



RPW Instrument

LFR Declared Material List

RPW-MEB-LFR-DML-00014-LPP
Iss. 02, Rev. 01

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CLASSIFICATION


PUBLIC



RESTRICTED



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 FRANCE

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Change Record

Issue	Rev.	Date	Authors	Modifications
01	00	22/09/11	V. LERAY	Original Issue for Preliminary Design Review
01	01	04/01/12	V. LERAY	Update following CNES comments.
02	00	17/04/13	V. LERAY	Update for MPCB Review. Informations will be confirmed after supplier contract establishment.
02	01	07/05/14	V. LERAY	Update user codes as requested during MPCB


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1 GENERAL

1.1 Scope of the Document

This document gives the list of the materials used inside LFR instrument.

1.2 Applicable Documents

This document responds to the requirements of the documents listed in the following table:

Mark	Reference/Iss/Rev	Title of the document	Authors	Date
AD1	SOLO-RPWAP-TS-52-CNES / 01 / 02	RPW Product Assurance Specification	CNES	18/06/2012
AD2				
AD3				
AD4				
AD5				

1.3 Reference Documents

This document is based on the documents listed in the following table:

Mark	Reference/Iss/Rev	Title of the document	Authors	Date
RD1				
RD2				
RD3				
RD4				
RD5				

2 MATERIAL GROUPS

Materials are classified into 20 groups depending on their type or their main use. See Table 1. Primers are classified in the group of their associated component.

Group number	Description
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 (including PCBs)
16	Rubbers and elastomers
17	Thermoplastics (e.g. non-adhesive tapes and foils [MLI])
18	Thermoset plastics (including PCBs)
19	Material aspects of wires and cables
20	Miscellaneous non-metallic materials, e.g. ceramics

Table 1: materials group numbers

The material list is provided inside a complete readable excel form, and inside a compatible form for ESA DMPL tool.

3 CONTENT OF THE DECLARED MATERIAL LIST

Described content here is the readable form. All the fields are provided inside the specific template for ESA DMPL tool.

The numbers below refer to the column numbers in the DML.

1 Item number

It consists of the materials group identifier and the user code. It takes the form of:

<Group number>.<Running number>.<InstrumentAcronym>

Characteristics of the item number are as follows:

- One item number only is defined per material type.
- If a material is suppressed from one document version to an over, the item number cannot be re-used.

2 Commercial identification or standardized designation



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The correct and standard identification or designation of the material is entered, such as trade name plus number.

If no trade name exists, then the manufacturer's name plus number is entered.

For metal alloys, the Aluminium Association (AA) system is used for aluminium alloys and the American Iron and Steel Institute (AISI) system for steel. For other metals or alloys, the main constituent is entered first, except in the case of a traditional name (e.g. brass or bronze). For each material, as designated above, a unique item number is given. If several lines are used for different applications or processing, sub-item numbers are added.

3 Chemical nature and product type

For metallic materials, the as-procured condition is added if applicable. When a semi-finished product is procured, the relevant state is given.

The thickness of the material is given if applicable.

4 Procurement information

The manufacturer name is given and, if different, the distributor one.

The reference of the procurement specification is given with issue, revision and date, if applicable. It is replaced by a national or international specification or standard, if it exists and identifies the source of procurement, if relevant.

5 Processing parameters

• 5.1 : Classical parameters

A summary of the process parameters (conventional) applied by the user of the process is listed, with reference to specification number.

• 5.2 : Link with Processes list

The associated process item number list is given here.

6 Use and location

The entered codes define the location of the material with respect to:


- The subsystem
- The particular piece of equipment
- The use of the equipment

Any restriction that applies to the use of a particular material is included in the corresponding comment column.

7 Environmental code

The environmental code is defined using Table 2.

	Code	Description	Comment
Besides Radiation	G	Geostationary	"S" or "L" is added to the first selected letter for materials on the surface of the spacecraft
	L	Low orbit	
	B	Radiation belt	
	I	Interplanetary	
	P	Planetary	
	S	Outside shadow	
	L	Outside light	
Ambience (A)	V	Vacuum	N.A.

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Temperature (T)	H	Hermetic	- Two values x/y indicate a thermal cycling - “RT” is used as a code between 283 K and 313 K - Two sets of codes describe materials that are at a boundary between environments
	M	Manned	
	E	Elevated pressure	
	1	0 to 100 K	
	2	101 to 200 K	
	3	201 to 300 K	
	
	2	1 to 10 cm	
	3	10 to 100 cm	
	
	

Table 2: environmental codes

8 Size code

The size code is indicated by an alphanumeric combination.

Code	Value
0	$0 < A \text{ or } V \text{ or } M \leq 1$
1	$1 < A \text{ or } V \text{ or } M \leq 10$
2	$10 < A \text{ or } V \text{ or } M \leq 100$
3	$100 < A \text{ or } V \text{ or } M \leq 1\ 000$
4	...

Table 3: size codes

Where:

- A is the area, in cm²
- V is the volume, in cm³
- M is the mass, in g

9 Validation references, justification for approval, prime comments and approval status

Reference is made to relevant test data that demonstrates the acceptability of the material under the environmental conditions and the application relevant to the LFR board.

► Sub column 9.1

Reference is made to relevant test data that demonstrates the acceptability of the material under the environmental conditions and the application relevant to the LFR board.

Corrosion (Corr)	
Code	Description
A	The material does not require a surface treatment or coating for its intended application – otherwise it shall be rated B
B	Details of the surface treatment to be given in Column 5.
X	Fails the requirement
U	Unknown
NA	Not applicable

Stress Corrosion Cracking (SCC)



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Code	Description
A	The material is known to have high resistance to SCC. Table I document ESA ECSS-Q-70-36 or listed in table 1 of NASA MSFC-STD-3029 (having high resistance to stress corrosion).
B	Table II and III document ECSS-Q-70-36. justification for approval (test reference) stated in Subcolumn 9.2 (generally making reference to ESA ECSS-Q-70-36)
U	Unknown characteristics
NA	Not applicable

Atomic Oxygen (ATOX)	
Code	Description
P	The material passed the ATOX test
F	The material failed the ATOX test
U	Materials of which ATOX characteristics are unknown
NA	Not applicable

Outgassing (OUT)	
Code	Description
P	The material passed the outgassing test detailed in ECSS-Q-70-02. RML and CVCM are given.
F	The material failed the outgassing test detailed in ECSS-Q-70-02.
U	Materials of which outgassing characteristics are unknown
NA	Not applicable


► Sub column 9.2 & 9.4

The justification for approval and prime approval status is used for any additional information to obtain customer approval.

Standard abbreviations are used to summarize the acceptability of a material for a specific property.

The prime approval status code is selected from Table 4. If approval cannot be given and one of the other codes is entered, comments are entered in column 9.2.

Code	Description
A	Approved Materials that may be used without restriction.
X	Approved with an RFA Materials that are subjected to an evaluation or validation programme. The RFA number is entered as a comment.
W	Approved with a concession Materials that do not meet the requirements but are used for functional reasons. The use of such materials has to be approved by the customer. The concession number is

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	entered as a comment.
P	Pending a decision Materials for which an evaluation report or a concession is waiting for the contractor's provisional or definitive approval.
O	Open New materials or materials for which investigations and validations are in progress.
R	Rejected
D	Deleted Materials that are no longer used.

Table 4: approval status codes

10 Customer approval status and comments

This code is selected from Table 4.

Additional comments are included where appropriate.

4 DECLARED MATERIAL LIST

See Excel file RPW-MEB-LFR-DML-00014-LPP



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6 DISTRIBUTION LIST

INTERNAL

LPP	X	T.CHUST
	X	A. JEANDET
	X	P.LEROY
	X	M.MORLOT
	X	Y. SIMON

LPP	X	V. LERAY

EXTERNAL

CNES		C. LAFFAYE
		S. MELLE
		D. FAYE
		C. BRYSSBAERT
		J. GAYRARD
		M-O. MARCHE
		R.PEREZ
		J. SICRE
		R. CATALA

CNES		E. VERLET
		G. CODOU
		J. CARRON
		G. ROLLAND
		H. COMBES
		G. NAVARRO

LESIA CNRS		M. MAKSIMOVIC
		M. DEKKALI
		G. BARBARY
		P-L. ASTIER
		F. CHAPRON
		Y. DE CONCHY
		L. GUEGUEN
		P. PLASSON
		I. LAGLIL

LESIA CNRS		L-R. MALAC-ALLAIN
		D. TIPHENE
		D. ZEGANADIN
		C. GUERIAU
		V. KRUPAR
		V. LERAY
		K. BOUGHEDADA
		L. MOUYSSET

AsI/ASCR		P. HELINGER
		J. BRINEK
		L KOZACEK
		P. VANA

IAP		J. CHUM
		P. HELLINGER
		I. KOLMASOVA
		J. SOUCEK

IRF		L.AHLEN
		C.CULLY
		S.E JANSSON
		A.VAIVADS

IWF		H. OTTACHER
		H. RUCKER
		M. STELLER
		G. LAKY

LPC2E		G. JANNET
		V. KRASNOSSELSKIKH
		M. KRETZSCHMAR
