

With compliments

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SUCOFLEX 104

Variations

SUCOFLEX_104, 104_P(E) cables that can be universally applied with the widest range of connector types, are available with most ruggedisations. In applications in which flexibility is the critical factor, the cable type SUCOFLEX_104_PE must be applied. In conjunction with the Q adaptor, which is a simple system for exchanging the connectors as well as the special connections for Agilent Technologies analysers, the two types constitute the ideal choice for use as test cables on network analysers. For assemblies used in EMC-critical applications, the M ruggedisation is available. This results in yet another considerable improvement of the high screening effectiveness below 100 MHz.

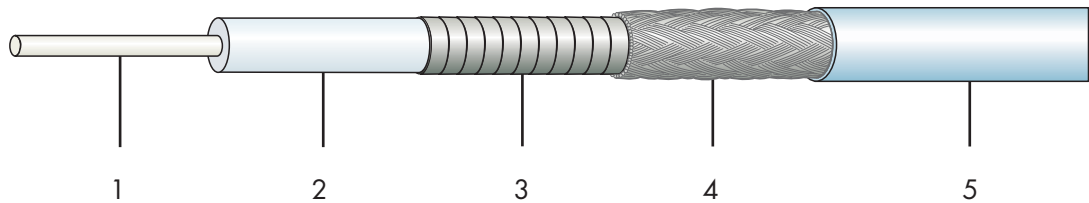
Mechanical and general data

HUBER+SUHNER cable type	Cable	Rugge- disation	Temperature		Weight kg/100m	Outer diameter (mm)	Bending radii	
			min. (°C)	max. (°C)			static (mm)	dyn. (mm)
SUCOFLEX_104	104	-	-55	+125	8.4	5.50	16	25
SUCOFLEX_104_A	104	A	-40	+85	17.3	10.30	30	50
SUCOFLEX_104_E	104_E	-	-40	+85	8.3	5.50	16	25
SUCOFLEX_104_EA	104_E	A	-40	+85	17.2	10.30	30	50
SUCOFLEX_104_EM	104_E	M	-40	+85	12.1	7.70	40	80
SUCOFLEX_104_B	104	B	-55	+125	18.9	10.00	45	45
SUCOFLEX_104_C	104	C	-25	+125	19.3	10.30	30	50
SUCOFLEX_104_D	104	D	-55	+125	9.6	6.10	20	30
SUCOFLEX_104_G	104	G	-50	+100	22.6	13.70	60	100
SUCOFLEX_104_P	104_P	-	-55	+125	6.9	5.50	16	25
SUCOFLEX_104_PE	104_PE	-	-40	+85	6.8	5.50	16	25
SUCOFLEX_104_PEA	104_PE	A	-40	+85	17.1	10.30	30	50
SUCOFLEX_104_PB	104_P	B	-55	+125	18.7	10.00	45	45
SUCOFLEX_104_PEM	104_PE	M	-40	+85	13.6	7.70	40	80

Further information about ruggedisation see pages 128 ff.

SUCOFLEX_104

Cable design



	Description	Diameter
1. Centre conductor	Solid silver-plated copper wire	
2. Dielectric	Low density PTFE	
3. 1st outer conductor	Silver-plated copper tape, wrapped	
4. 2nd outer conductor	Silver-plated copper braid	
5. Jacket	Fluoroethylenepropylene, blue	5.50 mm

Electrical cable data

Impedance			50 Ohm
Operating frequency			26.5 GHz
Capacitance			87 pF/m
Velocity of propagation			77 %
Time delay			4.3 ns/m
Nom. attenuation*	coefficient a	0.2291	coefficient b 0.0071
Max. attenuation*	coefficient a	0.2520	coefficient b 0.0078
Max. operating voltage			2.6 kVrms
Min. screening effectiveness up to 18 GHz			90 dB

*Attenuation calculation $a_{25} = a \cdot \sqrt{f}(\text{GHz}) + b \cdot f(\text{GHz})$ (dB/m)

General cable data

Temperature range	-55...+125 °C
Weight	8.4 kg/100m
Min. bending radius static	16 mm
Min. bending radius dynamic	25 mm

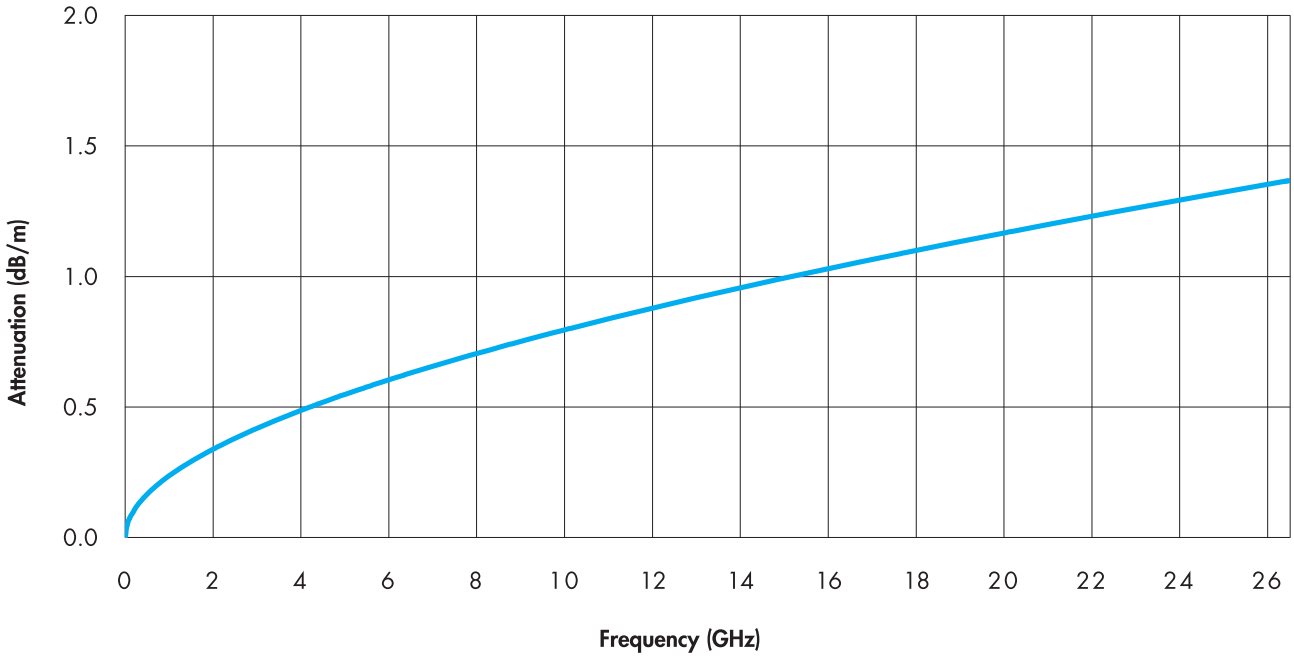
Suitable connectors

Please refer to pages 118 ff

SUCOFLEX_104

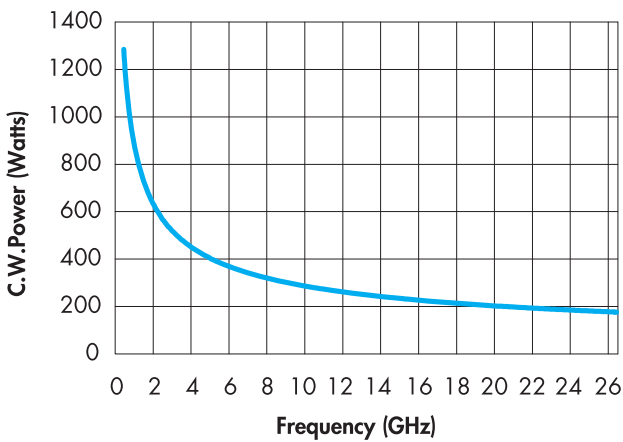
Cable attenuation

Nominal values @ +25 °C ambient temperature

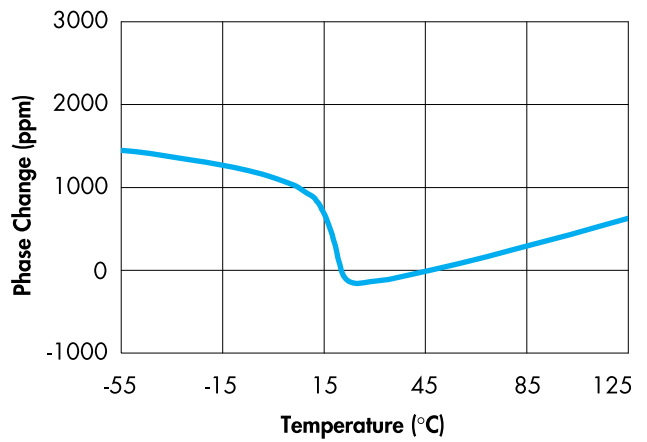


Power handling

Maximum values @ +40 °C ambient temperature and sea level



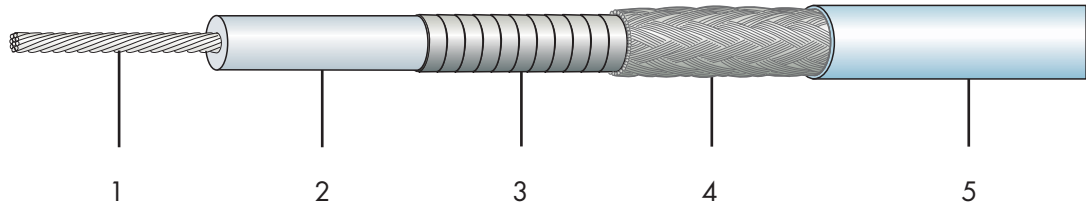
Phase change vs. temperature



SUCOFLEX 100

SUCOFLEX_104_P

Cable design



	Description	Diameter
1. Centre conductor	Stranded silver-plated copper wire	
2. Dielectric	Low density PTFE	
3. 1st outer conductor	Silver-plated copper tape, wrapped	
4. 2nd outer conductor	Silver-plated copper braid	
5. Jacket	Fluoroethylenepropylene, blue	5.50 mm

Electrical cable data

Impedance			50 Ohm
Operating frequency			26.5 GHz
Capacitance			87 pF/m
Velocity of propagation			77 %
Time delay			4.3 ns/m
Nom. attenuation*	coefficient a	0.2930	coefficient b 0.0175
Max. attenuation*	coefficient a	0.3223	coefficient b 0.0192
Max. operating voltage			2.4 kVrms
Min. Screening effectiveness up to 18 GHz			90 dB

*Attenuation calculation $a_{25} = a \cdot \sqrt{f}(\text{GHz}) + b \cdot f(\text{GHz})$ (dB/m)

General cable data

Temperature range	-55...+125 °C
Weight	6.9 kg/100m
Min. bending radius static	16 mm
Min. bending radius dynamic	25 mm

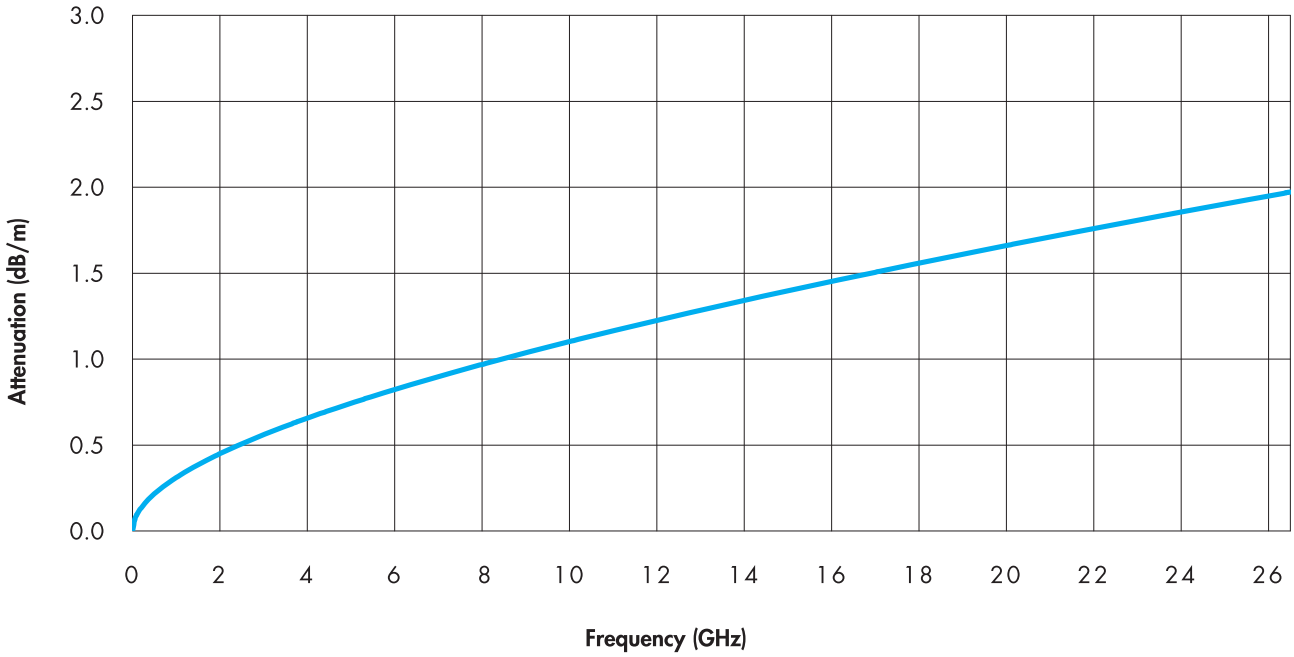
Suitable connectors

Please refer to pages 118 ff

SUCOFLEX_104_P

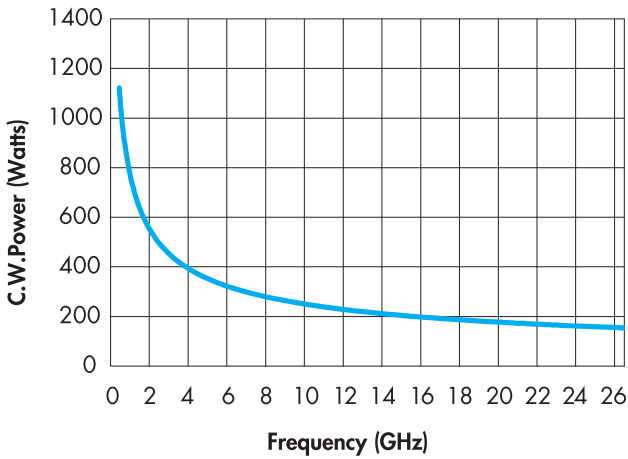
Cable attenuation

Nominal values @ +25 °C ambient temperature

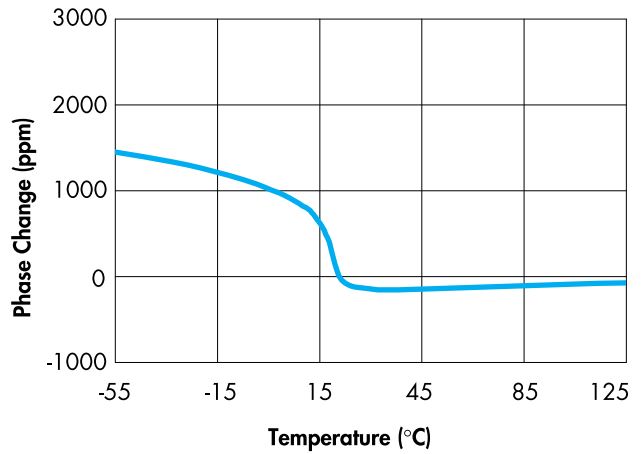


Power handling

Maximum values @ +40 °C ambient temperature and sea level

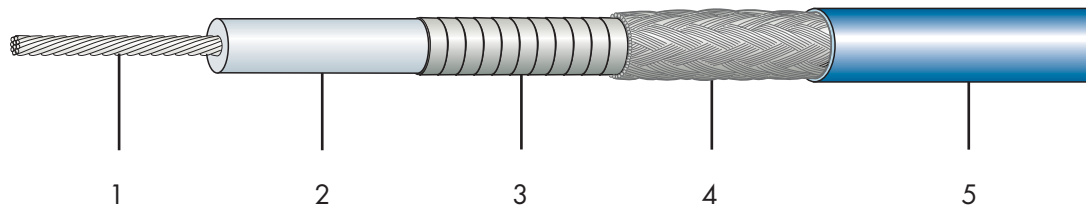


Phase change vs. temperature



SUCOFLEX_104_PE

Cable design



	Description	Diameter
1. Centre conductor	Stranded silver-plated copper wire	
2. Dielectric	Low density PTFE	
3. 1st outer conductor	Silver-plated copper tape, wrapped	
4. 2nd outer conductor	Silver-plated copper braid	
5. Jacket	Polyurethane, blue	5.50 mm

Electrical cable data

Impedance			50 Ohm
Operating frequency			26.5 GHz
Capacitance			87 pF/m
Velocity of propagation			77 %
Time delay			4.3 ns/m
Nom. attenuation*	coefficient a	0.2930	coefficient b 0.0175
Max. attenuation*	coefficient a	0.3223	coefficient b 0.0192
Max. operating voltage			2.4 kVrms
Min. screening effectiveness up to 18 GHz			90 dB

*Attenuation calculation

$$a_{25} = a \cdot \sqrt{f}(\text{GHz}) + b \cdot f(\text{GHz}) \quad (\text{dB/m})$$

General cable data

Temperature range	-40...+85 °C
Weight	6.8 kg/100m
Min. bending radius static	16 mm
Min. bending radius dynamic	25 mm

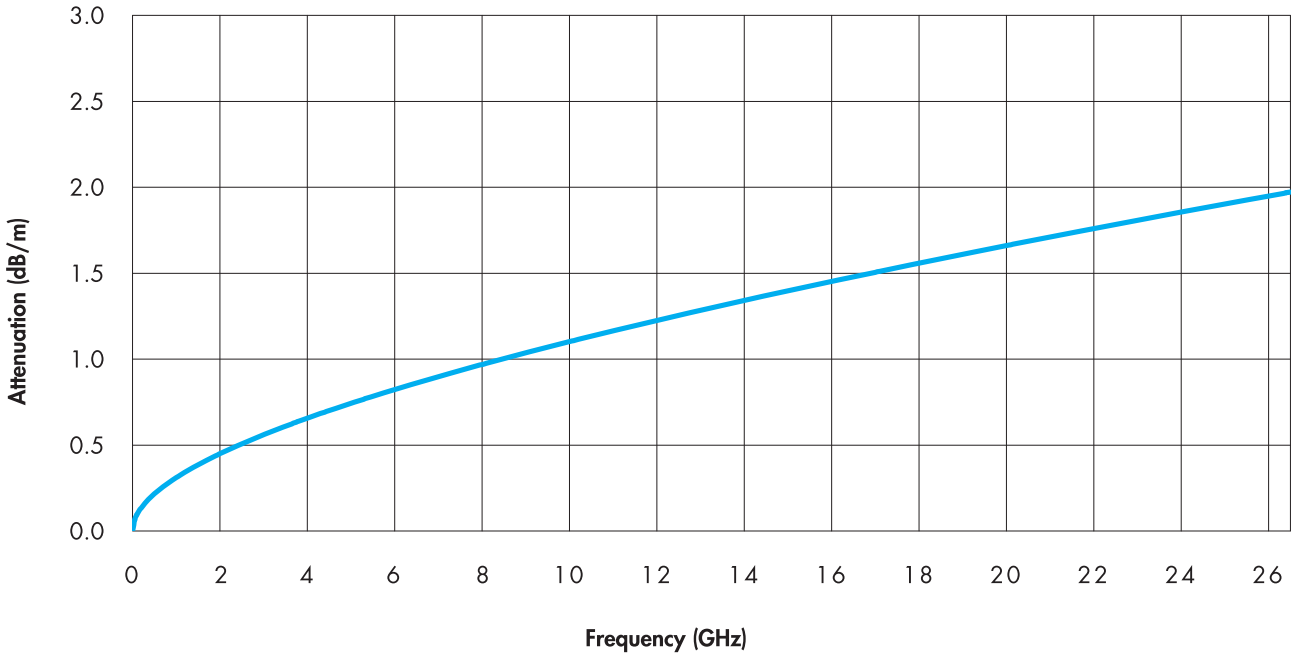
Suitable connectors

Please refer to pages 118 ff

SUCOFLEX_104_PE

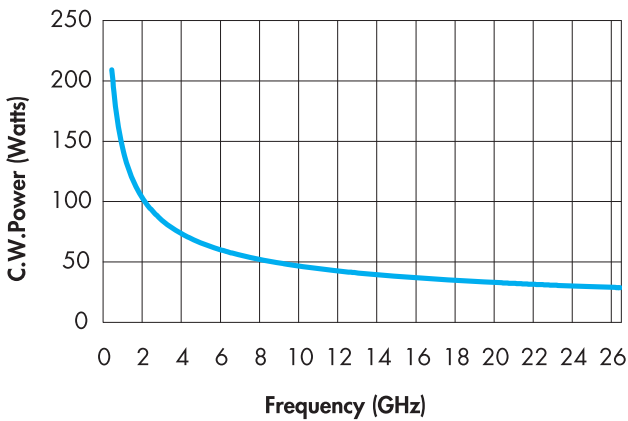
Cable attenuation

Nominal values @ +25 °C ambient temperature

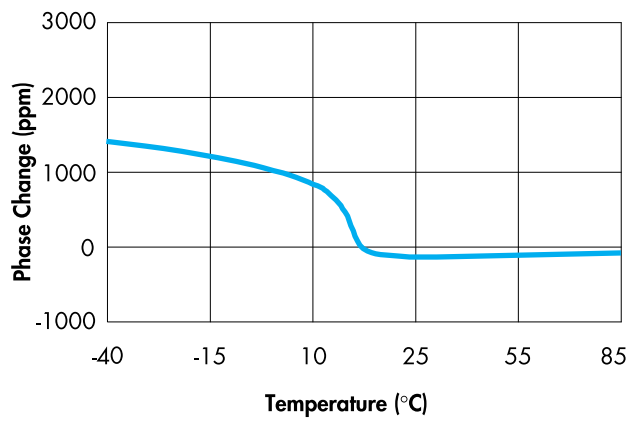


Power handling

Maximum values @ +40 °C ambient temperature and sea level



Phase change vs. temperature



SUCOFLEX 104

Suitable connectors

HUBER+SUHNER connector type	SF_104_(E)	SF_104_(A)(EA)	SF_104_(B)	SF_104_(C)	SF_104_(D)	SF_104_(EM)	SF_104_(G)	SF_104_(P)(PE)	SF_104_(PA)(PEA)	SF_104_(PB)	SF_104_(PEM)	Remarks	Weight (g)	Operating frequency (GHz)	VSWR ¹⁾	Fig.
11_BNC-451	•	•	•	•	•	•	•						30.0	4.0	1.14	101
11_BNC-452								•	•	•	•		30.0	4.0	1.14	101
11_DV-41								•	•	•		HP3.5	37.0	26.5	1.16	105
11_DV-42	•	•	•	•	•		•					HP3.5	37.0	26.5	1.16	105
11_N-47	•	•	•	•	•	•	•	•	•	•	•		31.0	15.0	1.12	121
11_N-451	•	•	•	•	•	•	•						40.0	18.0	1.12	122
11_N-452								•	•	•	•		41.0	18.0	1.12	122
11_N-453								•	•	•		PM	37.0	18.0	1.16	125
11_N-454	•	•	•	•	•	•	•	•	•	•	•	MIL	32.0	15.0	1.12	120
11_N-456	•	•	•	•	•	•	•					MIL	40.0	18.0	1.12	123
11_N-457								•	•	•	•	MIL	41.0	18.0	1.12	123
11_N-459	•	•	•	•	•			•	•	•		QL	32.0	15.0	1.12	126
11_N-461								•	•	•	•	SUCOTRIM	57.0	18.0	1.15	127
16_N-44	•	•	•	•	•	•	•					connector with combi nut	37.0	12.4	1.14	129
16_N-45	•	•	•	•	•	•	•					MIL	37.0	12.4	1.14	130
16_N-457								•	•	•	•	connector with combi nut	87.0	12.4	1.14	129
21_N-47	•	•	•	•	•	•	•						30.0	11.0	1.12	133
21_N-451	•	•	•	•	•	•	•						32.0	18.0	1.12	134
21_N-452								•	•	•	•		32.0	18.0	1.12	134
24_N-47	•	•	•	•	•	•	•					ML 12	37.0	11.0	1.12	136
24_N-451	•	•	•	•	•	•	•					ML 12	43.0	18.0	1.12	135
24_N-452								•	•	•	•	ML 12	43.0	18.0	1.12	135
11_PC3.5-42	•	•	•	•	•	•	•						13.0	18.0	1.12	160
11_PC3.5-43								•	•	•	•		13.0	18.0	1.12	160
														26.5	1.16	160
														26.5	1.16	160

SUCOFLEX 104

Suitable connectors

HUBER+SUHNER connector type	SF_104_(E)	SF_104_(A)(EA)	SF_104_(B)	SF_104_(C)	SF_104_(D)	SF_104_(EM)	SF_104_(G)	SF_104_(P)(PE)	SF_104_(PA)(PEA)	SF_104_(PB)	SF_104_(PEM)	Remarks	Weight (g)	Operating frequency (GHz)	VSWR1)	Fig.
21_PC3.5-42	•	•	•	•	•	•	•						12.0	18.0	1.12	
21_PC3.5-43								•	•	•	•		12.0	18.0	1.12	161
														26.5	1.16	161
11_PC7-41	•	•	•	•	•	•	•						40.0	18.0	1.10	165
11_PC7-42								•	•	•	•		41.0	18.0	1.10	165
Q	•	•	•	•									40.0	n/a	n/a	n/a
PQ								•	•	•			41.0	n/a	n/a	n/a
11_SMA-451	•	•	•	•	•	•	•	•	•	•	•		8.2	18.0	1.12	170
11_SMA-452								•	•	•		PM	12.0	18.0	1.16	172
11_SMA-456	•	•	•	•	•	•	•	•	•	•	•	MIL	8.2	18.0	1.12	170
11_SMA-457								•	•	•	•	SUCOTRIM	32.0	18.0	1.15	173
11_SMA-468	•	•	•	•	•			•	•	•		QL	8.2	18.0	1.12	171
16_SMA-451	•	•	•	•	•	•	•						8.8	18.0	1.12	174
16_SMA-452								•	•	•	•		11.0	18.0	1.12	174
16_SMA-456	•	•	•	•	•	•	•					MIL	8.7	18.0	1.12	174
21_SMA-451	•	•	•	•	•	•	•	•	•	•	•		6.8	18.0	1.12	175
24_SMA-451	•	•	•	•	•	•	•	•	•	•	•	ML 35	7.9	18.0	1.12	177
11_TNC-417								•	•	•		QL	19.0	12.4	1.14	
														18.0	1.18	195
11_TNC-418	•	•	•	•	•							QL	19.0	12.4	1.14	
														18.0	1.18	195
11_TNC-456								•	•	•	•		19.0	18.0	1.12	191
11_TNC-457	•	•	•	•	•	•	•						19.0	18.0	1.12	191
11_TNC-458								•	•	•			22.0	18.0	1.16	193
11_TNC-459								•	•	•		SUCOTRIM	36.0	18.0	1.15	194
16_TNC-454	•	•	•	•	•	•	•						23.0	18.0	1.14	196
24_TNC-456								•	•	•	•	ML 4	37.0	18.0	1.12	199
24_TNC-457	•	•	•	•	•	•	•					ML 4	19.0	18.0	1.12	198
25_TNC-452	•	•	•	•	•	•	•					ML 8	22.0	18.0	1.12	200

SUCOFLEX 104

Suitable connectors

HUBER+SUHNER connector type	104_(E)	104_A(EA)	104_B	104_C	SF 104_D	104EM	104_G	104_P(PE)	104_PA(PEA)	104_PB	104_PEM	Remarks	Weight (g)	Operating frequency (GHz)	VSWR ¹⁾	Fig.
11_4195-41	•	•	•	•	•	•	•						55.0	7.5	1.12	210
24_4195-41	•	•	•	•	•	•	•						64.0	7.5	1.12	211
11_716-401	•	•		•	•								113.0	7.5	1.12	220
11_716-402								•	•				118.0	7.5	1.12	220
21_716-401	•	•		•	•								105.0	7.5	1.12	222
21_716-402								•	•				111.0	7.5	1.12	222
25_716-401	•	•	•	•	•	•	•						116.0	7.5	1.12	224

Connector patterns

11 Straight cable plug
 16 Right angle cable plug
 21 Straight cable jack

24 Straight panel bulkhead cable jack
 25 Straight panel cable jack, flange mount

- 1) VSWR per connector
 ML xx: Mounting hole size xx refer to section "connector drawings", page 163
 MIL: Connector with safety holes and hex nut for military and airframe applications
 QL: Quick lock refer to section "special solutions", page 130
 PM: Phase matching connector
 HP3.5: 3.5 mm connection for Agilent Technologies equipment
 SUCOTRIM: with integrated phase trimmer refer to section "special solutions", page 131

Note: For dimensioned sketches of connectors, please refer to pages 138 ff.

Other connector types are available on request. Please contact your local HUBER+SUHNER partner.

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SUCOFLEX 100

Variations of ruggedisation

Type	for SUCOFLEX ...	Description
A	101(E), 101_P(E), 102(E)	<p>Consists of steel coil (flat wire), steel braid and polyurethane (PUR) jacket. Up to +85 °C, this ruggedisation offers excellent protection against compression, tension, torsion, abrasion and other mechanical forces acting upon the cable.</p> <p>Typical applications</p> <ul style="list-style-type: none"> • Test and measurement cables • Laboratory cables • Protected line replaceable units (LRU)
	103(E), 104(E), 104_P(E), 106, 106P	<p>Consists of steel spring (round wire), steel braid and polyurethane (PUR) jacket. Up to +85 °C, this ruggedisation offers excellent protection against compression, tension, abrasion and other mechanical forces acting upon the cable.</p> <p>Typical applications</p> <ul style="list-style-type: none"> • Laboratory cables • Protected line replaceable units (LRU)
B	103, 104, 104_P, 106	<p>Consists of a flexible hose of stainless steel. The ruggedisation protects the cable against compression, abrasion, mechanical injuries and open fire and hot objects (e.g. soldering irons). The continuous temperature is limited by the cable to +165 °C, and in the immediate proximity of the connectors to the maximum connector temperature.</p> <p>Typical applications</p> <ul style="list-style-type: none"> • Test and measurement cables in industrial environments
C	103, 104, 104_P, 106	<p>Is identical to the ruggedisation A except for the jacket, which consists of RADOX® instead of PUR. RADOX® is flame resistant up to +135 °C, but low abrasion resistant.</p> <p>Typical applications:</p> <ul style="list-style-type: none"> • Test and measurement cables

SUCOFLEX 100

Variations of ruggedisation

Type	for SUCOFLEX ...	Description
D	102, 103, 104, 106, 106_P, 302, 304	<p>Consists of an aramid yarn braid impregnated with silicon varnish. The ruggedisation protects the cable against abrasion and brief high temperatures.</p> <p>Typical applications</p> <ul style="list-style-type: none"> • Aircraft cabling • Ship cabling • Antenna feeders
G	104, 106	<p>Consists of a flexible, double-layer rubber hose with textile ply (NEOPRENE). High resistance to abrasion, torsion, chemicals and oils characterises this ruggedisation. Provided with water tight cable entries, this is the ideal ruggedisation for outdoor applications. Applicable up to +100 °C.</p> <p>Typical application</p> <ul style="list-style-type: none"> • Antenna cables in rough environments e.g. on shipborne applications
M	104E, 104_PE	<p>Consists of an additional soft magnetic band (μ-metal), braiding and an LSFH jacket (Low Smoke Free of Halogen). The ruggedisation protects the cable against electromagnetic radiation for EMC applications up to max. +85 °C.</p> <p>Typical applications</p> <ul style="list-style-type: none"> • Test and measurement cables in low frequency applications

Technical data	Ruggedisation						
	A	B	C	D	G	M	
Surface material	PUR	Stainless steel	RADOX	*)	NEOPREN	LSFH	
Colour	blue, black	natural	blue	blue	black	black	
Max. crush resistance	kN/m	80	80	80	–	10	–
Torsional stiffness	Nm ² /°	8.5x10 ⁻⁴	3.2x10 ⁻⁵	1.7x10 ⁻³	–	2.2x10 ⁻³	–
Max. tensile force							
Ruggedisation	N	1500	1000	1500	–	400	–
Cable-connector junction	N	400	500	400	–	400	–

*) Aramid yarn braiding impregnated with silicon varnish.

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SUCOFLEX 100

Connector drawings

BNC/DV

Depending on the particular cable entry or the selected ruggedisation, the connectors may have a different visual appearance as shown here!

The connectors are shown to the correct scale relative to one another so that their basic versions can be easily compared. The basic version is the appropriate connector for a given cable type without any ruggedisation.

It is not possible to derive a matching connector type from the cable type stated in the following tables. For this purpose, please compare the tables for the individual cable types in the "Variation" sections on pages 93 ff.

Mounting holes are specified on page 163.

Dimensioned sketches - connector drawings

HUBER+SUHNER connector type	Cable SUCOFLEX	Rugge- disation	A		B		C		D		Fig.	
			mm	inches	mm	inches	mm	inches	mm	inches		
11_BNC-373	103(E)		46.5	1.831	80.0	3.150			10.0	0.394	101	
	103(E)	A/C	72.5	2.854	84.0	3.307			14.5	0.571		
	103	B	64.0	2.520	84.0	3.307			15.0	0.591		
	103	D	46.5	1.831	80.0	3.150			10.0	0.394		
11_BNC-451	104(E),104P(E)		46.5	1.831	80.0	3.150			11.0	0.433		
11_BNC-452	104(E),104P(E)	A/C	62.0	2.441	74.0	2.913			14.5	0.571		
	104, 104P	B	64.0	2.520	84.0	3.307			15.0	0.591		
	104, 104P	D	46.5	1.831	80.0	3.150			11.0	0.433		
	104(E),104P(E)	M	71.0	2.795	75.0	2.953			14.0	0.551		
	104, 104P	G	77.0	3.031	84.0	3.307			17.5	0.689		
11_DV-112	101P(E)	A	36.5	1.437	74.0	2.913			12.0	0.472		105
11_DV-41	104P(E)		42.0	1.654	60.0	2.362			10.0	0.394		
	104P(E)	A/C	62.5	2.461	78.0	3.071			14.5	0.571		
	104P	B	64.5	2.539	108.0	4.252			15.0	0.591		
11_DV-42	104(E)		37.0	1.457	60.0	2.362			10.0	0.394		
	104(E)	A/C	57.5	2.264	78.0	3.071			14.5	0.571		
	104	B	60.0	2.362	108.0	4.252			15.0	0.591		
	104	D	42.0	1.654	60.0	2.362			11.0	0.433		
	104	G	66.5	2.618	88.0	3.456			17.5	0.689		

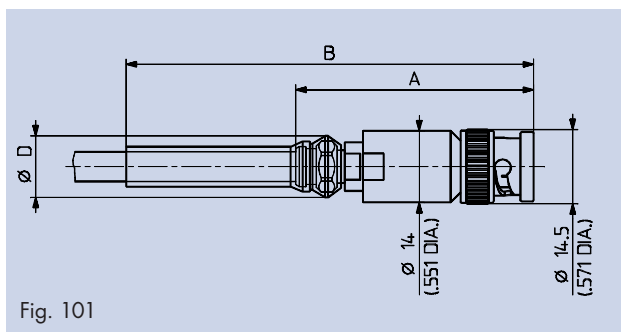


Fig. 101

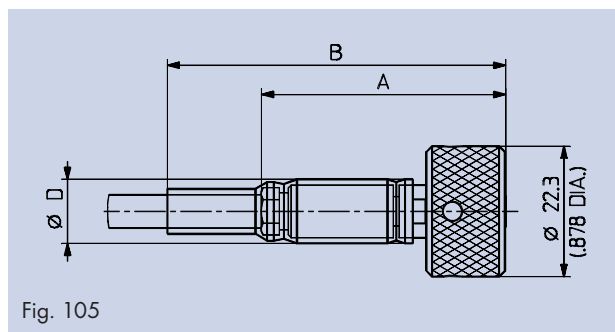


Fig. 105