

CABLE TECHNICAL SPECIFICATION

UPDATING

Issue	Date	Name	Modification
A00	09/11/06	Y. LETESTU	First issue
B00	11/12/06	Y. LETESTU	Changed frequency band and colour
C00	12/01/07	Y. LETESTU	Changed jacket material

Champlain Cable Compliance in blue and underlined

This document defines our technical requirements about the following product :

**DOUBLE BRAID COAXIAL CABLE (50 Ω)
WITH A CROSSLINK FOAMED POLYETHYLENE INSULATION.
NOMINAL JACKET DIAMETER = 3.16 MM.**

A - WIRE CHARACTERISTICS (inner conductor + braid)

- **Inner conductor description**

Seven strands of silver-coated, copper-covered steel wire
Wire diameter: 0.18mm (33 AWG)

[Comply](#)

- **Braid wire description**

Silver plated copper wire

[Comply](#)

- **Coating and copper quality**

Silver coating thickness: 1 μ m min

Electrolytic soft copper.

C 11000 quality class according to ASTM B 224

[Comply](#)

- **Surface aspect :**

- Traces
- Transversal « wrinkles »
- Surface peeling off

are not accepted.

[Comply](#)

DRAFT

- **Dimensions**

1 - Inner conductor (stranded):

Overall diameter: 0.54mm ± 0.02 [Dimensional tolerance should be +/- 0.05 to reflect supplier capabilities](#)

2 - Braid wire

Nominal diameter = 0.10mm (38 AWG) [Comply](#)

B - ISOLATION CHARACTERISTICS

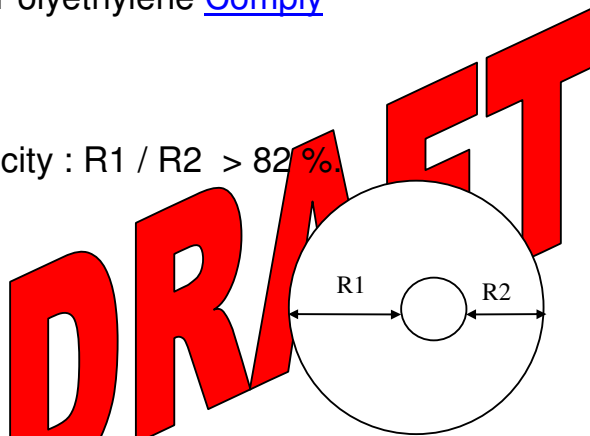
1 - Material

Crosslink Foam Polyethylene [Comply](#)

2 - Dimensions.

- Concentricity : $R1 / R2 > 82\%$.

[Comply](#)



3 - Mechanical characteristics

<i>Speed</i>	: 100 mm/mn. 4"/min
<i>Isolation length to retire</i>	: 70 mm. / 2-3/4" slug
<i>Sample length</i>	: 140 mm. 5-1/2" sample

Retention force F (daN) must be > 1 (daN) [2.25 lbf.](#)

[We undertand this to be a conductor / dielectric adhesion test, where a 70 mm slug is removed from a 140mm sample at a rate of 100 mm/min. We must perform this test to ensure compliance. Please be advised that this exact Radiall requirement is specified for much larger coaxial cables, so the values listed may change.](#)

C - BRAID CHARACTERISTICS

Inner braid:

Construction : TBC [Should be SPC](#)

Min Covering : 96 %. [Comply](#)

Outer braid:

Construction : TBC [Should be SPC](#)

Min Covering : 90 %. [Comply](#)

D - JACKET CHARACTERISTICS


1- Material :

Crosslink Halogen and sulphur free Polyethylene according to IEC 754-2.
[Comply](#)

Flame retardant material according to UL94 V0 or equivalent. [Comply](#)

2 - colour :

Black (RAL 9005) with blue stripe

Marking : “ E xxxx P STYLE 1375 30 V 80 °C  US AWM RADIALL “
approximately every 150 mm. (E xxxx is the UL file number of the supplier).
[Comply.](#)

3-Jacket retention force :

Jacket must be easily removed from the cable using automatic machine.

RADIALL proposes the following parameters :

- Maximum force F to extract 15 ± 1 mm of jacket from the cable must be

$2 \leq F \leq 8N$. [0.4-1.8 lbf for 5/8" slug](#)

- Test speed : 250 mm/mn. [10" / min](#)

[The cable must be manufactured and tested over several production lots before we can determine compliance.](#)

E - CABLE CHARACTERISTICS

1 - Dimensions :

- Core diameter = 1.54 ± 0.02 mm. [Tolerance too tight, should be ± .05 mm.](#)
- Inner Braid diameter = 2.03 ± 0.1 mm [Comply](#)
- Outer Braid diameter = 2.5 ± 0.1 mm [Comply](#)
- Jacket diameter = 3.16 ± 0.05 mm. [Tolerance too tight, should be ± .075 mm.](#)

2 - Electrical characteristics :

- Characteristics impedance : 50 ± 2 Ω.
- Frequency range : DC – 6 GHz
- Maximum attenuation at 25°C : see table below
- V.S.W.R for a length cable assembly as 10 m < x < 20 m : see table below
- Max power at 40°C (ambient temperature) and sea level

Frequency (GHz)	Max attenuation (dB/m)		VSWR (dB)		Max power (W)
	Radiall Reqt	Champlain Comment	Radiall Reqt	Champlain Comment	
0.10	0.26		≥25		TBD*
0.30	0.43		≥25		TBD
0.50	0.64		≥25		TBD
0.80	0.83		≥25		TBD
1.00	0.95	1.0	> 23	OK	90
1.50	1.21		≥23		TBD
2.00	1.44	1.5	>23	OK	65
2.50	1.65		≥23		TBD
3.00	1.86	1.9	> 19	OK	52
3.10	1.89		≥19		TBD
3.30	1.97		≥19		TBD
3.50	2.05		≥19		TBD
3.80	2.16		≥19		TBD
4.00	2.23	2.2	> 19	OK	45
4.50	2.41		≥19		TBD
5.00	2.58	2.5	> 19	OK	40
5.50	2.75		≥19		TBD
6.00	2.92		≥19		TBD

* To be defined by the supplier

- Min screening effectiveness: >70dB (up to 5GHz) [Comply](#)
- Velocity of propagation: 70.7% (*the supplier shall indicate the minimum and maximum value for the dielectric constant ϵ*) [Comply](#)

3- Environmental conditions

Temperature range : - 40°C to + 105°C. [Comply](#)

Flame retardant according to UL1581 VW1 or equivalent. The cable must be UL certified under the style UL1375. [Comply](#)

Fire resistance according to IEC 332-1. [Comply](#)

Smokes density according to IEC 1034-1 and 2. [Comply](#)

Chemical resistance : The supplier shall propose a standard (IEC or MIL). [Comply.](#)

4- Mechanical characteristics.

All the performances listed upper must be kept when bending on 10 mm radius (static bending) according to CEI 966-2-1 a. [Comply.](#)

5- Testing connectors reference.

Straight plug SMA for RD316 or ECO316D.
RADIALL reference : R125.072.221

F - PACKAGING

Reel dimensions: [Comply](#)

Flange diameter : max 450mm.

Bore diameter : 20<<60mm.

Total length : max 260m.

- Precise tidying . [Understood to mean no tangles or kinks.](#)
- Maximum weight per reel = 15 kg [Comply](#)
- Only one length per reel (linking is not accepted). [Comply](#)
- The packaging will guarantee the integrity of cable defined in this technical specification whatever means of transport used. [Comply](#)

These criteria can only be observed during utilisation, so the products are accepted with reserve until future use.
Any defect noticed at this point will be a reason for rejecting the cable .

H – LEGAL REQUIREMENTS

The cable defined in this specification must comply with

- ✓ RoHS Directive (Directive 2002/95/EC of the European Parliament and of the council [Comply](#))
- ✓ WEEE Directive (Directive 2002/96/EC of the European Parliament and of the council [Not familiar with directive, will need to investigate further](#))

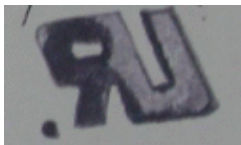
The cable supplier shall disclose controlled and reportable materials by fulfilling Radiall document FIQ MCC 1015 appendix D.

I - DELIVERY DOCUMENTS

- A) Each reel shall be UL marked as follows:
 - ✓ With UL sticker such as below: [Comply](#)



- ✓ With UL stamp on the supplier sticker such as below: [Comply](#)



- B) Each Spool shall be identified with only Radiall P/N, Date, Lot #, total Length in Meter, and Spool # (1 of 1, 1 of 2 ect.) [Comply](#)

- Certificate of conformance with the reels numbers and the corresponding manufacturing lot number.
The certificate of conformance guaranties the goods delivered are conformed to our specification. [Comply](#)
- Certificate of compliance regarding RoHS Directive and WEEE Directive with Radiall document FIQ MCC 1015 appendix D fulfilled [Not familiar with WEEE Directive or FIQ MCC 1015 Appendix D. Will need to investigate further.](#)

J - CHANGE NOTICE

All changes or deviations to the specifications directed by this requirement document must be submitted in writing. Written approval of the change or deviation must be received before the change or deviation is incorporated. [Agreed](#)

The manufacturer shall notify the procuring activity in writing of changes that affect quality, reliability, form, fit, or function of the cable. Failure to receive written approval of such changes from the procuring activity shall be sufficient cause for rejection of all the cable affected by the change. [Agreed](#)

It is not the intent of this requirement to prevent the manufacturer from improving this product but to ensure notification of changes that could affect the performance, quality, or reliability of the cable is communicated. [Agreed](#)

Champlain Cable ECO316DX Capabilities Report

9-Dec-08

Mechanical

Parameter	Specification	Result
Inner Conductor Diameter	0.54 mm +/- 0.05 0.021 in +/- 0.0020	Pass
Dielectric Core Diameter	1.54 mm +/- 0.05 0.061 in +/- 0.0020	Pass
Concentricity	82% min	Pass
Bond (dielectric)	1 daN min 2.25 lbf min	Pass
Braid Coverage	Inner 96% min	Pass
	Outer 90% min	Pass
Braid Diameter	Inner 2.03 mm +/- 0.1 0.080 in +/- 0.0039	Pass
	Outer 2.5 mm +/- 0.1 0.098 in +/- 0.0039	
Jacket Diameter	3.16 mm +/- 0.075 0.124 in +/- 0.0030	Pass
Jacket Retention Force	5 N +/- 3 1.1 lbf +/- 0.7	This requirement is under review. Final development based on actual results

Recommendations:

Use Champlain Cable's recommended Attenuation - 1.0, 1.5, 2.0, 2.2, 2.5.

Change VSWR to Return Loss.

Review Champlain's recommended spec changes to 06.45.01 specification.

Change jacket adhesion specification when enough data is collected based on capabilities and strip requirements.

Change dimensional tolerances to reflect capabilities.

Electrical

Attenuation (dB/m)		
Freq	Spec	Actual
1	0.95	1.0
2	1.44	1.5
3	1.86	1.9
4	2.23	2.2
5	2.58	2.5
Max. Power		
(W, 40°C, 0m ASL)		
Freq	Spec	Actual
1	TBD	90
2	TBD	65
3	TBD	52
4	TBD	45
5	TBD	40
VSWR (dB)		
Freq	Spec	CCC
1	>23	29.4
2	>23	36.2
3	>19	29.1
4	>19	31.6
5	>19	27.2