

Spaceflight SUCOFORM HiRel

Edition 2008/2009



Handformable semi-rigid





Your partner for system solutions

HUBER+SUHNER understands its role as being a partner in the development of innovative solutions which satisfy specific customer needs. For this purpose, our engineers combine components into an adequate solution so that the design standards and all the technical specifications will be fulfilled and reliable communications or power supply will be ensured even under adverse environmental conditions.

HUBER+SUHNER's premium technologies and products are perfectly suitable for space market requirements. For more than ten years HUBER+SUHNER develops and produces RF-products for spaceflight application. With customer specific qualifications, with processes according to ESA standards and audited by the customer, HUBER+SUHNER assures the best cost benefit relation.



SUCOFORM HiRel - the handformable semi-rigid microwave cable assembly for spaceflight applications

HUBER+SUHNER's SUCOFORM HiRel microwave cable assembly was specially developed and manufactured for spaceflight application. The main goal of this product is to substitute the expensive and hard to handle semi-rigid microwave cable assemblies. With the feature of being handformable, neither bending tooling, nor bending documentation is required. Only assembly length need to be specified and the product can be assembled and fixed in a spaceflight subsystem environment.

For longer RF connections for spaceflight applications please refer to HUBER+SUHNER's SUCOFLEX 300 series microwave cable assemblies.

Applications

- RF connections for components in spaceflight subsystems
- Static application

Features

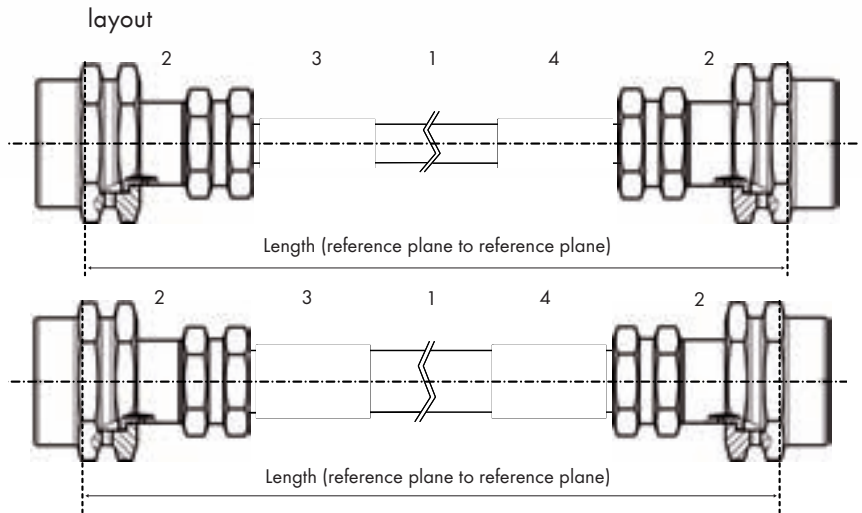
- Excellent electrical performance
- Handformable cable assembly
- Two dimensions: 0.086" and 0.141" diameter
- Leaded tin braid to avoid whiskers
- All conductive surfaces 2 µm silver plated according MIL-PRF-39012E
- Special designed SMA connectors:
 - Low weight
 - Superior mechanical stability (-55° - +100°C)
 - Retractable nut for easy mating
 - Connector vented

Benefits

- Suitable for substitution of semi-rigid microwave cable assemblies
- Bending on site, no additional bending tooling and documentation required
- Small size permit use in high-density areas
- Lower costs
- Easy installation
- Two cable diameter dimensions up to 18 GHz (Insertion Loss vs. weight)



Datasheet SUCOFORM 86 and SUCOFORM 141 HiRel spaceflight microwave cable assembly



Identification

Description	SM-86HiRel / connector A / connector B / length or SM-141HiRel / connector A / connector B / length
Item no.	TBD

Configuration

1	Cable	SUCOFORM 86 HiRel	SUCOFORM 141 HiRel
Assembly length		TBD	TBD mm
Cable diameter (1)		2.1	3.58 mm
2	Connector both ends - nut retractable, for secure mating - with across flat on connector body	11SMA-50-2-87 (SMA straight male)	11SMA-50-3-87 (SMA straight male)
3	Taper and identification sleeve «end A» (white)	front	TBD item number
		back	TBD TBD
4	Taper and identification sleeve «end B» (white)	front	TBD item number
		back	TBD TBD

Packaging In double polyethylene bag with drying agent

Additional information regarding space market products please find in the brochures SPACEFLIGHT - SUCOFLEX 300, item no. 84072025, Thermal vacuum testing SUCOFLEX TVAC, item no. 84072026 and in the catalogue TEST+MEASUREMENT, item no. 84068138.



All specifications are according to summary of HUBER+SUHNER spaceflight processes and qualification tests.

Electrical Specifications			
Cable		SUCOFORM 86 HiRel	SUCOFORM 141 HiRel
Impedance (nominal)		50	50 Ω
Operating frequency		DC ... 18	DC ... 18 GHz
Insertion loss (nom/max), (assembly 1 m length with straight SMA male connector on both ends)		2.22 / 2.5	1.56 / 1.70 dB@8 GHz
		3.57 / 4.1	2.56 / 2.80 dB@18 GHz
Insertion loss variation vs. temperature		≤ 0.0022	≤ 0.0026 $^{\circ}\text{K}^{-1}$
Return loss (assembly length ≤ 1 m)	DC ... 4 GHz	-21	-21
	4 ... 8 GHz	-19	-19
	4 ... 10 GHz	-19	-19
	8 ... 11.7 GHz	-17	-17
	10 ... 18 GHz	-17	-17
RF leakage	1 ... 12 GHz	-90	-90 dB
	12 ... 18 GHz	-80	-80
Resistance - insulation cable		$\geq 10^8$	$\geq 10^8$ $\text{M}\Omega^*\text{m}$
Withstand voltage - cable assembly (sea level)		> 1000	> 1500 V
Capacitance		95	92 pF^*m^{-1}
Time delay		4.70	4.71 ns^*m^{-1}
Phase variation vs. temperature (-55° ... +100°C)		< 5500	< 4800 ppm

Materials and finishes	
Cable centre conductor	Silver (min. 2 μm) plated copper clad steel wire
Cable dielectric	PTFE solid
Cable outer conductor	leaded tin soaked silver (min. 2 μm) plated copper wires
Connector centre contacts	CuBe gold plated
Connector insulator	PTFE solid
Connector body	CuBe gold plated
Connector nut	stainless steel
Taper and identification sleeves (white)	HTSCE1/8" ws

Processes		
Assembling in clean room	general working area	class 10000 class 100
Pre-ageing of cables before assembly process according ESA		ECSS-Q-70-18A
Soldering according ESA qualified materials and processes		ECSS-Q-70-08A and ECSS-Q-70-18A

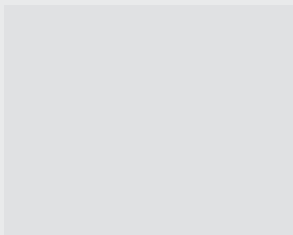
Mechanical specifications			
Minimum bending radius - static		10	20 mm
Cable retention force		40	70 N
Weight of the assembly	- SUCOFORM HiRel cable	16	47 g^*m^{-1}
	- SMA straight male connector	2.7	2.5 g

Environmental Specifications		
Temperature range		-55 ... +100 $^{\circ}\text{C}$
Vibration: sinus, random, shock according customer specific levels		
All connectors vented		
Out gassing according ESA-PSS-01-702		TML < 1%, CVCM < 0.1%

HUBER+SUHNER is certified according to ISO 9001 and ISO 14001.

WAIVER

It is exclusively in written agreements that we provide our customers with warrants and representations as to the technical specifications and/or the fitness for any particular purpose. The facts and figures contained herein are carefully compiled to the best of our knowledge, but they are intended for general informational purposes only.



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