



CARLO GAVAZZI SPACE SpA

HERSCHEL DPU_s/ICU

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Titolo : HERSCHEL SPIRE DPU UNIT DECLARED MATERIALS LIST <i>Title :</i>			

	Nome & Funzione <i>Name & Function</i>	Firma <i>Signature</i>	Data <i>Date</i>	LISTA DI DISTRIBUZIONE <i>DISTRIBUTION LIST</i>	N	A	I
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REGISTRAZIONE DELLE MODIFICHE / *CHANGE RECORD*

EDIZIONE <i>ISSUE</i>	DATA <i>DATE</i>	AUTORIZZAZIONE <i>CHANGE AUTHORITY</i>	OGGETTO DELLA MODIFICA E SEZIONI AFFETTE <i>REASON FOR CHANGE AND AFFECTED SECTIONS</i>
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1. SCOPE

The scope of this document is to define all materials to be used in the SPIRE DPU Unit for HERSCHEL DPUs/ICU Program.

This document is based on the SPIRE DPU Unit architecture defined for the Critical Design Review.

2. APPLICABLE & REFERENCE DOCUMENTS

2.1 APPLICABLE DOCUMENTS

AD	DOC. N.	ISSUE	TITLE
1	HERS-GEN-PL-CGS-002	DRAFT	HERSCHEL DPUs/ICU Product Assurance Plan

2.2 REFERENCE DOCUMENTS

RD	DOC. N.	ISSUE	TITLE
1	ESA PSS-01-700	2	The technical reporting and approval procedure for materials, mechanical parts and processes



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3. RESPONSIBILITY

CGS shall be responsible where applicable for the selection, procurement and acceptance of material, cable and mechanical parts which are in accordance with contractual specification.

4. METHODOLOGY FOR THE COMPILATION OF THE DML

The materials list consists of 12 columns which shall be completed as indicated below in according to [RD 1] document. Furthermore, similar materials shall be grouped as specified in table:

GROUP	MATERIALS
1	Aluminium and aluminium alloys
2	Copper and copper alloys
3	Nickel and nickel alloys
4	Titanium and titanium alloys
5	Steels
6	Stainless steels
7	Filler metals: welding, brazing, soldering
8	Miscellaneous metallic materials
9	Optical materials
10	Adhesives, coatings, varnishes
11	Adhesive tapes
12	Paints and inks
13	Lubricants
14	Potting compounds, sealants, foams
15	Reinforced plastics
16	Rubbers and elastomers
17	Thermoplastics (non adhesive tapes, foils)
18	Thermoset plastics
19	Wires and cables (for materials aspects only)
20	Miscellaneous nonmetallic materials (ceramics)

Column 1:Group number/Item number

Identified number relevant to each group and sequential item number in each group of the list (one only per material type).

Column 2:Commercial identification

Trade name and number (to be completed in full).

Correct and standard designation. If no trade name exists, then the manufacturer's name plus number are entered.

Column 3:Chemical nature and type of product e.g.: "epoxy adhesive".

Column 4:Procurement information


Manufacturer/supplier: this identifies the abbreviated name of the manufacturer and name of the supplier if different.

Specification: reference of the procurement specification whit issue and revision.

Column 5:Summary of processing parameters

Indicate as relevant: specification number, mixture proportions, cure temperature, special cleaning agent, surface treatment, temperature, etc..

Column 6:Use and location

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Indicate in what subsystems, box or item the material is used and whether it acts as structural element, thermal control, electrical insulation etc. as relevant.



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Column 7:Environmental code

R:Radiation/UV/ATOX(1)		A:Ambiance	T:Temperature
G=Geostationary	S=outside shadow	V=Vacuum	1=0 to 100 K
L=Low orbit	L=outside light	H=Hermetic	2=101 to 200 K
B=Radiation belts		M=Manned	3=201 to 300 K
I=Interplanetary		E=Elevated pressure	4=301 to 400 K etc.

(1) For materials inside the spacecraft, choose a letter from the left-hand column. For materials on the surface of the spacecraft, combine this letter with "L" or "S".

Column 8:Size code

AREA	A (cm ²)	0=0 to 1 1=1 to 10
VOLUME	V (cm ³)	2=10 to 100 3=100 to 1000
MASS	W (g)	4=1000 to 10000 etc.

Choose an alphanumeric combination from the above mentioned table.

Column 9

All the codes of column 9 shall be relevant for the project concerned, which implies that they refer to validated data applicable to this project, as detailed in the following table and the individual properties description below:

CORR Corrosion Resistance of metallic materials are rated per MSFC-SPEC-250, Class II requirements (as showed into NASA/MSFC MAPTIS databases) as follows:
 A: meet the requirements, and do not require a coating
 B: meet the requirements, if coated
 X: materials fails requirements
 U: property unknown/untested

SCC Stress Corrosion Cracking Susceptibility of metallic materials are rated per ESA PSS-01-736 or MSFC-SPEC-522 (as showed into NASA/MSFC MAPTIS databases) as follows:
 A: having high resistance to stress corrosion cracking (listed in table I)
 B: having moderate resistance to stress corrosion cracking (listed in table II)
 C: having low resistance to stress corrosion cracking (listed in table III)
 N: property not applicable within defined application constraints
 U: property unknown/untested

FLAM

Flammability of non-metallic materials tested per ESA PSS-01-721 tests are rated as follows:
 P: passed the test
 F: failed the test
 U: property unknown/untested

Flammability of non-metallic materials tested per NASA-STD-6001 tests are rated (as showed into NASA/MSFC MAPTIS databases)as follows:
 A: material that has a burn length of 6 in. (15 cm) or less
 B: material that has a burn length of more than 6 in. (15 cm) but less than 12 in. (30 cm)
 C: material that burn totally with small or no burn dripping
 X: material ignites K10 paper with small, moderate or large drip burning
 S: special test conducted on material
 I: less than 3 standard samples with less than 12 in. (30 cm) burn
 U: unacceptable data



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Note: for flammability wire and cable ratings per NASA-STD-6001 tests (as showed into NASA/MSFC MAPTIS databases) see as follows:

A: wire that has no ignition (no visible flame) with current overloads up to or exceeding fusion current of conductor and self-extinguishes in less than 3 in. (7 cm) per test 1

B: wire that has ignition (visible flame) burns less than 10 seconds, damage to all other wire (excluding current carrying wire) is less than 3 in. (7 cm) total per test 4, and self-extinguishes in 6 in. (15 cm) or less when tested in test 1

C: wire that fails criteria for above ratings

X: wire that burns completely in test 1 and/or test 4/or has moderate or large burn dripping

I: wire with insufficient data

S: special test conducted on material

U: unacceptable data

OFFG

Offgassing and toxicity of materials tested per ESA PSS-01-729 tests are rated (as showed into NASA/MSFC MAPTIS databases) as follows:

P: passed the test

F: failed the test

U: property unknown/untested

Offgassing and toxicity of materials tested per NASA-STD-6001 tests are rated (as showed into NASA/MSFC MAPTIS databases) as follows:

K: maximum limit weight \geq 100 pounds (45400 grams)

H: maximum limit weight \geq 50 pounds (22700 grams) < 100 pounds (45400 grams)

A: maximum limit weight \geq 10 pounds (4540 grams) < 50 pounds (22700 grams)

V: maximum limit weight \geq 5 pounds (2270 grams) < 10 pounds (4540 grams)

X: maximum limit weight < 5 pounds (2270 grams)

B: data inconclusive, a special cure is requested

I: material with insufficient data

OUTG

Outgassing or thermal vacuum stability of materials tested per ESA PSS-01-702 tests are rated as follows:

P: passed the test (TML \leq 1.0 %, VCM \leq 0.1 %)

F: failed the test

U: property unknown/untested

Outgassing or thermal vacuum stability of materials tested per JSC SP-R-0022A tests are rated (as showed into NASA/MSFC MAPTIS databases) as follows:

A: passed the test (TML \leq 1.0, VCM \leq 0.1)

B: data inconclusive, material should be tested prior to use

C: material with TML less than 3 and VCM less than 1

X: material with TML more than 3 and/or VCM more than 1


I: material with insufficient data

S: special test conducted on material


U: unacceptable data

Column 10:Justification for approval

The scope of this column is to enter any additional information that may be necessary in order to achieve customer's approval. This information is reference of the Request For Approval, reference of justificatory file for materials approved

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for other space or aeronautical programmes meeting the specific needs of the programme, reference of the evaluation report or waivers, reference NASA/MSFC MAPTIS databases codes, etc..

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Column 11: Approval status of the Prime (Prime App.)

A=Approved. All materials classified A may be used without restriction.

Y=Approved with restriction. These materials require the preparation of QC test specimens or a treatment before use.

W=Approved with a waiver. These materials do not meet the requirements but are used for functional reasons. The use of such materials shall be reduced to a minimum. The waiver number shall be entered in column 10.

P=Pending a decision. Materials for which an evaluation report or a waiver is awaiting the Contractor's provisional or definitive approval.

O=Open. New materials or materials for which investigations and qualification are in progress.

D=Deleted. This classification is used for a material which is no longer used.

Column 12: Customer approval and comments (Customer App.)

This column will be completed by Customer in accordance with the standard comments listed in [RD 1] document annex E.

5. DECLARED MATERIALS LIST

In the following pages (ANNEX A) are listed the materials envisaged during the manufacturing phase.

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12	
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.	
						R	A	T										
Group 01: ALUMINIUM AND ALUMINIUM ALLOYS																		
01/01	Aluminium alloy	AL 7075-T7351 Plate	CNR-IFSI Italy, Specification AMS-QQ-A-250/12 or AMS 4078	Chemical conversion coating on aluminium alloy MIL-C-5541class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Box Walls - Structural Elements	I	V	3 4	W4	B	A					NASA/MSFC MAPTIS: 50669		
01/02	Aluminium alloy	AL 7075-T73510 Rod	CNR-IFSI Italy, Specification AMS-QQ-A-200/11 or ASTM B221	Chemical conversion coating on aluminium alloy MIL-C-5541class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Mechanical parts	I	V	3 4	W1	B	A					NASA/MSFC MAPTIS: 51436		

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12	
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.	
						R	A	T										
01/03	Aluminium alloy	AL 7075-T73 Sheet	CNR-IFSI Italy, Specification AMS-QQ-A-250/12	Chemical conversion coating on aluminium alloy MIL-C-5541 class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Mechanical parts	I	V	3 4	W1	B	A					NASA/MSFC MAPTIS: 50239		
01/04	Aluminium alloy	AL 6061-T651 Plate	CNR-IFSI Italy, Specification AMS-QQ-A-250/11 or ASTM B209	Chemical conversion coating on aluminium alloy MIL-C-5541 class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Mechanical parts	I	V	3 4	W1	B	A					NASA/MSFC MAPTIS: 50646		

Declared Materials List

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Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.	
						R	A	T										
01/05	Aluminium alloy	AL 6061-T6 Extruded rod, bar and shapes	CNR-IFSI Italy, Specification AMS-QQ-A-200/8	Chemical conversion coating on aluminium alloy MIL-C-5541 class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Mechanical parts	I	V	3 4	W1	B	A					NASA/MSFC MAPTIS: 50643		
01/06	Aluminium alloy	AL 3.4364-T7351 Plate	CNR-IFSI Italy, DIN29546, LN9073, DAN26, DAN422, EN10204/3.1B	Chemical conversion coating on aluminium alloy MIL-C-5541 class 3 and/or anodic coating on aluminum alloy MIL-A-8625 class 2 type III	Box Walls - Structural Elements	I	V	3 4	W4	B	A					NASA/MSFC MAPTIS: 50669		
Group 02: COPPER AND COPPER ALLOYS																		

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
02/01	Oxygen-Free Copper alloy	Cu 99,99% min./plate	CNR-IFSI Italy / ASTM B-170, ASTM B-179-93, ASTM-F68-93	Nickel plating QQ-N-290A	Thermal dissipators on PCBs and/or conductor bridge on PCBs	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS: 10354, ESA PSS-01-701: C-5		
02/02	Electrolytic Touch Pitch (ETP) Copper alloy	Cu+Ag 99,90%min. plate	CNR-IFSI Italy / ASTM B5 ASTM B-152	Nickel plating QQ-N-290A	Thermal dissipators on PCBs and/or conductor bridge on PCBs	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS: 50827		
Group 03: NICKEL AND NICKEL ALLOYS																	
03/01	NONE																
Group 04: TITANIUM AND TITANIUM ALLOYS																	
04/01	NONE																
Group 05: STEELS																	
05/01	NONE																
Group 06: STAINLESS STEELS																	

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12
						Environm. code				Size code	C	S	F	O			
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	R	A	T	r						C	a	F
06/01	Stainless steels AISI 316	AISI 316 Plate, Bar	CNR-IFSI Italy / Specification MIL-S-5059	Surface passivation treatment according to QQ-P-35	Bonding Stud	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:10370		
06/02	Stainless steels AISI 304	AISI 304 Plate, Bar	CNR-IFSI Italy / Specification MIL-S-5059, AMS 5639	Surface passivation treatment according to QQ-P-35	Mechanical parts	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:10351		
Group 07: FILLER METALS: WELDING, BRAZING, SOLDERING																	
07/01	NONE																
Group 08: MISCELLANEOUS METALLIC MATERIALS																	
08/01	Magnete core ferrites: B64290-L45-X38, B64290-K632-X35, B64290-K44-X38, B64290-K44-X830	Ni-Fe alloy	SIEMENS / Tech. Bulletin of Manufact.		Inductor and transformer core	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:50864		
08/02	Magnete EFD core ferrite: B66417-160-K187, B66417-G-X187	Ni-Fe alloy	SIEMENS / Tech. Bulletin of Manufact.		Inductor and transformer core	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:50864		

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Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
08/03	Magnete EFD core ferrite: B66421-G-X187	Ni-Fe alloy	SIEMENS / Tech. Bulletin of Manufact.		Transformer core	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:50864		
08/04	Magnet MPP core: 55848-A2	Nikel-iron-molybdenum alloy	SIEMENS, Magnetics division of Spang&Company / Tech. Bulletin of Manufact.		Transformer core	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:10473		
08/05	Magnet MPP core: 55121-A2	Nikel-iron-molybdenum alloy	SIEMENS, Magnetics division of Spang&Company / Tech. Bulletin of Manufact.		Transformer core	I	V	3 4	W1	A	A				NASA/MSFC MAPTIS:10473		
Group 09: OPTICAL MATERIALS																	
09/01	NONE																
Group 10: ADHESIVES, COATING, VARNISHES																	

Declared Materials List

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Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
10/01	Adhesive Eccobond 285/11 Epoxy	See column 2	National Starch&Chemical (div. Emerson &Cuming) N.V. Belgium / Technical Bulletin of Manufacturer	Mixing ratios(by weight):4,5% of cat.11 Cured 8 h-82°C 50% R. H.	Adhes of non-structural parts	I	V	3 4	W1			A	K	A	NASA/MSFC MAPTIS: 05475		
10/02	Conformal coating ARATHANE (Uralane) 5750 A/B (LV) clear	See column 2	CIBA Specialty Chemicals MI-USA, HUNTSMAN CA-USA / Technical Bulletin of Manufacturer / MIL-I-46058C	Mixing ratios(by weight):18 parts of A and 100 parts of B (LV). Cured 7 days 25°C or 9 h 65°C 50% R.H.	Conformal coating of PCBs	I	V	3 4	W3			A	K	A	NASA/MSFC MAPTIS: 20209		

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Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F l a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
Group 15: REINFORCED PLASTICS																	
15/01	NONE																
Group 16: RUBBERS AND ELASTOMERS																	
16/01	Rubber silicon sheet Cho-therm 1671	See column 2	Chomerics MA-USA / Technical Bulletin of Manufacturer		Thermal filler for enhanced conductivity for components on the boards and for the box-satellite I/F	I	V	3 4	A4			A	K	A	NASA/MSFC MAPTIS: 64178		
Group 17: THERMOPLASTICS																	
Group 18: THERMOSET PLASTICS																	
18/01	Thermofit RT876	Polyolefin/Heat-shrinkable insulant sleeve	Raychem Ltd. CA-USA / Technical Bulletin of Manufacturer		To isolate electrical connection in electronic box	I	V	3 4	W1			P	P	P	ESA PSS-01-701sheet n°:T-2, NASA/MSFC MAPTIS: 20021, the length is minor of 10 cm and the spacing is major of 5 cm, the used color is blue		
Group 19: WIRES AND CABLES																	

Declared Materials List

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Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
19/01	SPM TYPE AWG 26 PAIR TWISTED WIRE P/N:390101813B	Polyimide/fluorothermoplast insulated wire, low freq., 600V, based on type SPM, single wire	W.L.Gore Germany / ESA/ESCC/3901/018 ESA-ESCC QPL	Crimping on connector contacts according to ECSS-Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2			A 1)	K 2)	A 3)	1)NASA test n° M103462 2)NASA test n° M103465-A MAPTIS(01353) 3)MAPTIS(62528) ESA/ESCC Qualified Part List		
19/02	SPM TYPE AWG 20 PAIR TWISTED WIRE P/N:390101816B	Polyimide/fluorothermoplast insulated wire, low freq., 600V, based on type SPM, single wire	W.L.Gore Germany / ESA/ESCC/3901/018 ESA-ESCC QPL	Crimping on connector contacts according to ECSS-Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2			A 1)	K 2)	A 3)	1)NASA test n° M103462 2)NASA test n° M103465-A MAPTIS(01353) 3)MAPTIS(62528) ESA/ESCC Qualified Part List		

Declared Materials List

1 Group No / Item No:	2 Commercial identification	3 * Chemical nature and * type of product	4 * Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	5 Summary of processing parameters	6 Use and location	7 Environm. code			8 Size code	9 C O R R S C C F I A M O F F G O U T G					10 Justification for approval	11 Prime App.	12 Custo mer App.
						R	A	T									
19/03	SPM TYPE AWG 12 SINGLE WIRE P/N:390101809B	Polyimide/fluoro thermoplast insulated wire, low freq., 600V, based on type SPM, single wire	W.L.Gore Germany / ESA/ESCC/3901/018 ESA-ESCC QPL	Crimping on connector contacts according to ECSS- Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2			A 1)	K 2)	A 3)	1)NASA test n° M103462 2)NASA test n° M103465-A 3)MAPTIS(01353) ESA/ESCC Qualified Part List		
19/04	Copper wire for winding type (0,2 mm, 0,25 mm, 0,4 mm, 0,5 mm): Tenvex H	Round copper wire (Cu ETP) enamelled with modified polyesterimide resins overcoated with amide- imide resins	INVEX ITALY / MIL-W- 583C type H	Crimping on connector contacts according to ECSS- Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Copper wire for winding of inductors and transformers	I	V	3 4	W2	A	A				NASA/MSFC MAPTIS: 50827		

Declared Materials List

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						R	A	T										
19/05	AWG 26 SINGLE WIRE KT 2607	Silver plated copper wire insulated with FEP	AXON FRANCE / ACCORDING TO MIL- W-16878	Crimping on connector contacts according to ECSS- Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2				A	K	A	NASA/MSFC MAPTIS: 00578		
19/06	100 ohm +/-7 ohm characteristic impedance AWG 22 pair twisted & shielded wire P/N:390200221B	PTFE/PFA insulated wire	W.L.Gore Germany / ESA ESCC 3902/002 ESA-ESCC QPL	Crimping on connector contacts according to ECSS- Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2				A 1)	K 2)	A 3)	1)NASA test n° M103462 2)NASA test n° M103465-A MAPTIS(01353) 3)MAPTIS(62528) ESA/ESCC Qualified Part List		

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F I a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
19/07	77 ohm +/-5 ohm characteristic impedance AWG 24 pair twisted & shielded wire P/N:10612-9	Modified ETEFE insulated wire	Raychem / Technical Bulletin of Manufacturer / according to MIL-C-27500	Crimping on connector contacts according to ECSS-Q-70-26A, Soldering according to ECSS-Q-70-08A, ESA PSS-01-738 Is.1	Electrical connections in electronic box	I	V	3 4	W2			P 1)	P 1)	P 2)	1) MIL-HDBK-17 2)NASA reference publication 1124		
Group 20: MISCELLANEOUS NONMETALLIC MATERIALS																	
20/01	PCBs FR4	See column 2	PRINTCA Denmark, ZINCOCELERE DIVISION CSI Italy / ECSS-Q-70-10A, ECSS-Q-70-11A, MIL-P-18177, ESA Approved, MIL QPL-55110		PCBs of electronic box	I	V	3 4	W3			A	K	A	NASA/MSFC MAPTIS: 05543, ECSS-Q-70-10A, ECSS-Q-70-11A, MIL-PRF-55110, NASA Ref. Pub. 1124 rev.2		

Declared Materials List

1	2	3	4	5	6	7			8	9					10	11	12
Group No / Item No:	Commercial identification	* Chemical nature and * type of product	* Procurement Information * Manufacturer / Supplier * Specification Issue/Rev	Summary of processing parameters	Use and location	Environm. code			Size code	C o r r	S C C	F l a m	O F F G	O U T G	Justification for approval	Prime App.	Custo mer App.
						R	A	T									
20/02	DURAVER PD-CU	Printed wiring board rigid, glass base, woven, polyimide resin, heat resistant (GI)	PRINTCA Denmark, ZINCOCELERE DIVISION CSI Italy / ECSS-Q-70-10A, ECSS-Q-70-11A, base mat.: GIN0016CH/CHB2X (ISOLA) MIL-S-13949/10, ESA Approved,		PCBs of electronic box	I	V	3 4	W3			A	K	A	NASA/MSFC MAPTIS: 61428, ECSS-Q-70-10A, ECSS-Q-70-11A		
20/03	Temp-lace 231H	PTFE impregnated with synthetic rubber finish	Gudebrod Inc. Pennsylvania-USA / MIL-T-43435B type 3 finish C size 4		Lacing tape for fixing components and cables on PCBs and internal box	I	V	3 4	W1			A	A	A	NASA/MSFC MAPTIS: 05900		