A
				Ultra Low Loss	Ultra Low Loss	Ultra Low Loss
5062	**5088**	**5128**	**5168**	**5228A**	**5328A**	**5438A**
EC1-50	EC2-50	EC4-50	EC4.5-50	EC5-50-A	EC6-50-A	EC7-50-A
dard jacket - halogen free in acc. with IEC 60754						
5062-HLFR	**5088-HLFR**	**5128-HLFR**	**5168-HLFR**	**5228A-HLFR**	**5328A-HLFR**	**5438A-HLFR**
EC1-50-FR	EC2-50-FR	EC4-50-FR	EC4.5-50-FR	EC5-50-A-FR	EC6-50-A-FR	EC7-50-A-FR
tardant jacket in acc. with IEC 60754, 60332-1, 60332-3 Cat. C & 61034						
9.7	11.8	16.0	21.9	27.8	39.0	50.0
3	4	7	10	10	20	20
82	88	88	88	89	88	89
2.32	1.69	1.17	0.81	0.62	0.44	0.36
9.38	6.79	4.69	3.29	2.50	1.80	1.47
14.05	10.14	7.01	4.94	3.75	2.72	2.23
20.27	14.59	10.08	7.16	5.43	3.98	3.25
21.95	15.79	10.91	7.76	5.88	4.32	3.53
23.22	16.69	11.54	8.22	6.22	4.58	3.74
24.81	17.82	12.32	8.79	6.65	4.91	4.01
3.24	4.11	6.77	9.27	14.60	21.24	28.27
0.80	1.02	1.68	2.28	3.60	5.17	6.88
0.54	0.68	1.13	1.52	2.40	3.42	4.55
0.37	0.48	0.78	1.05	1.66	2.34	3.12
0.34	0.44	0.72	0.96	1.53	2.15	2.87
0.32	0.42	0.68	0.91	1.45	2.03	2.71
0.30	0.39	0.64	0.85	1.35	1.90	2.53
6.9	11	25.6	62	86	184	302
18.6	14.2	9.8	6.5	5.1	3.7	2.8

1/4" Hiflex

STANDARD 5042

Cable type : **5042**

Reference : **EC1-50-HF**

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : **5042-HLFR**

Reference : **EC1-50-HF-FR**

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	copper clad aluminium wire
Diameter (mm)	1.9
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	4.6
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	6.4
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	0.55
Diameter (mm)	7.5

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	2.5
b) 15 repeated bends (cm)	2.5
• ***Maximum pulling strength*** (daN)	30
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	-
• ***Flat plate crush resistance*** (kg/mm)	1.8
• ***Bending moment*** (Nm)	1.1
• ***Approximate weight***[2] (kg/km)	83 / 88

[1] a = 0.552
b = 0.0011
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1.5
• ***Nominal capacity*** (pF/m)	80
• ***Relative propagation velocity*** (%)	82
• ***Inductance*** (µH/m)	0.203
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	9.2
- outer conductor (Ω/km)	4.4
• ***RF peak voltage*** (kV)	0.6
• ***RF peak power*** (kW)	3.6
• ***Cut-off-frequency*** (GHz)	22
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	1.76	3.93
20	2.49	2.77
30	3.06	2.26
80	5.03	1.37
100	5.63	1.23
150	6.93	1.00
200	8.03	0.86
300	9.89	0.70
400	11.48	0.60
450	12.20	0.57
500	12.89	0.54
600	14.18	0.49
700	15.37	0.45
800	16.49	0.42
894	17.49	0.39
960	18.16	0.38
1000	18.56	0.37
1500	23.03	0.30
1700	24.63	0.28
1800	25.40	0.27
1880	26.00	0.27
2000	26.89	0.26
2170	28.10	0.25
2200	28.31	0.24
2300	29.00	0.24
2400	29.68	0.23
2500	30.35	0.23
2700	31.65	0.22
3000	33.53	0.21
4000	39.31	0.18
6000	49.36	0.14

NM50B14X

NF50P14X

NM50BL14X

CONNECTORS & TOOLS

Reference	Description
NM50B14X	N male, with silicone gasket
NF50P14X	N female, with silicone gasket, panel mount
NM50BL14X	N male, right angle, with silicone gasket
716MB14X	7-16 DIN male, with silicone gasket
SPTC50B14X	Cable preparation tool
Cutting knife	Spare parts for cable preparation tools
Peeling knife	(Refer to installation instructions of the tool)

SPTC50B14X

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥34*	≥34*
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1	≤1
• ***Inner contact resistance*** (mΩ)	≤1.5	≤1.5
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>400**	>600
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX/PTFE	TPX
• ***Gaskets***	High quality silicone	

* ≥30 for right angle connector
** >250 for right angle connector

ACCESSORIES

Description	Reference
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41

1/2" Hiflex

STANDARD 5092

Cable type : **5092**

Reference : **EC4-50-HF**

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : **5092-HLFR**

Reference : **EC4-50-HF-FR**

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	copper clad aluminium wire
Diameter (mm)	3.55
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	9.0
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	12.2
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	0.7
Diameter (mm)	13.6

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	3
b) 15 repeated bends (cm)	3
• ***Maximum pulling strength*** (daN)	68
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	0.5
• ***Flat plate crush resistance*** (kg/mm)	2.1
• ***Bending moment*** (Nm)	2.0
• ***Approximate weight***[2] (kg/km)	191 / 203

[1] a = 0.317
b = 0.00068
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	82
• ***Relative propagation velocity*** (%)	82
• ***Inductance*** (µH/m)	0.203
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	2.65
- outer conductor (Ω/km)	3.50
• ***RF peak voltage*** (kV)	1.1
• ***RF peak power*** (kW)	12.8
• ***Cut-off-frequency*** (GHz)	13.2
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	*Attenuation at 20 °C*[3] (dB/100m)	*Mean power rating*[4] (kW)
10	1.01	9.45
20	1.43	6.66
30	1.76	5.43
80	2.89	3.30
100	3.24	2.94
150	3.98	2.39
200	4.62	2.06
300	5.69	1.67
400	6.61	1.44
450	7.03	1.36
500	7.43	1.28
600	8.17	1.17
700	8.86	1.08
800	9.51	1.00
894	10.09	0.95
960	10.47	0.91
1000	10.70	0.89
1500	13.30	0.72
1700	14.23	0.67
1800	14.67	0.65
1880	15.02	0.63
2000	15.54	0.61
2170	16.24	0.59
2200	16.36	0.58
2300	16.77	0.57
2400	17.16	0.56
2500	17.55	0.54
2700	18.31	0.52
3000	19.40	0.49
4000	22.77	0.42
6000	28.63	0.33

716MBL12X

NF50B12X

716MB12X

NM50BL12X

CONNECTORS & TOOLS

Reference	Description
716MB12X	7-16 DIN male, with silicone gasket
716FB12X	7-16 DIN female, with silicone gasket
716MBL12X	7-16 DIN male, right angle, with silicone gasket
NM50B12X	N male, with silicone gasket
NF50B12X	N female, with silicone gasket
NM50BL12X	N male, right angle, with silicone gasket
SPTC50B12X	Cable preparation tool for straight connectors
SPTC50BL12X	Cable preparation tool for right angle connectors
Cutting knife	Spare parts for cable preparation tools
Peeling knife	(Refer to installation instructions of the tool)

SPTC50B12X

SPTC50BL12X

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥34*	≥34*
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1	≤1
• ***Inner contact resistance*** (mΩ)	≤1	≤1
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>400	>700
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX/PTFE	
• ***Gaskets***	High quality silicone	

* ≥30 for right angle connector

ACCESSORIES

Description	Reference
• ***Grounding clamp with normal outlet***	GCS12X
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41

GCS12X

7/8" Hiflex

STANDARD 5228X

Cable type : ***5228X***

Reference : ***EC5-50-HF***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5228X-HLFR***

Reference : ***EC5-50-HF-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	corrugated copper tube
Diameter (mm)	9.4
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	23.4
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	25.0
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.4
Diameter (mm)	27.8

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	9
b) 15 repeated bends (cm)	12.5
• ***Maximum pulling strength*** (daN)	130
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1.2
• ***Flat plate crush resistance*** (kg/mm)	1.7
• ***Bending moment*** (Nm)	8.4
• ***Approximate weight***[2] (kg/km)	475 / 525

[1] a = 0.1189
b = 0.000336
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	76
• ***Relative propagation velocity*** (%)	88
• ***Inductance*** (µH/m)	0.189
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	2.5
- outer conductor (Ω/km)	1.02
• ***RF peak voltage*** (kV)	3.0
• ***RF peak power*** (kW)	90
• ***Cut-off-frequency*** (GHz)	5.1
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	0.38	25.49
20	0.54	17.96
30	0.66	14.62
80	1.09	8.87
100	1.22	7.91
150	1.51	6.42
200	1.75	5.53
300	2.16	4.48
400	2.51	3.85
450	2.67	3.62
500	2.83	3.42
600	3.11	3.11
700	3.38	2.86
800	3.63	2.66
894	3.86	2.51
960	4.01	2.41
1000	4.10	2.36
1500	5.11	1.89
1700	5.47	1.77
1800	5.65	1.71
1880	5.79	1.67
2000	5.99	1.61
2170	6.27	1.54
2200	6.32	1.53
2300	6.48	1.49
2400	6.63	1.46
2500	6.79	1.43
2700	7.09	1.36
3000	7.52	1.29
4000	8.86	1.09
6000	-	-

NM50V78M

716FV78M

CONNECTORS & TOOL

Reference	Description
716MV78M	7-16 DIN male, O-Ring
716FV78M	7-16 DIN female, O-Ring
NM50V78M	N male, O-Ring
NF50V78M	N female, O-Ring
SPTC50AV78X	Cable preparation tool
Inner ring	Spare parts for cable preparation tool
Outer ring	(Refer to installation instructions of the tool)
Spring	
Cutting knife	
Peeling knife	
Flaring knife	

SPTC50AV78X

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥34	≥34
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤0.7	≤0.7
• ***Inner contact resistance*** (mΩ)	≤1	≤1
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>400	>1000
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	PTFE	TPX
• ***Gaskets***	High quality silicone	

ACCESSORIES

Description	Reference
• ***Grounding clamp, parallel outlet***	GCS78L
Grounding clamp, parallel outlet with hinge	GCS78PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-78
Pre-laced hoisting grip	HG-78-L
	see page 35

GCS78PAR

1-1/4" Hiflex

STANDARD 5328X

Cable type : ***5328X***

Reference : ***EC6-50-HF***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5328X-HLFR***

Reference : ***EC6-50-HF-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	corrugated copper tube
Diameter (mm)	13.6
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	33.5
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	36.0
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.5
Diameter (mm)	39.0

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	15
b) 15 repeated bends (cm)	25
• ***Maximum pulling strength*** (daN)	180
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1.4
• ***Flat plate crush resistance*** (kg/mm)	2.1
• ***Bending moment*** (Nm)	19
• ***Approximate weight***[2] (kg/km)	720

[1] a = 0.0821
b = 0.000388
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	76
• ***Relative propagation velocity*** (%)	88
• ***Inductance*** (µH/m)	0.189
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	2.1
- outer conductor (Ω/km)	0.69
• ***RF peak voltage*** (kV)	4.3
• ***RF peak power*** (kW)	180
• ***Cut-off-frequency*** (GHz)	3.3
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	*Attenuation at 20 °C*[3] (dB/100m)	*Mean power rating*[4] (kW)
10	0.26	40.75
20	0.37	28.64
30	0.46	23.28
80	0.77	14.03
100	0.86	12.49
150	1.06	10.09
200	1.24	8.67
300	1.54	6.98
400	1.80	5.97
450	1.92	5.60
500	2.03	5.29
600	2.24	4.79
700	2.44	4.39
800	2.63	4.08
894	2.80	3.83
960	2.92	3.68
1000	2.98	3.60
1500	3.76	2.85
1700	4.04	2.65
1800	4.18	2.57
1880	4.29	2.50
2000	4.45	2.41
2170	4.67	2.30
2200	4.70	2.28
2300	4.83	2.22
2400	4.95	2.17
2500	5.08	2.12
2700	5.31	2.02
3000	5.66	1.90
4000	-	-
6000	-	-

NF50V114N1

716FV114N1

CONNECTORS & TOOL

Reference	Description
716MV114N1	7-16 DIN male, O-Ring
716FV114N1	7-16 DIN female, O-Ring
NM50V114N1	N male, O-Ring
NF50V114N1	N female, O-Ring
SPTC50AV114X	Cable preparation tool
Inner ring	Spare parts for cable preparation tool
Outer ring	(Refer to installation instructions of the tool)
Spring	
Cutting knife	
Peeling knife	

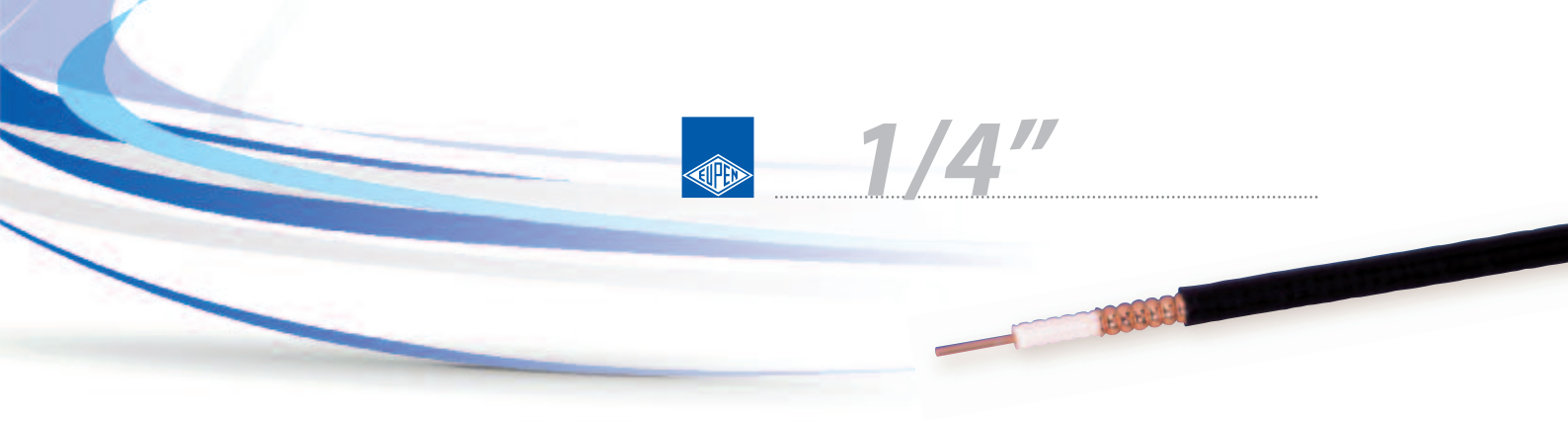
SPTC50AV114X

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥35	≥35
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1.0	
• ***Inner contact resistance*** (mΩ)	≤1.0	
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤-155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>1000	
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX	
• ***Gaskets***	High quality silicone	

ACCESSORIES

Description	Reference
• ***Grounding clamp, parallel outlet***	GCS114L
Grounding clamp, parallel outlet with hinge	GCS114PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-114
Pre-laced hoisting grip	HG-114-L
	see page 35

GCS114PAR



1/4"

STANDARD 5062

Cable type : ***5062***

Reference : ***EC1-50***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5062-HLFR***

Reference : ***EC1-50-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	copper clad aluminium wire
Diameter (mm)	2.4
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	6.5
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	7.5
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.1
Diameter (mm)	9.7

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	3
b) 15 repeated bends (cm)	8
• ***Maximum pulling strength*** (daN)	40
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	-
• ***Flat plate crush resistance*** (kg/mm)	0.8
• ***Bending moment*** (Nm)	1.5
• ***Approximate weight***[2] (kg/km)	111 / 124

[1] a = 0.41769
b = 0.00115
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	82
• ***Relative propagation velocity*** (%)	82
• ***Inductance*** (µH/m)	0.203
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	5.85
- outer conductor (Ω/km)	3.3
• ***RF peak voltage*** (kV)	0.8
• ***RF peak power*** (kW)	6.9
• ***Cut-off-frequency*** (GHz)	18.6
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	1.33	5.64
20	1.89	3.98
30	2.32	3.24
80	3.83	1.96
100	4.29	1.75
150	5.29	1.42
200	6.14	1.23
300	7.58	0.99
400	8.81	0.85
450	9.38	0.80
500	9.91	0.76
600	10.92	0.69
700	11.86	0.63
800	12.73	0.59
894	13.52	0.56
960	14.05	0.54
1000	14.36	0.52
1500	17.90	0.42
1700	19.18	0.39
1800	19.79	0.38
1880	20.27	0.37
2000	20.98	0.36
2170	21.95	0.34
2200	22.12	0.34
2300	22.68	0.33
2400	23.22	0.32
2500	23.76	0.32
2700	24.81	0.30
3000	26.33	0.29
4000	31.02	0.24
6000	39.25	0.19

NF50A14

NM50AL14

CONNECTORS & TOOLS

Reference	Description
716MA14	7-16 DIN male, O-Ring
716FA14	7-16 DIN female, O-Ring
NM50A14	N male, O-Ring
NF50A14	N female, O-Ring
NM50AL14	N male, right angle, O-Ring
SPTC50A14	Cable preparation tool
Cutting knife	Spare parts for cable preparation tools
Peeling knife	(Refer to installation instructions of the tool)

SPTC50A14

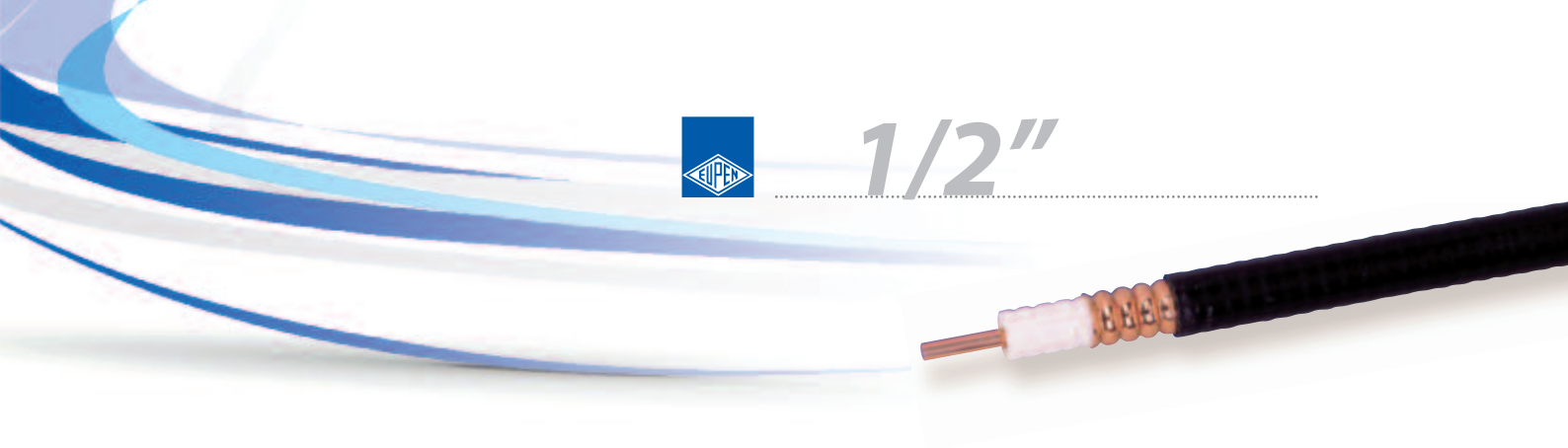
Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥34*	≥34
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1	≤1
• ***Inner contact resistance*** (mΩ)	≤1.5	≤1.5
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>400	>700
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX/PTFE	
• ***Gaskets***	High quality silicone	

* ≥30 for right angle connector

ACCESSORIES

Description	Reference
• ***Grounding clamp with normal outlet***	GCS14
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41

GCS14



1/2"

STANDARD 5128

Cable type : **5128**

Reference : **EC4-50**

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : **5128-HLFR**

Reference : **EC4-50-FR**

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	copper clad aluminium wire
Diameter (mm)	4.8
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	12.4
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	13.8
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.1
Diameter (mm)	16.0

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	7
b) 15 repeated bends (cm)	12
• ***Maximum pulling strength*** (daN)	94
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1
• ***Flat plate crush resistance*** (kg/mm)	1.5
• ***Bending moment*** (Nm)	3.4
• ***Approximate weight***[2] (kg/km)	225 / 247

[1] a = 0.21
b = 0.00052
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	76
• ***Relative propagation velocity*** (%)	88
• ***Inductance*** (µH/m)	0.189
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	1.48
- outer conductor (Ω/km)	2.14
• ***RF peak voltage*** (kV)	1.6
• ***RF peak power*** (kW)	25.6
• ***Cut-off-frequency*** (GHz)	9.8
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	*Attenuation at 20 °C*[3] (dB/100m)	*Mean power rating*[4] (kW)
10	0.67	11.79
20	0.95	8.31
30	1.17	6.77
80	1.92	4.11
100	2.15	3.67
150	2.65	2.98
200	3.07	2.57
300	3.79	2.08
400	4.41	1.79
450	4.69	1.68
500	4.96	1.59
600	5.46	1.45
700	5.92	1.33
800	6.36	1.24
894	6.74	1.17
960	7.01	1.13
1000	7.16	1.10
1500	8.91	0.89
1700	9.54	0.83
1800	9.85	0.80
1880	10.08	0.78
2000	10.43	0.76
2170	10.91	0.72
2200	10.99	0.72
2300	11.27	0.70
2400	11.54	0.68
2500	11.80	0.67
2700	12.32	0.64
3000	13.06	0.60
4000	15.36	0.51
6000	19.39	0.41

NF50V12

716FV12N1

716MVL12

CONNECTORS & TOOL

Reference	Description
716MV12N1	7-16 DIN male, O-Ring
716FV12N1	7-16 DIN female, O-Ring
716MVL12	7-16 DIN male, right angle, O-Ring
NM50V12	N male, O-Ring
NF50V12	N female, O-Ring
NM50VL12	N male, right angle, O-Ring
SPTC50AV12	Cable preparation tool
Cutting knife	Spare parts for cable preparation tool
Peeling knife	(Refer to installation instructions of the tool)

Rem.: EIA connectors available on request

SPTC50AV12

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥34*	≥34*
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1	≤1
• ***Inner contact resistance*** (mΩ)	≤1	≤1
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>500**	>1000***
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX/PTFE	TPX
• ***Gaskets***	High quality silicone	

* ≥30 for right angle connector
** >400 for N-right angle connector
*** >700 for 7-16 right angle connector

ACCESSORIES

Description	Reference
• ***Grounding clamp with parallel outlet***	GCS12PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-12
Pre-laced hoisting grip	HG-12-L
	see page 35

GCS12PAR

7/8" A
Ultra Low Loss

STANDARD 5228A

Cable type : ***5228A***

Reference : ***EC5-50-A***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5228A-HLFR***

Reference : ***EC5-50-A-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	smooth copper tube
Diameter (mm)	9.2
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	23.5
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	25.0
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.4
Diameter (mm)	27.8

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	10
b) 15 repeated bends (cm)	25
• ***Maximum pulling strength*** (daN)	130
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1.2
• ***Flat Plate Crush resistance*** (kg/mm)	1.6
• ***Bending moment*** (Nm)	10
• ***Approximate weight***[2] (kg/km)	430 / 480

[1] a = 0.1107
b = 0.000333
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	75
• ***Relative propagation velocity*** (%)	89
• ***Inductance*** (µH/m)	0.187
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	1.63
- outer conductor (Ω/km)	1.31
• ***RF peak voltage*** (kV)	2.9
• ***RF peak power*** (kW)	86
• ***Cut-off-frequency*** (GHz)	5.1
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	0.35	25.46
20	0.50	17.93
30	0.62	14.60
80	1.02	8.85
100	1.14	7.89
150	1.41	6.40
200	1.63	5.51
300	2.02	4.46
400	2.35	3.83
450	2.50	3.60
500	2.64	3.41
600	2.91	3.09
700	3.16	2.85
800	3.40	2.65
894	3.61	2.49
960	3.75	2.40
1000	3.83	2.35
1500	4.79	1.88
1700	5.13	1.75
1800	5.30	1.70
1880	5.43	1.66
2000	5.62	1.60
2170	5.88	1.53
2200	5.92	1.52
2300	6.07	1.48
2400	6.22	1.45
2500	6.37	1.41
2700	6.65	1.35
3000	7.06	1.27
4000	8.33	1.08
6000	-	-

NM50V78N1

716FV78N1

CONNECTORS & TOOL

Reference	Description
716MV78N1	7-16 DIN male, O-Ring
716FV78N1	7-16 DIN female, O-Ring
NM50V78N1	N male, O-Ring
NF50V78N1	N female, O-Ring
SPTC50AV78M	Cable preparation tool
Inner ring	Spare parts for cable preparation tool
Outer ring	(Refer to installation instructions of the tool)
Spring	
Cutting knife	
Peeling knife	
Flaring knife	

Rem.: EIA connectors available on request.

SPTC50AV78M

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥35	≥35
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1.0	
• ***Inner contact resistance*** (mΩ)	≤1.0	
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>1000	
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX	
• ***Gaskets***	High quality silicone	

ACCESSORIES

Description	Reference
• ***Grounding clamp, parallel outlet***	GCS78L
Grounding clamp, parallel outlet with hinge	GCS78PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-78
Pre-laced hoisting grip	HG-78-L
	see page 35

GCS78PAR

1-1/4" A

Ultra Low Loss

STANDARD 5328A

Cable type : ***5328A***

Reference : ***EC6-50-A***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5328A-HLFR***

Reference : ***EC6-50-A-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	smooth copper tube
Diameter (mm)	13.0
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	33.5
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	36.0
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.5
Diameter (mm)	39.0

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	20
b) 15 repeated bends (cm)	35
• ***Maximum pulling strength*** (daN)	240
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1.4
• ***Flat plate crush resistance*** (kg/mm)	2.4
• ***Bending moment*** (Nm)	30
• ***Approximate weight***[2] (kg/km)	803 / 889

[1] a = 0.0783
b = 0.00031
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	76
• ***Relative propagation velocity*** (%)	88
• ***Inductance*** (µH/m)	0.189
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	0.95
- outer conductor (Ω/km)	0.69
• ***RF peak voltage*** (kV)	4.3
• ***RF peak power*** (kW)	184
• ***Cut-off-frequency*** (GHz)	3.7
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	0.25	37.13
20	0.36	26.12
30	0.44	21.24
80	0.73	12.84
100	0.81	11.44
150	1.01	9.26
200	1.17	7.96
300	1.45	6.42
400	1.69	5.51
450	1.80	5.17
500	1.91	4.88
600	2.10	4.42
700	2.29	4.07
800	2.46	3.78
894	2.62	3.56
960	2.72	3.42
1000	2.79	3.34
1500	3.50	2.66
1700	3.76	2.48
1800	3.88	2.40
1880	3.98	2.34
2000	4.12	2.26
2170	4.32	2.15
2200	4.35	2.14
2300	4.47	2.08
2400	4.58	2.03
2500	4.69	1.98
2700	4.91	1.90
3000	5.22	1.78
4000	-	-
6000	-	-

NF50V114N1

716FV114N1

CONNECTORS & TOOL

Reference	Description
716MV114N1	7-16 DIN male, O-Ring
716FV114N1	7-16 DIN female, O-Ring
NM50V114N1	N male, O-Ring
NF50V114N1	N female, O-Ring
SPTC50AV114M	Cable preparation tool
Inner ring	Spare parts for cable preparation tool
Outer ring	(Refer to installation instructions of the tool)
Spring	
Cutting knife	
Peeling knife	

Rem.: EIA connectors available on request.

SPTC50AV114M

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 3 GHz*** (dB)	≥35	≥35
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1.0	
• ***Inner contact resistance*** (mΩ)	≤1.0	
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>1000	
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	TPX	
• ***Gaskets***	High quality silicone	

ACCESSORIES

Description	Reference
• ***Grounding clamp, parallel outlet***	GCS114L
Grounding clamp, parallel outlet with hinge	GCS114PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-114
Pre-laced hoisting grip	HG-114-L
	see page 35

GCS114PAR

1-5/8" A
Ultra Low Loss

STANDARD 5438A

Cable type : ***5438A***

Reference : ***EC7-50-A***

Cable with standard UV resistant PE jacket, halogen free according to IEC 60754

FLAME RETARDANT HLFR

Cable type : ***5438A-HLFR***

Reference : ***EC7-50-A-FR***

Cable with UV resistant, halogen free, low smoke, flame retardant jacket according to IEC 60754, IEC 60332-1, IEC 60332-3 Cat. C and IEC 61034

CHARACTERISTICS

Construction

• ***Inner conductor***	
Material	corrugated copper tube
Diameter (mm)	17.7
• ***Dielectric***	
Material	gas-injected cellular polyethylene
Diameter (mm)	43.0
• ***Outer conductor***	
Material	corrugated copper tube
Diameter (mm)	46.6
• ***Jacket***	
Material	black polyethylene
Thickness (mm)	1.7
Diameter (mm)	50.0

Mechanical

• ***Minimum bending radius***	
a) single bending (cm)	20
b) 15 repeated bends (cm)	40
• ***Maximum pulling strength*** (daN)	250
• ***Recommended temperature range***	
- Storage	-70 to +85 °C
- Installation	-40 to +60 °C
- Operation	-55 to +85 °C
• ***Maximum length per hoisting grip*** (m)	70
• ***Maximum hanger spacing*** (m)	1.5
• ***Flat plate crush resistance*** (kg/mm)	2.4
• ***Bending moment*** (Nm)	38
• ***Approximate weight***[2] (kg/km)	1019 / 1131

[1] a = 0.064
b = 0.000253
$\propto(f) = a \cdot \sqrt{f} + b \cdot f$ [dB/100m]

[2] Standard PE jacket / HLFR jacket

[3] Nominal values

[4] Ambient temperature = 40 °C; Temperature of inner conductor = 100 °C; VSWR = 1.0; no solar loading

Electrical

• ***Characteristic impedance*** (Ω)	50 ±1
• ***Nominal capacity*** (pF/m)	75
• ***Relative propagation velocity*** (%)	89
• ***Inductance*** (µH/m)	0.187
• ***DC-resistance at 20 °C***	
- inner conductor (Ω/km)	1.44
- outer conductor (Ω/km)	0.5
• ***RF peak voltage*** (kV)	5.5
• ***RF peak power*** (kW)	302
• ***Cut-off-frequency*** (GHz)	2.8
• ***Insulation resistance*** (MΩ.km)	>>5000

• ***Attenuation***[1] ***and power rating***

Frequency (MHz)	***Attenuation at 20 °C***[3] (dB/100m)	***Mean power rating***[4] (kW)
10	0.20	49.42
20	0.29	34.76
30	0.36	28.27
80	0.59	17.09
100	0.67	15.22
150	0.82	12.32
200	0.96	10.60
300	1.18	8.55
400	1.38	7.33
450	1.47	6.88
500	1.56	6.50
600	1.72	5.89
700	1.87	5.41
800	2.01	5.03
894	2.14	4.73
960	2.23	4.55
1000	2.28	4.45
1500	2.86	3.54
1700	3.07	3.30
1800	3.17	3.19
1880	3.25	3.12
2000	3.37	3.01
2170	3.53	2.87
2200	3.56	2.85
2300	3.65	2.77
2400	3.74	2.71
2500	3.83	2.64
2700	4.01	2.53
3000	-	-
4000	-	-
6000	-	-

NF50V158N1

716MV158N1

CONNECTORS & TOOL

Reference	Description
716MV158N1	7-16 DIN male, O-Ring
716FV158N1	7-16 DIN female, O-Ring
NM50V158N1	N male, O-Ring
NF50V158N1	N female, O-Ring
SPTC50AV158M	Cable preparation tool
Inner ring	Spare parts for cable preparation tool
Outer ring	(Refer to installation instructions of the tool)
Spring	
Cutting knife	
Peeling knife	

Rem.: EIA connectors available on request.

SPTC50AV158M

Specification of	N-connectors	7-16 connectors
Electrical		
• ***Nominal impedance*** (Ω)	50	50
• ***Return loss at 2.7 GHz*** (dB)	≥35	≥35
• ***Insulation resistance*** (GΩ)	≥5	≥10
• ***Test voltage*** (at sea level) (kV rms, 50 Hz)	2.5	4
• ***Working voltage*** (at sea level) (kV rms, 50 Hz)	1	2.7
• ***Screening effectiveness up to 1 GHz*** (dB)	>128	>128
• ***Outer contact resistance*** (mΩ)	≤1.0	
• ***Inner contact resistance*** (mΩ)	≤1.0	
• ***PIM ratio*** (2 x 20 W carrier) (dBc)	≤ -155 (Typical -163)	
Mechanical		
• ***Torque on coupling nut*** (Nm)	8	30
• ***Cable retention*** (N)	>1500	
Environmental		
• ***Temperature range*** (°C)	-40 to +85	
• ***Degree of protection*** (humidity)	IP67/IP68 (mated connectors)	
Materials		
• ***External parts***	brass with silver or trimetal or electroless nickel plating	
• ***Outer contact***	brass with silver or trimetal plating	
• ***Inner contact***	silver plated high-strength copper alloy	
• ***Dielectric***	PTFE	TPX
• ***Gaskets***	High quality silicone	

ACCESSORIES

Description	Reference
• ***Grounding clamp with parallel outlet***	GCS158PAR
• ***Fixing clamps***	see page 36
• ***Additional weatherproofing***	see page 41
• ***Lace-up hoisting grip***	HG-158
Pre-laced hoisting grip	HG-158-L
	see page 35

GCS158PAR

SOLDERED JUMPER CABLES

with connectors DIN 7-16, N and 4.3-10

EUPEN offers jumper cables with 1/2" Hiflex cable (5092 / EC4-50-HF) or 1/2" standard cable (5128 / EC4-50). The connectors are soldered and a wide range of interfaces is available: DIN 7-16, N or 4.3-10, many of them being available as straight or right angle connectors. These jumper cables are designed for watertight applications and optimised performances.

interface 4.3-10

Features

- *excellent return loss values*
- *very low bending radius:*
  - *30 mm for 1/2" Hiflex (5092)*
  - *70 mm for 1/2" standard (5128) for single bending (125 mm for repeated bendings)*
- *very low level of 3rd order intermodulation products*
- *easy, fast and reliable installation*
- *water tightness according to IP67/IP68 (mated connectors)*
- *the overmolding of the connector provides an additional mechanical protection*

Product reference

EC4-vv-S-www-XYZXYZ

EC4 = 1/2" cable (5128)
vv = HF for Hiflex (5092)
S = soldered connector
www = length in cm
X = D for DIN 7-16 type connector
N for N type connector
43 for 4.3-10 type connector
Y = M for male or F for female
Z = L for right angle connector

Marking

- Manufacturer EUPEN
- Week & Year of Production
- Product Ref.: for ex.: *EC4-HF-S-200-DMDM*
- Torque
- Product Nr. EUPEN
- Serial Number

Technical data

Cable type*	EC4-50-HF (5092) 1/2"-HIFLEX	EC4-50 (5128) 1/2"
Electrical		
• Nominal impedance [Ω]	50 ±1	
• Frequency range [MHz]	10 - 2700	
• PIM ratio (2 x 20 W carrier) [dBc]	≤ -155 (Typical -163)	
• Attenuation per m at 20 °C [dB] - without connectors**		
960 MHz	0.106	0.071
1880 MHz	0.151	0.103
2200 MHz	0.170	0.113
2600 MHz	0.187	0.123
• RF Voltage rating (Peak) [V]	1130	1600
• Relative propagation velocity [%]	82	88
Mechanical		
• Minimum bending radius [mm]		
- single	30	70
- repeated	30	125
• Connector torque (nominal) [Nm]		
- DIN 7-16 connector	28	28
- N type connector	12	12
- 4.3-10 connector	8	8
Environmental		
• Temperature range [°C]		
- installation	-40 to +60	
- operating	-55 to +85	
• Protection against water ingress	Water tightness acc. to IP 68 (0.5 bar / 24 h) (mated connectors)	
• General environmental	Corrosion and UV resistant	
• RoHS compliance (EU Directive 2002/95/EC)	YES	

Maximum power rating [W]

Connector 1	Connector 2	Reference	0.8-1.0 GHz	1.7-2.2 GHz	2.5-2.7 GHz	0.8-1.0 GHz	1.7-2.2 GHz	2.5-2.7 GHz
7-16	7-16	...-DyzDyz	880	560	500	1090	710	630
7-16	N	...-DyzNyz	640	400	350	640	400	350
N	N	...-NyzNyz	640	400	350	640	400	350
7-16	4.3-10	...-Dy43M	700	470	420	-	-	-

Return loss [dB] ***

Connector 1	Connector 2	Reference	0.8-1.0 GHz	1.7-2.2 GHz	2.5-2.7 GHz	0.8-1.0 GHz	1.7-2.2 GHz	2.5-2.7 GHz
7-16	7-16	...-DyDy	≥ 32	≥ 28	≥ 28	≥ 32	≥ 29	≥ 29
		...-DyDML	≥ 30	≥ 28	≥ 28	-	-	-
		...-DMLDML	≥ 28	≥ 26	≥ 26	-	-	-
7-16	N	...-DyNy	≥ 32	≥ 28	≥ 28	≥ 32	≥ 29	≥ 29
		...-DyNML	≥ 30	≥ 28	≥ 28	-	-	-
		...-DMLNy	≥ 30	≥ 28	≥ 28	-	-	-
		...-DMLNML	≥ 28	≥ 26	≥ 26	-	-	-
N	N	...-NyNy	≥ 30	≥ 27	≥ 27	≥ 30	≥ 27	≥ 27
		...-NyNML	≥ 29	≥ 27	≥ 27	-	-	-
		...-NMLNML	≥ 28	≥ 26	≥ 26	-	-	
7-16	4.3-10	...-Dy43M	≥ 32	≥ 28	≥ 28	-	-	-

* HLFR versions also available

** Typical values without connectors, the typical connector attenuation (2 connectors) is less than 0.02 [dB]

*** These values are given for a length of the jumper up to 7 meters.

LOW-LOSS BRAIDED CABLES

Flexible 50 Ohms low-loss coaxial cables

As an alternative to the corrugated cables with a welded copper tube as outer conductor, ***EUPEN*** also offers low-loss braided cables. Their flexibility and easy handling make them installation-friendly. Moreover, their better behaviour at high frequencies gives them an advantage over the traditional RG cables.

CHARACTERISITCS

Cable type	*EC200*	*EC400+* *	*EC600*
Construction			
• ***Inner conductor***			
Material	copper wire	copper clad aluminium wire	copper clad aluminium wire
Diameter (mm)	1.08	2.7	4.47
• ***Dielectric***			
Material	gas-injected cellular polyethylene	gas-injected cellular polyethylene	gas-injected cellular polyethylene
Diameter (mm)	2.95	7.25	11.56
• ***Outer conductor***			
Tape	aluminium tape, bonded to the dielectric	aluminium tape, bonded to the dielectric	aluminium tape
Diameter over tape (mm)	3.05	7.35	11.7
Braid	tinned copper braid	tinned copper braid	tinned copper braid
Diameter over braid (mm)	3.7	8.0	12.3
• ***Jacket***			
Material	black polyethylene	black polyethylene	black polyethylene
Thickness (mm)	0.65	1.1	1.35
Diameter (mm)	5.0	10.2	15.0

N.B. for complete datasheets, please contact us

* Also available in **H**alogen-free, **L**ow-smoke and **F**lame **R**etardant version (EC400-**HLFR**)

Cable type	EC200	EC400+	EC600
Mechanical			
• *Minimum bending radius*			
a) single bending (cm)	2.5	2.5	8
b) 15 repeated bends (cm)	5	5	15
• *Maximum pulling strength* (daN)	11	30	50
• *Recommended temperature range*			
- Storage	-70 to +85 °C	-70 to +85 °C	-70 to +85 °C
- Installation	-40 to +60 °C	-40 to +60 °C	-40 to +60 °C
- Operation	-55 to +85 °C	-55 to +85 °C	-55 to +85 °C
• *Weight* (kg/km)	32	90	175
Electrical			
• *Characteristic impedance* (Ω)	50 ±2	50 ±2	50 ±2
• *Relative propagation velocity* (%)	83	85	87
• *DC-resistance at 20 °C*			
- inner conductor (Ω/km)	19.9	4.56	1.65
- outer conductor (Ω/km)	12.1	6.4	4.4
• *RF peak voltage* (kV)	0.4	1.0	1.6
• *Cut-off-frequency* (GHz)	39	16	10
• *Screening attenuation* (dB)	>90	>90	>90

• *Attenuation and power rating*

Frequency	*Attenuation at 20 °C*[1]	*Mean power rating*[2]	*Attenuation at 20 °C*[1]	*Mean power rating*[2]	*Attenuation at 20 °C*[1]	*Mean power rating*[2]
(MHz)	(dB/100m)	(kW)	(dB/100m)	(kW)	(dB/100m)	(kW)
10	3.3	1.62	1.3	5.05	0.8	9.74
20	4.7	1.14	1.8	3.56	1.1	6.87
30	5.7	0.93	2.2	2.90	1.4	5.59
80	9.4	0.57	3.7	1.76	2.3	3.39
100	10.6	0.51	4.1	1.57	2.5	3.03
150	13.0	0.41	5.1	1.28	3.1	2.46
200	15.0	0.36	5.9	1.10	3.6	2.12
300	18.5	0.29	7.2	0.90	4.5	1.72
400	21.5	0.25	8.4	0.77	5.2	1.48
450	22.8	0.23	8.9	0.73	5.5	1.39
500	24.1	0.22	9.4	0.69	5.8	1.31
600	26.5	0.20	10.3	0.62	6.4	1.19
700	28.7	0.19	11.2	0.58	7.0	1.10
800	30.7	0.17	12.0	0.54	7.5	1.02
894	32.6	0.16	12.8	0.51	7.9	0.96
960	33.8	0.16	13.2	0.49	8.3	0.93
1000	34.5	0.15	13.5	0.48	8.4	0.91
1500	42.7	0.13	16.8	0.38	10.5	0.73
1700	45.6	0.12	18.0	0.36	11.3	0.68
1800	47.0	0.11	18.5	0.35	11.6	0.66
1880	48.1	0.11	19.0	0.34	11.9	0.64
2000	49.8	0.11	19.6	0.33	12.3	0.62
2170	52.0	0.10	20.5	0.31	12.9	0.59
2200	52.3	0.10	20.7	0.31	13.0	0.59
2300	53.6	0.10	21.2	0.31	13.3	0.57
2400	54.8	0.10	21.7	0.30	13.6	0.56
2600	57.2	0.09	22.6	0.27	14.2	0.54
2700	58.4	0.09	23.1	0.27	14.5	0.53
3000	61.8	0.09	24.5	0.26	15.4	0.50

[1] Nominal values
[2] Ambient temperature = 40°C ; temperature of inner conductor = 100°C ; VSWR = 1.0 ; no solar loading

ACCESSORIES FOR CABLES

1. Adapters

Eupen offers a wide range of inside-series and inter-series 7-16 DIN and N type adapters designed in ***Premium*** and ***Precision*** models.

Features

- *Low reflection coefficient up to 2.7 GHz*
- *Low PIM (typ. -163dBc)*
- *high contact force realized with inner contacts made in a high-strength copper alloy*
- *Silver plated*
- *Watertight (IP67/IP68)*
- *Corrosion resistant*

A. Premium adapters

Premium adapters are characterised by a minimum Return loss of -34 dB up to 2.7 GHz.

Description	***Reference***
N male to 7-16 male	AD50NM716M
N female to 7-16 male	AD50NF716M
N male to 7-16 female	AD50NM716F
N female to 7-16 female	AD50NF716F
N male to N female	AD50NMF
N male to N male	AD(T)50NMM
N female to N female	AD50NFF
7-16 male to 7-16 female	AD(T)716MF
7-16 female to 7-16 female	AD(T)716FF
7-16 male to 7-16 male	AD(T)716MM

B. Precision adapters

For applications where high electrical performances and very low return loss are requested, and where high precision measurement equipment is requested - such as field test application in the cellular communication - we offer high precision adaptors featuring lowest return loss with guaranteed minimum -40 dB up to 2.7 GHz.

Description	***Reference***
N male to 7-16 male	PRAD50NM716M
N female to 7-16 male	PRAD50NF716M
N male to 7-16 female	PRAD50NM716F
N female to 7-16 female	PRAD50NF716F
7-16 female to 7-16 female	PRAD716FF
7-16 male to 7-16 male	PRAD716MM

2. Preset torque wrenches

The torque wrenches emit an audible "click" when the specified torque is reached. Proper tightening ensures water-tightness and prevents loosening from vibration.

A. blue wrench handles for connector back nuts

Connector	*Size mm (in)*	*Head thickness mm*	*Torque value Nm (ft-lb)*	*Reference*
1/2" & 1/2"-Hiflex	19 (3/4")	7	27 (20)	TQ-34-F20
7/8" & 7/8"-Hiflex	30 (1-3/16")	12	30 (22)	TQ-30MM-F22
1-1/4" & 1-1/4"-Hiflex	43 (1-11/16")	13	40 (29)	TQ-11116-F29
1-5/8"	58 (2-1/4")	13	50 (37)	TQ-214-F37

Important: Hold connector body fixed while turning back nut with torque wrench.

B. red wrench handles for connector interfaces

Connector	*Size mm (in)*	*Head thickness mm*	*Torque value Nm (ft-lb)*	*Reference*
7-16 DIN coupling nut	32 (1-1/4")	13	25 (18)	TQ-114-F18-M

3. Hook spanners

Connector	*Hook spanner type*	*Pin diameter*	*Reference*
1-1/4"	hook spanner 35/60	4 mm	EU-HKS-35/60
1-5/8"	hook spanner 60/90	5 mm	EU-HKS-60/90

4. Grounding clamps

A. Grounding clamps "GCS"

parallel outlet

90° outlet

The optimal grounding of the transmission line antenna to base station is a very weak point. In order to guarantee the best grounding we recommend the use of the EUPEN grounding clamps in order to ground the coaxial outer conductor to the antenna tower or ground wire. The main features of the Eupen grounding clamps are:

- ***Ultra quick and easy installation***
- ***No loose parts***
- ***Lightning current capability up to 100kA for bigger size (wave type 10/350 µs)***
- ***Very low contact resistance < 1mOhm***
- ***Waterproof according IP67 / IP68 without additional tape or sealant***
- ***Corrosion resistant***
- ***Reusable***

GROUNDING CLAMPS

Reference	***GCS14***	***GCS38***	***GCS12X***	***GCS12PAR***	***GCS78L* GCS78PAR***	***GCS114L* GCS114PAR***	***GCS158PAR***
Cable size	1/4"	3/8"	1/2" Hiflex	1/2"	7/8"A & 7/8" Hiflex	1-1/4"A & 1-1/4" Hiflex	1-5/8"A
Outlet	90°	90°	90°	parallel	parallel	parallel	parallel
Cable cut (mm)	24	20	24	25	21	26	30

For further details please refer to technical specifications.
* versions without hinge

B. Connector grounding kit "CGC" 12-158

Description

- Stainless steel tightening strap
- 60 cm lead with attachment lug and stainless steel M6 Allen screw, washer and nut.

Features

- Fast, easy and reliable installation
- Low contact resistance
- Corrosion resistant material
- Reusable
- Only one model for all the connector sizes from 1/2" to 1-5/8"

5. Hoisting grips

We offer two types of hoisting grips : the “lace-up” version and the “pre-laced” version.
The “pre-laced” hoisting grip can be installed very quickly at the extremity of one cable, whereas the “lace-up” hoisting grip can be installed at any point of the cable.
Hoisting grips are used to raise the cable up the tower. They can be tied off as a permanent support. Use one hoisting grip for maximum 70 m cable length.

The hoisting grips are manufactured from high-grade tin coated bronze to provide highest corrosion resistance.

REFERENCE

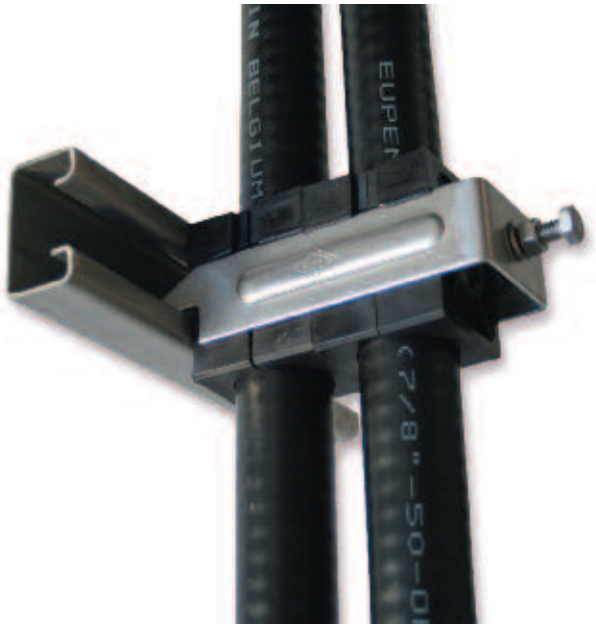
Size	*1/2”*	*7/8”*	*1-1/4”*	*1-5/8”*
Lace-up type	HG-12	HG-78	HG-114	HG-158
Pre-laced type	HG-12-L	HG-78-L	HG-114-L	HG-158-L

6. Fixing clamps

A. EUCATEC™ RF cable clamps

Features

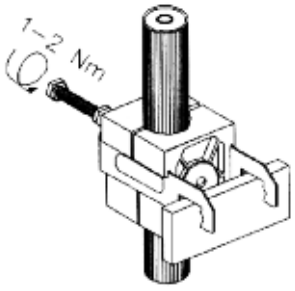
- High durability given by non-corrosive metal components in V2A stainless steel and calibrated saddles in ultraviolet and aging resistant polyamide
- Mountable at "C"-profile rails usual in radio systems as well as flat sections to a maximum of 25 mm thickness and tubes up to a diameter of 25 mm (according to clamp type)
- Easy handling; the cable clamps (single type) consist of merely two elements
- Inlet design with grooves on both sides to retain the saddles in the clamp while fixing the cable
- Protection of the cable against a possible harm through the tensioning screw is ensured since the tensioning screw is combined firmly with the polyamide shell
- All EUCATEC Cable Clamps are available in single, double or triple version
- Optional lock nut (-LN) for extra-secure hold

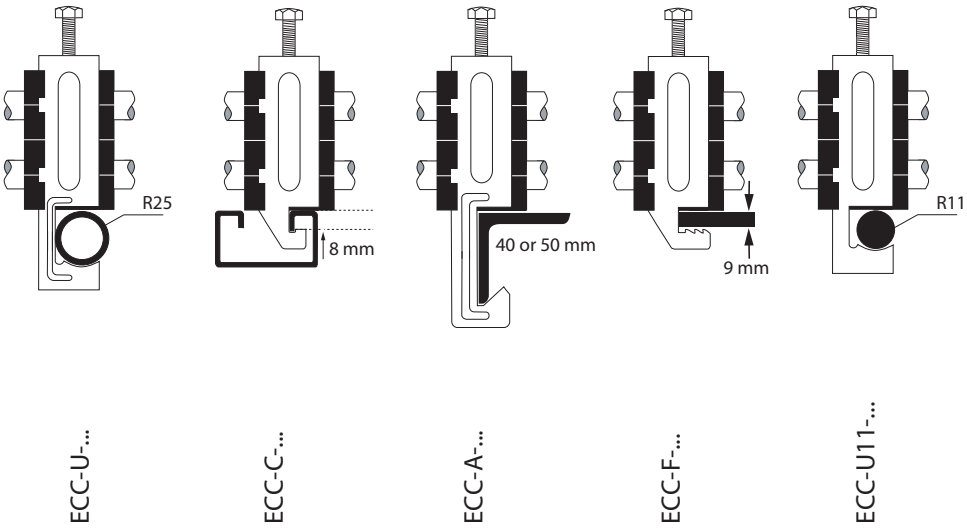


ECC-C-2x78-LN

Suitable profile types

- Standard C-Profile
- Flat sections
- Pipes
- Right angle





Please contact us for a comprehensive list of the available versions.

B. Multiple cable clamp system MCCS

- High durability given by stainless steel for the metal components and UV- and aging-resistant plastic material for the saddle (polypropylene)
- Easy handling
- Central fastening bolt M8
- Fixing angle adapter M8 with two threads
- Color of the saddle : black
- Sizes available: from 1/2" to 1-5/8"
- Single, double or triple version available

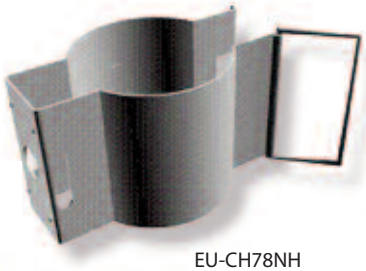
MCCS-2x78

The multiple cable clamps MCCS provide an easy and robust way to organize bundled runs of coaxial cables. The stainless steel and the plastic material used ensure a long durability, whereas the angle adapter with 2xM8 threads offers multiple fixing possibilities.

C. Stainless steel clamp system

Reference	*1/2"*	*7/8"*	*1-1/4"*	*1-5/8"*
Clip Hangers	EU-CH12NH	EU-CH78NH	EU-CH114NH	EU-CH158NH

Material : stainless steel



EU-CH78NH

OPTION: Angle Adapter for clip hangers

Description	*Reference*
Angle Adapter (zinc plated*)	EU-AA-SL-Z

* stainless steel version on request

D. Orientable stainless steel spring clamp

- For mounting on flat plate or angle
- No additional hardware required
- Orientable

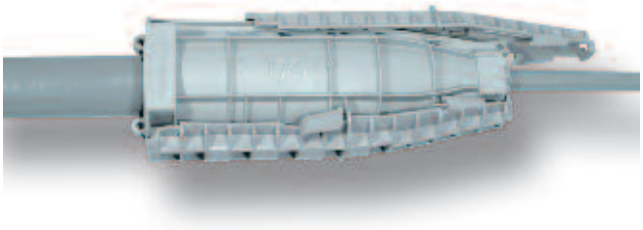
Reference	*1/2"*	*7/8"*	*1-1/4" & 1-5/8"*
Spring Clamp	EU-ES9016	EU-ES9028	EU-ES9040

Other specific clamps are available on request

7. Eucaseal

The Eucaseal is an additional and optional gel closure sealing system that provides a reliable sealing of coaxial connectors used at the transition between:

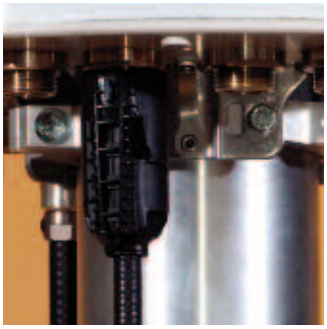
- jumper and antennas or the electric devices like TMA'S ....
- jumper and feeder cables exposed to the outside environment



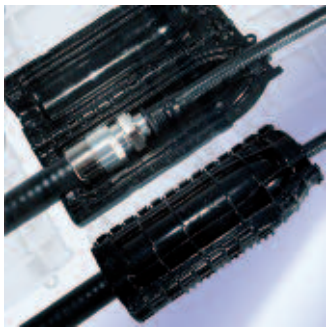
ES-12-114 (grey color)

Benefit

The housing contains an innovative gel material and provides an efficient moisture block. The ease of installation and the long-term protection makes it a reliable and cost effective solution.



ES-12-BOX



ES-12-78

Features

- Reliable protection over a wide operation temperature range: -30 °C to 60 °C
- Wraparound and no disconnection of the connector
- Quick and easy to install
- Easily removable and re-usable
- Gel material provides an effective barrier against ingress of water and other contaminants - IP 68 acc. EN 60529
- No tape, no mastics or tools required for installation and removal
- UV resistant
- Tested under extremely severe conditions, vibrations (acc. IEC 60068-2-6 Test Fc) and temperature cycles (acc. IEC 60068-2-14 Test Nb)
- Protection against excessive bending of the cable

EUCASEAL

Application	***1/2" jumper to antenna or box***	***1/2" jumper to 7/8" feeder***	***1/2" jumper to 1-1/4" feeder***	***1/2" jumper to 1-5/8" feeder***
Reference	**ES-12-BOX**	**ES-12-78**	**ES-12-114**	**ES-12-158**
Cable type	1/2" & 1/2" Hiflex	1/2" & 1/2" Hiflex to 7/8"A or 7/8" Hiflex	1/2" & 1/2" Hiflex to 1-1/4"A or 1-1/4" Hiflex	1/2" & 1/2" Hiflex to 1-5/8"A
Connector type	***only DIN 7-16*** - max. length 60 mm - max. body diameter 26,6 mm - nominal distance between panel connectors 45 mm	N or 7-16	N or 7-16	N or 7-16

Available in black and grey
For further details please refer to technical specifications.

8. Lightning arresters

Our lightning arresters offer an additional protection for the BTS against lightning damages and can be used in wideband applications up to 2500 MHz.

In addition to the 1/4-wave lightning arresters with 7/16 connectors, a gas-tube version with a replaceable gas capsule is available with N connectors. It permits the transmission of DC-voltage.

Quarter wave lightning arrester
ref: EU-LA-QW-800-2500-DMDF

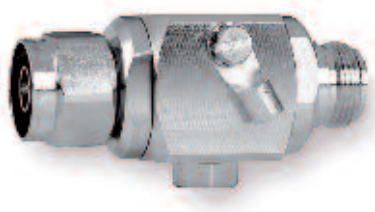
Features

- Quick and easy to install
- Basic range up to 2200 or 2500 MHz
- Arrester method: 1/4 Wave or gas-tube

*Technical Data **

- Impedance: 50 Ohm
- Insertion loss: < 0.1 dB
- Return Loss (VSWR): < 1.15
- Surge current handling capability (8/20 µs): 40 kA (1/4 wave)
  20 kA (gas tube)

* For further details please refer to technical specifications



Gas-tube lightning arrester
EU-LA-G230-2500-NMNF

PRODUCT CODES

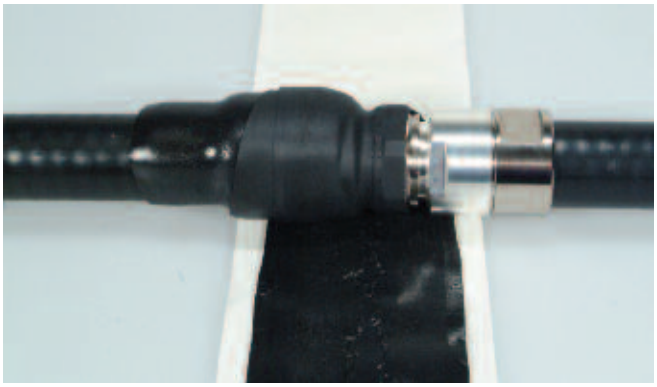
Code	*Arrester Method*	*Connectors*	*Frequency Range*
EU-LA-QW-800-2500-DMDF	1/4 wave	7/16 male-female	800-2500 MHz
EU-LA-QW-800-2500-DFDF	1/4 wave	7/16 female-female	800-2500 MHz
EU-LA-QW-650-2200-DMDFP	1/4 wave	7/16 male-female panel mount	650-2200 MHz
EU-LA-G230-2500-NMNF	gas tube	N male-female	DC-2500 MHz

9. Weatherproofing tape kit

If additional weatherproofing is required, it can be achieved with appropriate adhesive tapes wrapped around the cable/connector junction. EUPEN supplies a weatherproofing tape kit for additional protection of connector, cable and jumper junctions.

Features

- Universal weatherproofing
- Special weather resistant PVC-Tape
- Suitable for difficult weather conditions



TECHNICAL DATA

Butyl mastic tape	
• Material	self-fusing butyl (lead free)
• Color	black
• Length (m)	2
• Width (mm)	65
• Thickness (mm)	2.5
Adhesive all-weather PVC-tape	
• Material	PVC (lead free)
• Color	black
• Length (m)	20
• Width (mm)	25
• Thickness (mm)	0.2
• Tensile strength (N/cm)	≥ 20
• Elongation (%)	≥ 200
• Temperature range (°C)	-40 to +105
• Resistance to flame propagation	self-extinguishing
• Dielectric strength (kV/mm)	≥ 40

The following table indicates the quantity of connectors or splices which can be sealed with 1 kit:

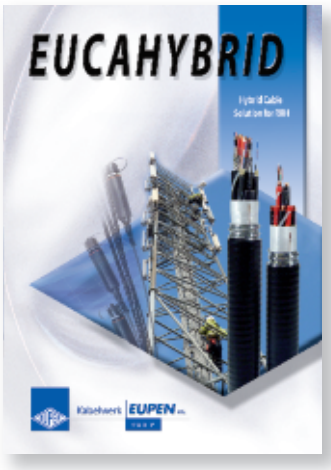
Cable/Connector size	***1/4" & 3/8"***	***1/2" & 1/2"X***	***7/8"***	***1-1/4"***	***1-5/8"***
Single connector	10	9	7	5	3
Splice	6	5	4	3	2

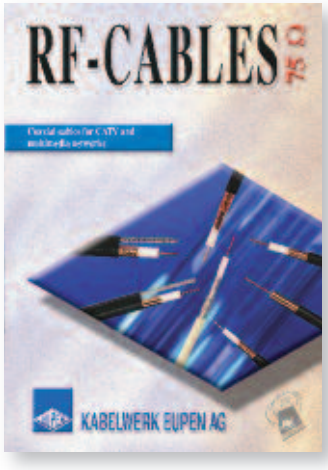
PRODUCT OVERVIEW

Product Designation	***Contents***
Weatherproofing tape kit	1 roll of self-fusing butyl tape (65 mm x 2 m) 1 roll of black PVC tape (25 mm x 20 m)

OTHER EUPEN RF PRODUCTS

In addition to the 50 Ohm cables, EUPEN offers a wide range of RF products:
Radiating Cables for confined areas, 75 Ohm Cables for CATV and multimedia networks, Hybrid Cables for FTTA, Waveguides, ...

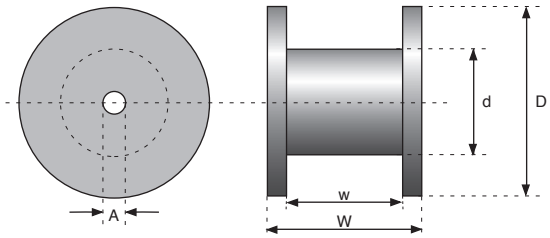




CABLE PACKING AND HANDLING INFORMATION

The coaxial cable will be supplied on wooden drums made of planed wooden boards or plywood. In order to protect the cable during transportation and storage, the drums will be battened with wooden boards nailed on the flanges.
The drums are provided with a label containing cable information as cable type, cable length and production batch (see label on right). The drums can be impregnated on request.

The standard drum sizes used for the different cable types are shown in the table below.



Most used drums per cable type[1]:

Cable type		***Drum type***	***Usual length***	***Outer diam.[2] D***	***Drum diam. d***
			(m)	(cm)	(cm)
EC1-50 (5062)	1/4″	HE 07	up to 800	70	40
EC1-50 (5062)	1/4″	HE 08 HF	from 800 to 1350	80	40
EC1-50-HF (5042)	1/4″ Hiflex	HE 07	up to 1200	70	40
EC1-50-HF (5042)	1/4″ Hiflex	HE 08 HF	from 1200 to 2150	80	40
EC2-50 (5088)	3/8″	HE 07	up to 500	70	40
EC2-50 (5088)	3/8″	HE 08 HF	from 500 to 900	80	40
EC4-50 (5128)	1/2″	HE 07	up to 250	70	40
EC4-50 (5128)	1/2″	HE 08 HF	from 250 to 500	80	40
EC4-50 (5128)	1/2″	HE 12	from 500 to 1500	120	40
EC4-50-HF (5092)	1/2″ Hiflex	HE 07	up to 330	70	40
EC4-50-HF (5092)	1/2″ Hiflex	HE 08 HF	from 330 to 750	80	40
EC4-50-HF (5092)	1/2″ Hiflex	HE 12	from 750 to 1500	120	40
EC4.5-50 (5168)	5/8″	HE 12	up to 800	120	40
EC4.5-50 (5168)	5/8″	HE 13	from 800 to 1300	130	47
EC5-50-A (5228A)	7/8″A	HE 12	up to 500	120	40
EC5-50-A (5228A)	7/8″A	HE 13	from 500 to 850	130	47
EC5-50-HF (5228X)	7/8″ Hiflex	HE 12	up to 500	120	40
EC5-50-HF (5228X)	7/8″ Hiflex	HE 13	from 500 to 850	130	47
EC6-50-A (5328A)	1-1/4″ A	HF 17S	up to 500	170	90
EC6-50-A (5328A)	1-1/4″ A	HF 17B	from 500 to 700	170	90
EC6-50-A (5328A)	1-1/4″ A	HF 20S	from 700 to 1000	200	90
EC6-50-HF (5328X)	1-1/4″ Hiflex	HF 17S	up to 500	170	90
EC6-50-HF (5328X)	1-1/4″ Hiflex	HF 17B	from 500 to 700	170	90
EC6-50-HF (5328X)	1-1/4″ Hiflex	HF 20S	from 700 to 1000	200	90
EC7-50-A (5438A)	1-5/8″A	HF 17B	up to 400	170	90
EC7-50-A (5438A)	1-5/8″A	HF 18	from 400 to 500	180	90
EC7-50-A (5438A)	1-5/8″A	HF 20S	from 500 to 650	200	90
EC7-50-A (5438A)	1-5/8″A	HF 20B	from 650 to 900	200	90

[1] These combinations cable/length/drum are examples of the most common cases. Others are possible under request.
[2] battened + 5 cm
[3] Depending on the humidity of the wood, drum weights can vary greatly!
[4] Standard PE jacket

Drum label

Outer width *W* (cm)	*Inner width* *w* (cm)	*Shaft hole* *A* (cm)	*Freight volume* *drum/battened drum* (m^3)	*Approx. drum weight* *drum/battened drum*[3] (kg)	*Approx. cable weight*[4] (kg/km)
42	40	6.5	0.20 / -	7 / -	111
53	50	6.5	0.34 / 0.38	16 / 35	111
42	40	6.5	0.20 / -	7 / -	83
53	50	6.5	0.34 / 0.38	16 / 35	83
42	40	6.5	0.20 / -	7 / -	146
53	50	6.5	0.34 / 0.38	16 / 35	146
42	40	6.5	0.20 / -	7 / -	225
53	50	6.5	0.34 / 0.38	16 / 35	225
53	49	8.0	0.77 / 0.82	25 / 60	225
42	40	6.5	0.20 / -	7 / -	191
53	50	6.5	0.34 / 0.38	16 / 35	191
53	49	8.0	0.77 / 0.82	25 / 60	191
53	49	8.0	0.77 / 0.82	25 / 60	345
76	72	8.0	1.28 / 1.36	40 / 90	345
53	49	8.0	0.77 / 0.82	25 / 60	430
76	72	8.0	1.28 / 1.36	40 / 90	430
53	49	8.0	0.77 / 0.82	25 / 60	475
76	72	8.0	1.28 / 1.36	40 / 90	475
74	64	9.0	2.14 / 2.24	150 / 215	803
102	92	9.0	2.95 / 3.12	175 / 250	803
92	80	9.0	3.68 / 3.77	280 / 380	803
74	64	9.0	2.14 / 2.24	150 / 215	720
102	92	9.0	2.95 / 3.12	175 / 250	720
92	80	9.0	3.68 / 3.77	280 / 380	720
102	92	9.0	2.95 / 3.12	175 / 250	1019
102	92	9.0	3.30 / 3.49	200 / 300	1019
92	80	9.0	3.68 / 3.77	280 / 380	1019
122	110	9.0	4.88 / 5.00	280 / 400	1019

Kabelwerk **EUPEN** AG

cable

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05/2015 - 2000 pc (K)