

SUCOFLEX® 300

The light weight, high performance cable assembly

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SUCOFLEX® 300

The lightweight, high performance microwave cable assembly

Product description

The SUCOFLEX 300 lightweight, low-loss flexible microwave cable assemblies are high-end products designed to meet the stringent needs of space flights systems (e.g. satellites) and aerospace systems (aircraft, helicopters, missiles), which are subjected to extremely severe operating conditions.

The 300 series offers a consistently outstanding mechanical and electrical performance, stability and reliability up to 18 GHz. The added feature of this SUCOFLEX type is a weight reduction of up to 40% compared to our conventional products.



Features and benefits

For space applications

- Assemblies produced in a clean environment room
- Specifically designed lightweight connectors
- Extensive testing of assemblies
- High-end assemblies approved by Europe's leading satellite manufacturers
- Ruggedisations available on request

For defence applications

- Lightweight reduces overall system weight and aids portability
- Rugged connectors made for easy serviceability
- Specialised range of connectors, which is being continuously extended
- Comprehensive tested product range
- High-end product approved for Europe's most sophisticated military aircraft
- Additional armours provide increased crush and abrasion resistance
- Ruggedisations available on request

HUBER+SUHNER type	Operating frequency (GHz)	Temperature range		Outer diameter (mm)	Nom. attenuation 18 GHz/25 °C (dB/m)	Bending radii	
		minimum (°C)	maximum (°C)			static (mm)	dyn. (mm)
SUCOFLEX_301	18	-55	+125	3.5	2.0	15	20
SUCOFLEX_302	18	-55	+125	3.7	1.9	20	30
SUCOFLEX_304	18	-55	+125	5.4	1.2	20	50

Please contact your [local HUBER+SUHNER partner](#) for more specific information.

SUCOFLEX® 300 - Lightweight Series

SUCOFLEX 300 Microwave Cable Assemblies offer a lightweight connection solution combined with a low loss. The weight is reduced up to 40% compared to conventional low loss cables assemblies. These features make it ideal for aerospace and spaceflight applications.

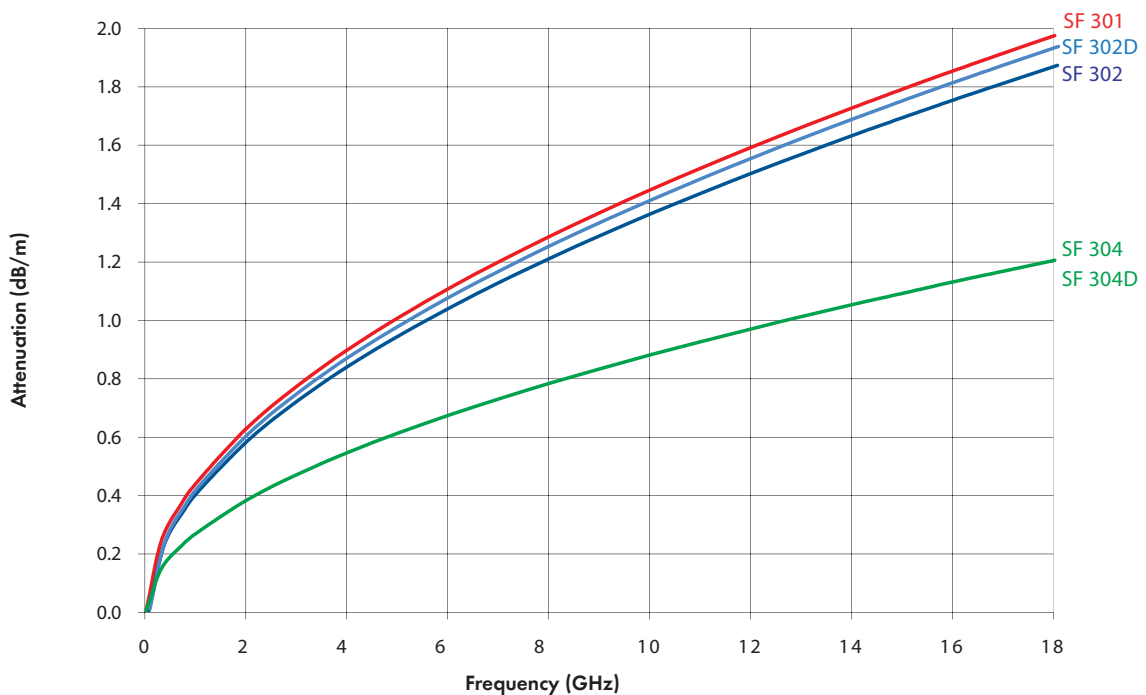
Cable assembly design



Note: SUCOFLEX® 300 lightweight low-loss microwave cables are available as "ready to use" assemblies only

1	Centre conductor	Lightweight wire with silver plated conductive surface
2	Dielectric	Low density PTFE
3	1st Shield	Helical wrapped silver plated tape
4	2nd Shield	Silver plated round wire braid
5	Jacket	Solid extruded ETFE
6	Connector	Connector designs with different materials available e.g. optimised for low weight, max. mechanical strength

Cable attenuation



SUCOFLEX® 300 - Lightweight Series

Assembly insertion loss

The nominal or maximum loss at +25 °C of an assembly provided with two connectors (male or female) is calculated according to the following formulas.

$$\alpha_{25} = a \cdot \sqrt{f} + b \cdot f$$

$$IL = \alpha_{25} \cdot (l + l_{C1} + l_{C2}) + (c_1 + c_2) \cdot \sqrt{f}$$

where

α_{25}	Cable attenuation at 25 °C	[dB/m]
a, b	Attenuation parameters cable	see cable data sheet
f	Frequency	[GHz]
IL	Assembly insertion loss	[dB]
l	Length assembly	[m]
l_{C1}, l_{C2}	Length extension (for swept connectors only)	[m] see connector data sheet
$c_1 + c_2$	Loss coefficient connectors	see connector data sheet

Assembly VSWR / Return Loss

The VSWR or Return Loss of an assembly provided with two connectors (male or female) is calculated according to the following formula.

$$VSWR_{ASSY} = VSWR_{C1} \cdot VSWR_{C2} \qquad RL = 20 \cdot \log \left[\frac{VSWR_{ASSY} + 1}{VSWR_{ASSY} - 1} \right]$$

The maximum VSWR levels of the connectors are listed on the connector data sheets.

Note: Calculated assembly VSWR is valid for "S11" as well as "S22" on 4-pole view

Cable assembly identification

Each cable assembly will be fitted with an identification shrink tube marked with the HUBER+SUHNER serial number. Further information like the customer's part number can be printed on request.

Spaceflight requirements

Cable assemblies for spaceflight applications are manufactured by ESA certified assemblers in a class 10'000 clean room environment. These cable assemblies meet the outgassing requirements according to ESA PSS-01-702 and are 100% X-ray inspected.

Please identify your orders as "SPACEFLIGHT ORDER" to ensure that you will receive spaceflight grade cable assemblies.

SUCOFLEX® 301

Electrical cable data

Frequency range			DC ... 18 GHz
Impedance			50 Ohm
Attenuation	for calculation use formula on page 167		
	a/b parameters nominal values	@ 25 °C a_{nom}	0.4320
		b_{nom}	0.0076
	maximum values	a_{max}	0.4752
		b_{max}	0.0084
Capacitance			86.4 pF/m
Relative signal propagation			77.0 %
Signal delay			4.3 ns/m
Phase stability	vs temperature	over entire temp. range	1500 ppm
	vs flexure		$\pm 0.8^\circ/\text{GHz}$
Minimum screening effectiveness up to 18 GHz			> 90 dB

General cable data

Temperature range		- 55 ... + 125 °C
Weight		23.9 g/m
Diameter		3.5 mm
Min. bending radius	static	15 mm
	dynamic	20 mm
Qualification status spaceflight		qualified

Suitable connectors

Connector type	Max. frequency (GHz)	VSWR	Loss coefficient c	Length extension (m) l_c	Temperature range (°C)	Fig.
11_SMA-187	18	1.12	0.02	0	- 55 ... + 125	300
16_SMA-189	18	1.12	0.02	0.018	- 55 ... + 125	301
11_SMA-152	18	1.20	0.02	0	- 55 ... + 125	302
16_SMA-161	18	1.12	0.025	0.008	- 55 ... + 125	303
16_SMA-180	18	1.12	0.025	0.008	- 55 ... + 125	304

for spaceflight only

Other connector types and patterns on request.

SUCOFLEX® 302 / 302D

Electrical cable data

			SUCOFLEX_302	SUCOFLEX_302D
Frequency range			DC ... 18 GHz	DC ... 18 GHz
Impedance			50 Ohm	50 Ohm
Attenuation	for calculation use formula on page 167			
	a/b parameters nominal values	@ 25 °C a _{nom}	0.4045	0.4170
		b _{nom}	0.0084	0.0087
	maximum values	a _{max}	0.4449	0.4587
		b _{max}	0.0093	0.0096
Capacitance			87.3 pF/m	87.3 pF/m
Relative signal propagation			77.0 %	77.0 %
Signal delay			4.3 ns/m	4.3 ns/m
Phase stability	vs temperature	over entire temp. range	2850 ppm	2850 ppm
	vs flexure		± 2.0°/GHz	± 2.0°/GHz
Minimum screening effectiveness up to 18 GHz			> 90 dB	> 90 dB

General cable data

		SUCOFLEX_302	SUCOFLEX_302D
Temperature range		- 55 ... + 125 °C	- 55 ... + 125 °C
Weight		29 g/m	31 g/m
Diameter		3.7 mm	4.3 mm
Min. bending radius	static	20 mm	20 mm
	dynamic	30 mm	30 mm
Qualification status spaceflight		n/a	n/a

Suitable connectors

Connector type	Max. frequency (GHz)	VSWR	Loss coefficient c	Length extension (m) l _c	Temperature range (°C)	Fig.
11_SMA-254	18	1.12	0.02	0	- 55 ... + 125	320
16_SMA-210	18	1.20	0.02	0.018	- 55 ... + 125	321
16_SMA-259	18	1.12	0.025	0.008	- 55 ... + 125	322
11_TNC-226	18	1.12	0.02	0	- 55 ... + 125	323

Other connector types and patterns on request

Further information about D-armour [see page 127](#).

SUCOFLEX® 304 / 304D

Electrical cable data

			SUCOFLEX_304	SUCOFLEX_304D
Frequency range			DC ... 18 GHz	DC ... 18 GHz
Impedance			50 Ohm	50 Ohm
Attenuation	for calculation use formula on page 167			
	a/b parameters nominal values	@ 25 °C		
		a_{nom}	0.2607	0.2607
		b_{nom}	0.0052	0.0052
	maximum values			
		a_{max}	0.2868	0.2868
		b_{max}	0.0057	0.0058
Capacitance			86.7 pF/m	87.0 pF/m
Relative signal propagation			77.0 %	77.0 %
Signal delay			4.3 ns/m	4.3 ns/m
Phase stability	vs temperature	over entire temp. range	1500 ppm	1500 ppm
	vs flexure		$\pm 2.4^\circ/\text{GHz}$	$\pm 2.4^\circ/\text{GHz}$
Minimum screening effectiveness up to 18 GHz			> 90 dB	> 90 dB

General cable data

		SUCOFLEX_304	SUCOFLEX_304D
Temperature range		- 55 ... + 125 °C	- 55 ... + 125 °C
Weight		46 g/m	56 g/m
Diameter		5.4 mm	6.0 mm
Min. bending radius	static	20 mm	20 mm
	dynamic	50 mm	50 mm
Qualification status spaceflight		qualified	n/a

Suitable connectors

Connector type	Max. frequency (GHz)	VSWR	Loss coefficient c	Length extension (m) l_c	Temperature range (°C)	Fig.
11_SMA-487	18	1.12	0.02	0	- 55 ... + 125	340
16_SMA-489	18	1.12	0.02	0.028	- 55 ... + 125	341
24_N-408	15	1.16	0.02	0	- 55 ... + 125	342
11_SMA-459	18	1.12	0.02	0	- 55 ... + 125	343
16_SMA-461	18	1.12	0.025	0	- 55 ... + 125	344
24_SMA-454	18	1.20	0.02	0	- 55 ... + 125	345
11_TNC-457	18	1.12	0.02	0	- 55 ... + 125	346
16_TNC-459	18	1.18	0.025	0	- 55 ... + 125	347
24_TNC-457	18	1.12	0.02	0	- 55 ... + 125	348

for spaceflight only

Other connector types and patterns on request. Further information about D-armour [see page 127](#).