



Data sheet

Cri/oFlex[®] CF2

Tackle your cryogenic cabling challenge!

Cri/oFlex[®] cabling combines the robustness and compatibility of standard SMA and SMP connectors with the versatility of an in-house developed transmission line platform on flexible substrates. Cri/oFlex[®] is specifically designed for cryogenic environments where thermal load, microwave performance, small form factor and phase stability are critical. Cri/oFlex[®] comes as a standardized cable setup (CF2) as described below, but can be highly customized upon request. Cri/oFlex[®] CF2 products are ideally suited for very compact and densely packed cryogenic environments. Providing very sturdy cables that can be bend countless times, Cri/oFlex[®] solves your cryogenic cabling challenges!

Features

- Extremely flexible
- Excellent phase stability
- Small form factor
- Optional filtering & signal conditioning
- Countless bending and straightening cycles
- Low thermal load

General Properties	
Connector	
Connector Type	SMA, SMP, SMPM (all male)
Connector Configuration	Straight and Right-angle
Flex	
Length	10 to 1200 mm
Width	4 mm
Thickness	0.3 mm
Materials	Polyimide & Silver (Ag)
Transmission-line type	Stripline

Thermal Properties	
Operating Temperature	10 ⁻³ K → 400 K
Heat Load @ 4K (ΔT: 4 - 40 K), L = 0.4m	< 18 μW
Expected Heat Load @ 10 mK (ΔT: 10 - 350 mK), L = 0.2m	~ 5 nW
Thermal Cycles	> 50

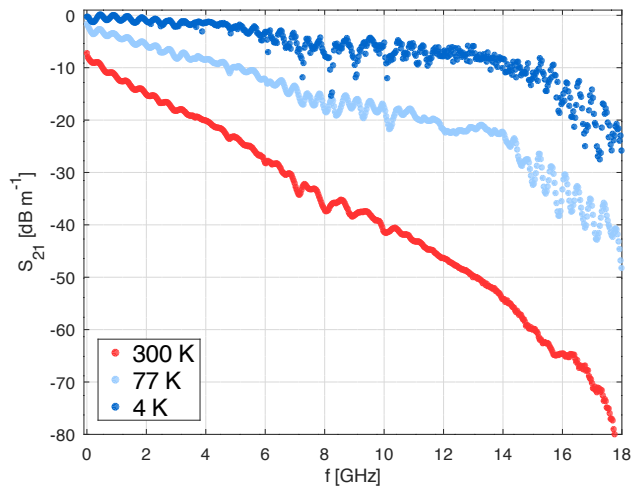
(Static) Mechanical Properties	
Min. Bending Radius	1 mm
Required Length for Longitudinal Rotation	2.5 cm / rotation
Max. Tensile Force	50 N

Electrical Properties	
Impedance	50 Ω (± 2 Ω) (Customizable on Request)
Operating Frequency	DC to 18 GHz
Isolation	-60 dB, flex to flex, for connector data contact us

Attenuation [dB/m]	Frequency	300 K	77K	4 K
	2 GHz	12	5	2
6 GHz	27	12	4	
12 GHz	45	21	8	
18 GHz	80	40	25	

Signal Properties

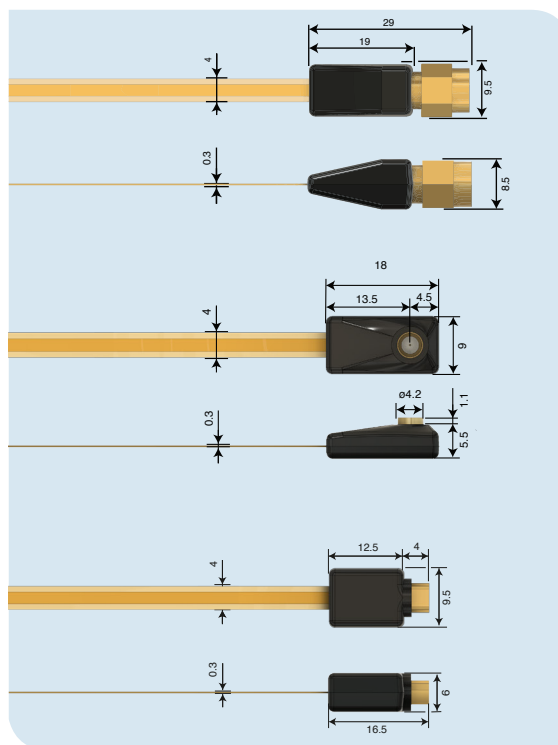
Cri/oFlex[®] CF2



In the table below we show the available connector options and frequency bandwidths; ✓ readily available, ✓ available upon request, ✗ under development. The flex cables can be configured with different connectors at each end, for example an SMA-SMP hybrid. In the figure on the right the dimensions are shown for the 3 readily available connector types, see the table below for the respective bandwidth options.

Connector Type	0-2 GHz	0-6 GHz	0-12 GHz	0-18 GHz
SMP right-angle	✓	✓	✓	✓
SMA straight	✓	✓	✓	✗
SMP straight	✓	✓	✓	✓

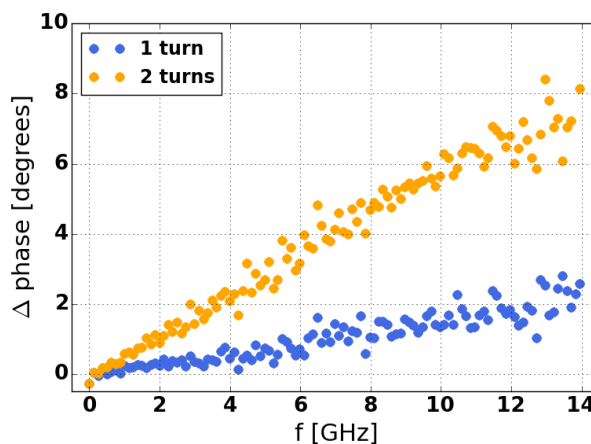
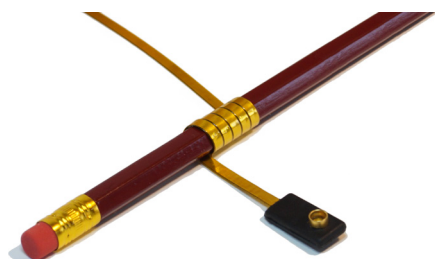
The figure on the left handside shows the roll-off (S_{21}) of an SMA-SMP DC-18 GHz bandwidth flex cable. Depending on connector type the overall attenuation may vary. A bandwidth up to 26.5 GHz is actively being developed. The return loss ($-S_{11}$) depends on the connector type but typically varies between 18 and 22 dB, for more information visit our website.



Phase Stability

Cri/oFlex[®] CF2

In many cryogenic applications phase stability is essential. Cri/oFlex[®] shows exceptional phase stability, on par with excellent phase stable cables for room temperature. This is demonstrated in the right figure, where the resulting phase difference upon winding a CF2 once or twice around a pencil is measured, as shown in the image below.



For more information please consult our website: <http://www.delft-circuits.com/>