DOCUMENT CHANGE REQUEST

DCR number 521	Changes required for: Qualification	Originator: AXON CABLES SAS (F.
Date: 2009/05/29	Date sent: 2009/05/29	Organisation: CNES
Status: IMPLEMENTED		

Title:	Wires and Cables, Fluoropolymer Insulated, Low Frequency, 600V, -200 to + 200 degC, Based on		
Number:	3901/024	Issue:	1

Other documents affected:

Page:

Page 9, 14 Para 4-4-2

Paragraph:

Page 9, 14 Para 4-4-2

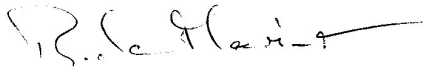
Original wording:

Proposed wording:

Cf appendix Nr 02 from the DCR attached form.

Justification:

The weight of variante 53 has to be increased.
The definition of the primary insulation has to be updated.
CF details in appendix 1 from the DCR attached form.

Attachments:
DCR_for_ESCC_3901024_V2.pdf, null
Modifications:
N/A
Approval signature:

Date signed:
2009-05-29

DOCUMENT CHANGE REQUEST

DCR Class

TO BE COMPLETED BY ORIGINATOR

Change request No.

Originator (1) F. LEBOURCQ
Affiliation AXON CABLE SAS
CNES

Originator signature (2)
Date: May 04 th 2009

Page 1 of [8] (3)

DOCUMENT AFFECTED

Doc. No. (4)	Status (5)	Title	
3901024	1	Fluropolymer wire and cables Low frequency 600 v – 200 to + 200 °C based type CSWL	(6)

Paragraph(s) and page(s) affected (7)
Page 9, 14 § 4-4-2

Other documents affected (8)

PROPOSED WORDING OF CHANGE (9)

CF details in appendix 2

These modifications are required for our qualification

Continuation sheet(s) attached
☒ Yes ☐ No

JUSTIFICATION (10)

The weight of variante 53 has to be increased
The definition of the primary insulation has to be updated
CF details in appendix 1

Continuation sheet(s) attached
☒ Yes ☐ No

Changes required for: Procurement (project) ☐ Qualification ☐ MRB decision ☐ (11)
General Improvement of Spec. ☐ Other ☐

RESERVED FOR USE BY THE ESCC EXECUTIVE SECRETARIAT

Date of registration:

Order of Priority for Appr. / Impl.: 1 (high) ☐ 2 (medium) ☐ 3 (low) ☐

Attachments: ☐

Qualification Status: Qualified ☐ In process of qualification ☐ N/A) ☐

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Approved
☐Yes ☐No
Priority ☐

Signature
Role Date

Reference to SCSB / PSWG decision

Approved wording if different from box 9 or reason for rejection

Continuation sheet(s) attached
☐ Yes ☐ No

Weight of variante 53

The weight of the variante 53 is given at 21 grs/meter maximum. The current weight measured by AXON CABLE is 23.62 with "nominal" dimensions.
The theoretical calculation with the maximum dimension give 24.35 grs/meter
We propose to increase the weight at 24.30 grs/meter

Insulation of the primary wire (construction).

CF page 14 § 4-4-2
The specification require to manufacture the wire with the HST-F tape (min.76% overlap, wall thickness 0.1 mm nom.) and one lay of PTFE tape (min. 51 % overlap, wall thickness 0.05 mm nom.).
We suppose that HST-F mean "high strength toughened fluoropolymer".

Axon Cable propose to update the specification to use its own PTFE tape product and clarify the designation of HST-F PTFE tape.

Proposal for material.

4-4-2-1 : Material:
Any insulating material shall be virgin high strength toughened fluoropolymer PTFE tape (HST-F) and PTFE with only those additives that necessary for processing and pigmentation.

As the diameter of every variants of single wire is toleranced, the following points can be modified.

Proposal for construction.

4-4-2-2 : construction:
The insulation shall have a uniform cross section throughout the length of the wire and the conductor shall be evenly centred in the insulation.
The insulation shall consist of one wrapped high strength toughened fluoropolymer PTFE tape (HST-F) and one lay PTFE tape (minimum 51 % overlap wall thickness of insulation of 0.15 mm nom) as specified in figure 2a

Proposed deviation for AXON CABLE.

The expended PTFE tape shall be Celloflon ® for AXON CABLE
CF Figure 2 (c) page 11 from ESCC 3901024 (in appendix 2).



FLUOROPOLYMER INSULATED

WIRES AND CABLES,

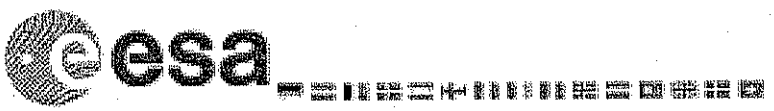
LOW FREQUENCY, 600V, -200 TO +200 °C,

BASED ON TYPE CSWL

ESCC Detail Specification No. 3901/024

ISSUE 1
October 2002

CF page 1
March ?



european space agency
agence spatiale européenne

Pages 1 to 20

FLUOROPOLYMER INSULATED

WIRES AND CABLES,

LOW FREQUENCY, 600V, −200 TO +200 °C,

BASED ON TYPE CSWL

ESA/SCC Detail Specification No. 3901/024

CF
Cover Page

space components
coordination group

Issue/Rev.	Date	Approved by	
		SCCG Chairman	ESA Director General or his Deputy
Issue 1	March 2002		

TABLE 1(a) - TYPE VARIANTS (CONTINUED)

VARIANT No.	SHIELDED		No. OF CORES	WIRE SIZE ISO/AWG (Note 1)	STRANDING No. OF STRANDS x DIAMETER (mm)	CONDUCTOR CHARACTERISTICS			SHIELD STRAND Ø (mm)	CORE MAX Ø (mm)	FINISHED WIRE OR CABLE CHARACTERISTICS	
	YES	NO				MAX Ø (mm)	NOM SECT. (mm^2)	MAX OHMIC RESISTANCE (Ω/km)			MAX Ø (mm)	MAX WEIGHT (kg/km)
49	x	-	3	-/30	7x0.102	0.32	0.057	385	0.079	0.75	2.2	9.0
50	x	-	3	-/28	7x0.127	0.39	0.09	259	0.079	0.85	2.4	10.6
51	x	-	3	001/26	19x0.1	0.47	0.15	171	0.079	1.0	2.8	12.7
52	x	-	3	002/24	19x0.12	0.58	0.25	121	0.079	1.15	3.1	15.9
53	x	-	3	004/22	19x0.15	0.76	0.4	64	0.079	1.3	3.4	24,30
54	x	-	3	006/20	19x0.20	0.99	0.6	37	0.079	1.55	3.9	33
55	x	-	3	012/16	19x0.30	1.49	1.2	15	0.079	2.2	5.3	62.2
56	x	-	3	030/12	37x0.32	2.18	3.0	7.5	0.079	3.0	7.0	115.5
57	x	-	4	-/30	7x0.102	0.32	0.057	386	0.079	0.75	2.4	10.9
58	x	-	4	-/28	7x0.127	0.39	0.09	260	0.079	0.85	2.6	13
59	x	-	4	001/26	19x0.1	0.47	0.15	171	0.079	1.0	3.0	15.7
60	x	-	4	002/24	19x0.12	0.58	0.25	122	0.079	1.15	3.4	20.2
61	x	-	4	004/22	19x0.15	0.76	0.4	64	0.079	1.3	3.7	26.4
62	x	-	4	006/20	19x0.20	0.99	0.6	37	0.079	1.55	4.3	42
63	x	-	4	012/16	19x0.30	1.49	1.2	16	0.079	2.2	5.9	80.7
64	x	-	4	030/12	37x0.32	2.18	3.0	7.9	0.079	3.0	7.8	151.5

NOTES

1. Where given, in accordance with ISO2653. AWG sizes are for reference only when ISO sizes are shown.

FIGURE 2 - PHYSICAL CHARACTERISTICS

Dimensions are given in Table 1(a)

FIGURE 2(a) - FINISHED WIRES

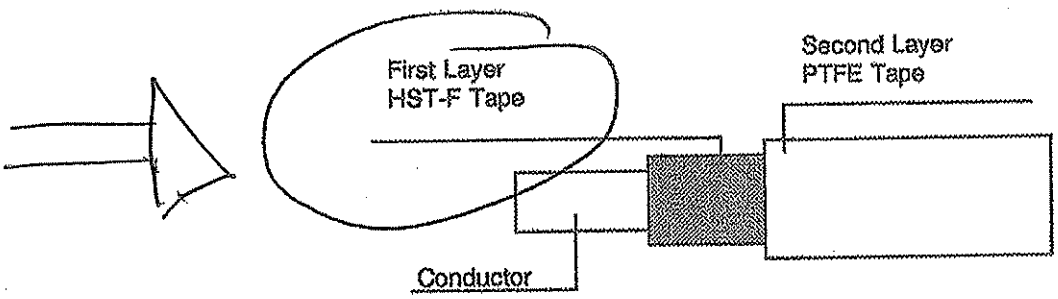


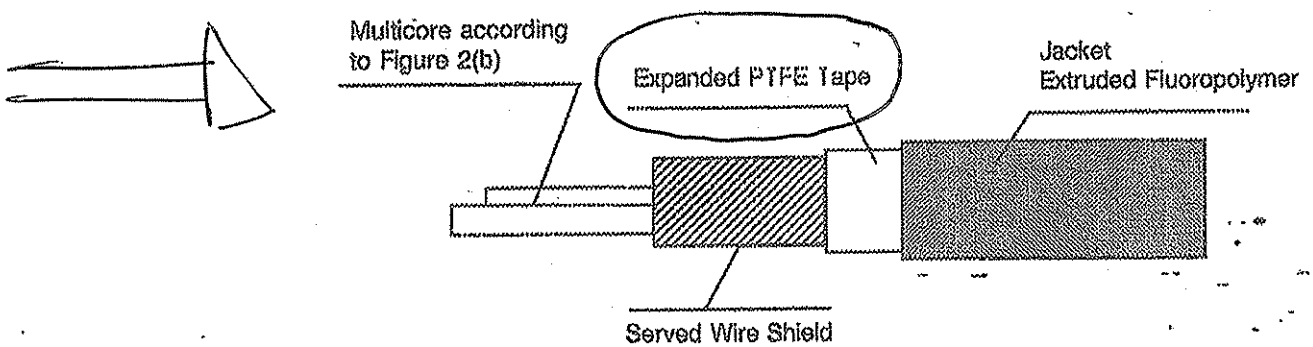
FIGURE 2(b) - MULTICORE CABLE



NOTES

1. Finished wire according to Figure 2(a).

FIGURE 2(c) - SHIELDED AND JACKETED CABLES



4.4.1 Conductor

4.4.1.1 Material Characteristics

All strands used in the manufacture of the conductors shall be silver-coated, soft or annealed, oxygen-free high conductivity copper for ISO 004, 006, 012 and 030 and silver – coated high strength copper alloy for ISO 001, 002 and AWG 28 and 30.

The silver thickness shall be 2.0 microns minimum.

For all copper conductors, any strand shall show a 10% minimum elongation.

For high-strength copper alloy conductors, the tensile characteristics shall be not less than 6% in elongation and 35kg per square mm in tensile strength.

For determination of the conductor resistance at +20°C, as mentioned in Para 9.5 of ESA/SCC Generic Specification No. 3901, the α coefficient for copper alloy is 0.0035.

4.4.1.2 Stranding

The conductors shall be constructed of concentrically laid strands to produce a smooth and uniform conductor of circular cross-section and free from any high strands or other surface irregularities.

The length of lay of the external layer shall not be less than 8, nor more than 16, times the maximum conductor diameter specified in Table 1(a).

4.4.2 Insulation

4.4.2.1 Material

CF proposal in Appendix 1

Any insulating material shall be virgin high strength toughened fluoropolymer and PTFE with only those additives that are necessary for processing and pigmentation.

4.4.2.2 Construction

The insulation shall have a uniform cross-section throughout the length of the wire and the conductor shall be evenly centred in the insulation.

The insulation shall consist of one wrapped lay of HST-F tapes (min. 76% overlap, wall thickness 0.1 mm nom.) and one lay of PTFE tapes (min. 51% overlap, wall thickness 0.05 mm nom.) as specified in Figure 2(a).

4.4.3 Shield

4.4.3.1 Material Characteristics

Shield strands shall meet the requirements for silver-coated annealed copper outlined in Para. 4.4.1.1 of this specification.

4.4.3.2 Construction

The shield shall be closely and helically wound around the single insulated wire or twisted bundle of insulated wires (core) and provide not less than 90% coverage as calculated by the following formula:

$$K = \frac{n \times d_w - \sqrt{(\pi D)^2 + P^2}}{P\,\pi D} \times 100(\%)$$

K = Coverage (%).
n = Number of serving wires.
d_w = Shield strand diameter (mm).
D = Diameter of core (mm).
P = Serving Pitch (mm).

APPENDIX 'A'

AGREED DEVIATIONS FOR GORE (D)

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Figure 2	Expanded PTFE tape shall be GORE-TEX®
Para. 4.4.4	Expanded PTFE tape shall be GORE-TEX®

NOTES
1. GORE-TEX® = Registered Trade Mark of W.L. Gore & Associates GmbH.

ITEMS AFFECTED	DESCRIPTION OF DEVIATIONS
Figure 2	Expanded PTFE tape shall be CELLOFLON (R)
Para. 4.4.4	Expanded PTFE tape shall be CELLOFLON (R)

Note:
CELLOFLON (R) = Registered Trade Mark from
AXON CABLE SAS