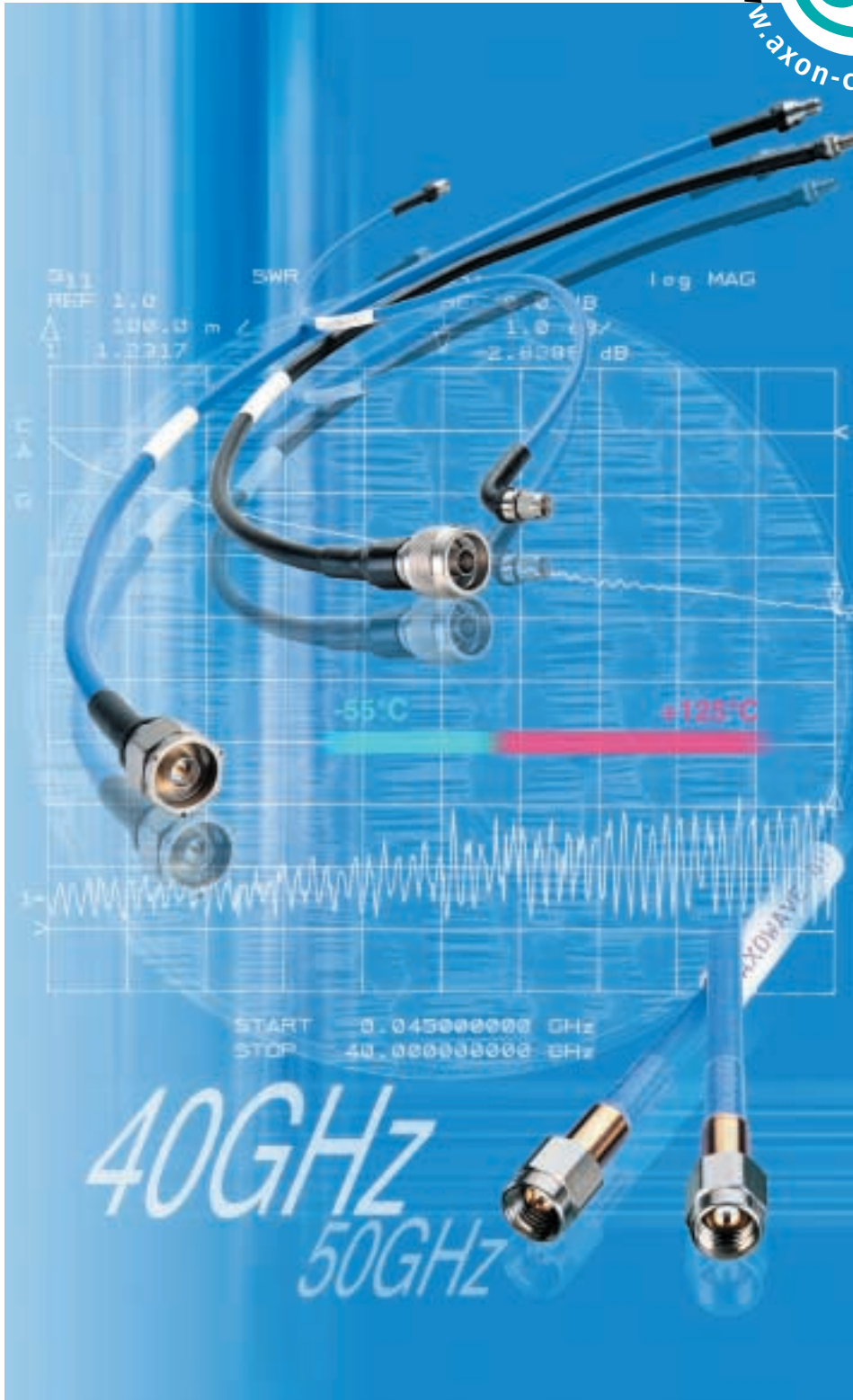


axon'

CABLE & INTERCONNECT



Axowave® / Axolab® / Axospec®

MICROWAVE COAXIAL ASSEMBLIES





A COMPLETE RANGE OF LOW LOSS MICROWAVE COAXIAL ASSEMBLIES

AXON' can offer three families of flexible low loss microwave coaxial assemblies :

AXOWAVE®

FEP- (Fluorethylenepropylene) or PU- (Polyurethane) insulated assemblies.

AXOLAB®

Assemblies protected by :

- a flexible stainless steel hose and a thermoplastic insulation ; the crush resistance is greater than 150 kg on a 5 cm cable length,
- a flexible stainless steel spring and a polyolefine insulation ; the crush resistance is higher than 80 kg on a 5 cm cable length.

On request, these assemblies can be delivered without insulation.

AXOSPEC®

Custom designed assemblies.



HYBRID HARNESSSES

AXON' has developed hybrid harnesses for increasingly complex applications. They integrate various configurations of wires and terminations such as coaxials up to 40 GHz, high flexible wires, shielded pairs, fibre optics, power cables, optimised shielding etc...

Complete solutions of harnesses including circular, miniature or coaxial connectors (SMA, N, TNC, K ...) can meet very specific requirements.



Flexible microwave

The flexible microwave assemblies of the U series have been specially designed to have the high bending strength required for dynamic applications (radar, surveillance or navigation systems etc). Materials have been chosen to guarantee good mechanical and electrical characteristics. The 2.5 U version (diameter of 2.5 mm) for example is able to keep its electrical properties after 1 million bends (3.0 dB/m at 18 GHz). These cables can be used at temperatures between - 55°C to + 125°C.



AXOWAVE®, AXOLAB®, and AXOSPEC® are mainly used as measurement and equipment assemblies as well as for antennae.

The cables are terminated either by SMA, N or TNC connectors. For use in radiocommunications (GSM, DCS, PCS, ...) AXON' can offer assemblies for base transceiver stations with a very low intermodulation level (PIM < -155 dBc). These assemblies are terminated by connector series 7/16 and 4.1/9.5.

On request, an overmoulding of the cable/connector termination assures waterproofing and good mechanical protection. AXON's microwave coaxial assemblies are used in a frequency range of 0 to 40 GHz at temperatures of -55° to +125°C or -40° to +80°C depending on the outer jacket. For greater temperature ranges, do not

hesitate to contact us. For outdoor applications, please contact us. The microwave assemblies are delivered in individual boxes and are identified by a white heatshrink sleeve with the following black marking :

- the cable type,
 - the name of the supplier, "AXON' ",
 - the batch and serial number.
- Microwave assemblies functioning at a frequency of 50 GHz are being developed by our R&D team.

QUALITY ASSURANCE

AXON' is ISO 9001 approved.

Electrical and dimensional controls are carried out at each stage of the cable manufacture.

The VSWR and insertion losses are measured on 100 % of all assemblies produced, and a test certificate is automatically supplied. Other measurements can be carried out on request : phase matching, shielding efficiency, intermodulation, ...

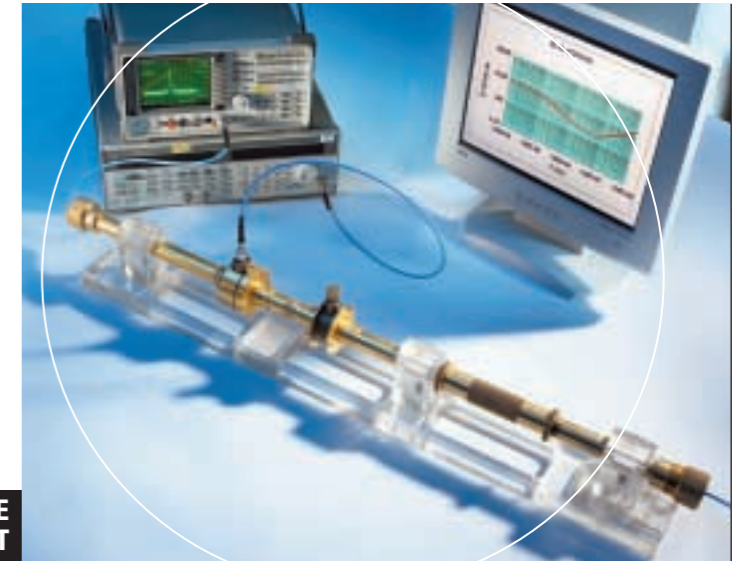
EMI/EMC KNOW HOW

The AXON' EMI/EMC laboratory has been approved by the French Army to carry out transfer impedance measurements.

AXON' guarantees the electromagnetic protection adapted to the environmental conditions of the assembly.

Two types of equipment are at AXON's disposal to evaluate the EMI-protection of each assembly :

- a transfer impedance measurement bench is used to evaluate the shielding efficiency of the cable up to 6 GHz,
- a mode stirred chamber is used to measure the shielding efficiency of assemblies up to 18 GHz.



TRANSFER IMPEDANCE MEASUREMENT

SELECTION GUIDE

To allow you to choose the microwave coaxial cable best suited to your needs, please refer to the table below which shows the key characteristics of the different cable types.

	AXOWAVE® 3S	AXOWAVE® 4H	AXOWAVE® 5C	AXOWAVE® 5T	AXOWAVE® 5L	AXOWAVE® 8 F	AXOWAVE® 8G	AXOWAVE® 15P	AXOWAVE® 20W	AXOWAVE® 28Z
ELECTRICAL CHARACTERISTICS										
CHARACTERISTIC IMPEDANCE (Ω)	50 ± 1	50 ± 1	50 ± 1	50 ± 1	50 ± 1	50 ± 2	50 ± 2	50 ± 2	50 ± 2	50 ± 2
OPERATING FREQUENCY (GHz)	0 - 18	0 - 40	0 - 26,5	0 - 18	0 - 18	0 - 18	0 - 18	0 - 10	0 - 7	0 - 5
CUT-OFF FREQUENCY (CABLE) (GHz)	42	42	29	29	29	19	18	10	7	5
NOMINAL CAPACITANCE (pF/m)	87	85	87	87	87	81	81	81	86	77
VELOCITY OF PROPAGATION (%)	76	76	76	76	76	81	81	81	77	86
INSERTION LOSSES (dB) (1m assembly) (at max. frequency)	2,10	2,95	2,10	1,60	1,60	1,05	0,90	0,55	0,36	0,25
Max. VSWR (in the frequency band) (For assemblies > 10 m, please contact us)	1,25 SMA plugs, straight	1,35 K-compatible connectors	1,25 from 0 to 18 GHz 1,35 from 18 to 26.5 GHz SMA plugs, straight	1,20 SMA plugs, straight	1,20 SMA plugs, straight	1,35 N plugs, straight	1,35 N plugs, straight	1,35 N plugs, straight	1,35 N plugs, straight	1,35 N plugs, straight
SCREENING EFFICIENCY (dB) at 1 GHz	< - 100	< - 100	< - 110	< - 110	< - 120	< - 110	< - 120	< - 90	< - 100	< - 100
PHYSICAL AND MECHANICAL CHARACTERISTICS										
OUTER DIAMETER OF THE CABLE (mm)	3,7	4,1	5,3	5,3	5,4	7,8	8,4	14,8	20	28
MIN. BEND RADIUS, STATIC APPLICATION (mm)	20	20	25	25	25	45	55	100	150	200
MIN. BEND RADIUS, DYNAMIC APPLICATION (mm)	40	50	50	50	50	80	—	140	200	250
CABLE/CONNECTOR MIN. RETENTION FORCE (N)*	80	98	90	90	90	110	110	200	250	250
APPROX. CABLE WEIGHT (g/m)	35	38,5	72	72	75	138	162	345	665	1070
OUTER JACKET MATERIAL	FEP	FEP	FEP	FEP	FEP	FEP	FEP	PU	PU	PU

* Advised but not maximum values.

Do not hesitate to ask for our technical data sheets which contain detailed information on the electrical and mechanical performances of each assembly. AXON' also offer standard coaxial cables : single or double braid, triaxials, low noise coaxials, miniature coaxials PICO-COAX®, coaxial cables with CELLOFLON® dielectric. Ask for our catalogue !

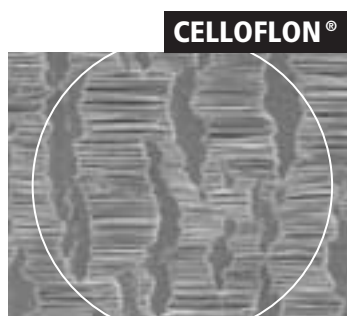


CELLOFLON® DIELECTRIC

For excellent electrical performances

AXON' use porous PTFE dielectrics for the manufacture of their microwave coaxial assemblies to obtain a dielectric constant similar to air. The microwave transmission will thus be improved.

As quality PTFE tapes are rarely available, AXON' have developed their own expanded products, brandnamed CELLOFLON®. These PTFE tapes have been patented.



COMPARISON For a volume of 10 cm³

	PTFE	CELLOFLON® 50 % POROSITY	CELLOFLON® 75 % POROSITY	CELLOFLON® 80 % POROSITY
DENSITY	2.10	1.05	0.525	0.42
DIELECTRIC CONSTANT	2.10	1.47	1.23	1.18
WEIGHT (g)	21	10.5	5.2	4.2

The low dielectric constant of CELLOFLON® helps to considerably improve the electrical performances of the cable, achieving lower insertion losses, a higher cut-off frequency and faster propagation velocity. For identical performances the dimensions of a CELLOFLON® cable will be smaller and the cables' weight and volume lower. The insertion losses of a one metre AXOWAVE® 8G assembly,

terminated by two straight male N connectors, are only 0.90 dB at 18 GHz.

The use of CELLOFLON® improves the phase stability of the assemblies, under mechanical stress as well as when submitted to temperature changes.

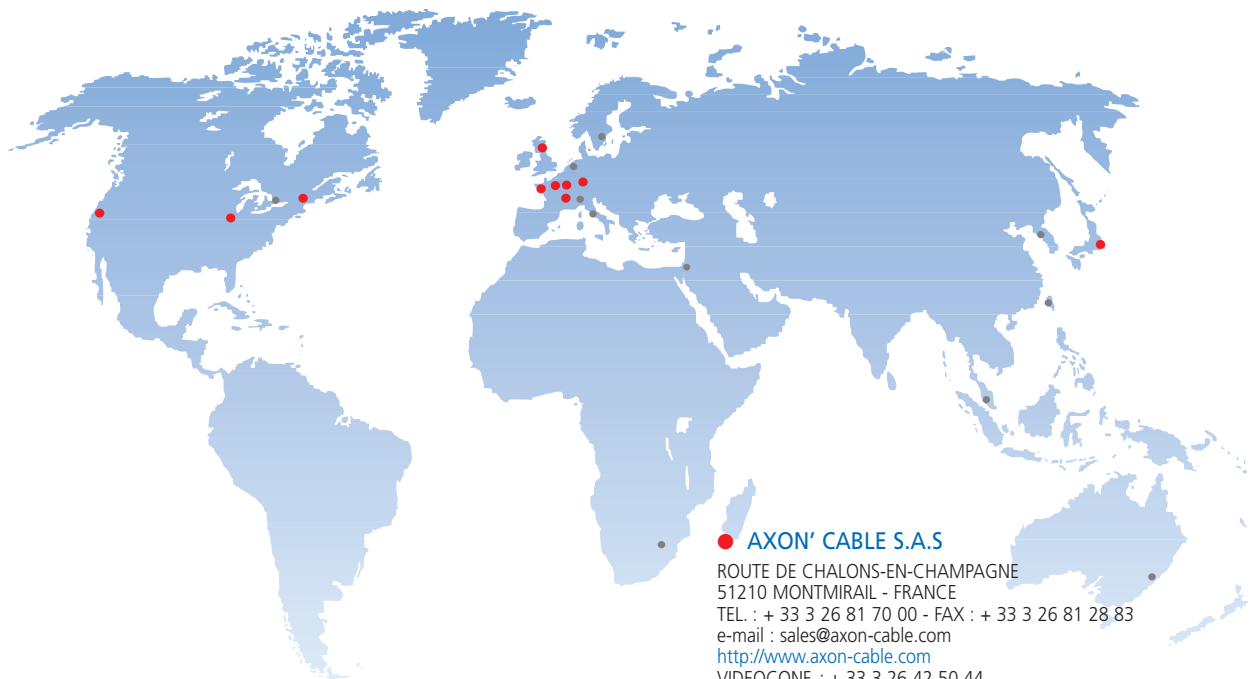
COMPATIBLE CONNECTORS

AXON' is able to custom design the connectors shown below. On request, special surface treatments like chromium or silverplating can be offered. Other types of connectors can be developed as well.

	SMA plug			SMA bulkhead feedthrough jack		N plug		N bulkhead feedthrough jack		TNC plug		TNC femelle à feedthrough jack		Type 7/16 plug		Type 7/16 flange mount cable jack		K
	straight	swept 90°	elbow	straight	swept 90°	straight	swept 90°	straight	swept 90°	straight	swept 90°	straight	elbow	straight	elbow			
AXOWAVE® 3S	x	x	x (10 GHz maxi)	x	x													
AXOWAVE® 4H																		x
AXOWAVE® 5C	x	x		x	x													
AXOWAVE® 5T	x	x		x	x	x	x			x	x							
AXOWAVE® 5L	x	x		x	x	x	x			x	x		x	x	x			
AXOWAVE® 8F	x					x	x	x (6 GHz maxi)		x	x	x						
AXOWAVE® 8G	x					x		x (6 GHz maxi)		x								
AXOWAVE® 15P						x												
AXOWAVE® 20W						x		x										
AXOWAVE® 28Z						x		x										

Typical insertion loss values for some connectors (in dB) :

- straight connectors : $\cong 0,06\sqrt{f}$ with f in GHz
- swept connectors : $\cong 0,07\sqrt{f}$ with f in GHz



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