



CARLO GAVAZZI SPACE SpA

HERSCHEL DPU_s/ICU

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	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>
DRAFT			



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1. SCOPE

The scope of this document is to define all processes to be used in the SPIRE DPU Unit for HERSCHEL DPU_s/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 DPU _s /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 that all listed processes are in accordance with the applicable documents.

4. METHODOLOGY FOR THE COMPILATION OF THE DPL

The processes list consist of 11 columns which shall be completed as indicated below in according to [RD 1] document. Furthermore, the processes shall be classified as specified in table:

GROUP	PROCESSES
1	Adhesive bonding
2	Composite manufacture
3	Encapsulation/moulding
4	Painting/coating
5	Cleaning
6	Welding
7	Crimping/stripping/wire wrapping
8	Soldering/brazing
9	Surface conversion treatments
10	Plating
11	Machining
12	Forming
13	Heat treatment
14	Special fabrication: processes developed specifically for the programme
15	Marking
16	Miscellaneous processes
17	Inspection procedures

Column 1:Item number

Sequential item number in each group. One only per process type.

Column 2:Process identification

Process name, title, standard identification.

Column 3:Specification Issue/Rev

Specification number with issue/revision status relevant the process.

Column 4:Process description

Brief description of the process.

Column 5:Use and location

Define location and use of process in the spacecraft/equipment.


Column 6:Manufacturer's name

This identifies the abbreviated name of the manufacturer and name of the supplier if different (the one who applies the process).


Column 7:Associated items in materials list

Corresponding materials list or mechanical parts list item number.

Column 8:Criticality of the process

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Indicate here whether process is critical or noncritical. In the case of a critical process, add reason for criticality (see the definition in [RD 1] document annex A)

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Column 9:Justification for validation approval

The purpose of this column is to enter any additional information that may be necessary in order to achieve customer's approval. This information comprises reference and issue of the RFA/Approval, processes justification file, evaluation reports and waivers.

Column 10:Contractor's approval (Prime val.)

The Prime contractor shall complete this subcolumn and by doing so confirms that:

- the line indications are correct and complete
- the process has passed all applicability tests (including quality control testing)

A=Approved. The validation is approved by the Contractor.

W=Approved with a waiver. The use of such processes shall be reduced to a minimum. The waiver number shall be entered in column 9.

P=Pending a decision . Processes for which a validation report or a waiver is awaiting the Contractor's decision.

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

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

Column 11:Customer approval (Customer val.)

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

5. DECLARED PROCESSES LIST

In the following pages are listed the processes envisaged during the manufacturing phase.



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5.1 GROUP N° 1 – ADHESIVE BONDING

1	2	3	4	5	6	7	8	9	10	11
ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
01	Adhesion of non-structural parts	PA072 Is.1	Adhesion of non-structural parts with epoxide adhesive Eccobond 285 cat.11. Mixing ratios (by weight): 4,5% of cat.11, cured 8h-82°C 50%R.H.	Adhesion of non-structural parts	CGS	DML:10/01	Not Critical	NASA/MSFC MAPTIS: 05475		
02	Adhesion of identification label and non-structural parts	3M Technical bulletin of manufacturer	Adhesion of identification label and non-structural parts with Scotch-weld EC-2216B/A. Mixing ratios (by weight): 7pbw A: 5pbw B. cured 2h-70°C 50%R.H.	Adhesion of identification label and non-structural parts	CGS	DML:10/03	Not Critical	ESA PSS-01-701: S-7, NASA/MSFC MAPTIS: 05066		



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5.2 GROUP N° 2 – COMPOSITE MANUFACTURE

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ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
	NONE									



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5.3 GROUP N° 3 – ENCAPSULATION/MOULDING

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ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
	NONE									



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5.4 GROUP N° 4 – PAINTING/COATING

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ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
01	Conformal coating	CIBA, HUNTSMAN Technical Data Sheets	Conformal coating on assembled PCBs with ARATHANE (Uralane) 5750 A/B (LV) clear. Mixing rations(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	CGS	DML:10/02	Not Critical	NASA/MSFC MAPTIS: 20209		



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5.5 GROUP N° 5 – CLEANING

1	2	3	4	5	6	7	8	9	10	11
ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
01	Cleaning	PA071 Is.1	Cleaning of PCBs	PCBs of the electronic box	CGS	DML:20/01 and 20/02	Not Critical	PA071 is.1		



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5.6 GROUP N° 6 – WELDING

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ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
	NONE									



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5.7 GROUP N° 7 – CRIMPING/STRIPPING/WIRE WRAPPING

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ITEM N°	PROCESS IDENTIFICATION	SPECIFICATION ISSUE/REV.	PROCESS DESCRIPTION	USE AND LOCATION	MANUFACTURER NAME	ASSOCIATED ITEMS IN MATERIAL LIST	CRITICALITY OF THE PROCESS	JUSTIFICATION FOR VALIDATION APPROVAL	PRIME VAL.	CUSTOMER VAL.
01	Crimping	ECSS-Q-70-26A	Crimping of high reliability electrical connections	Wires crimping on connector contacts	CNR-IFSI, CGS	DML:19/01 to 19/03, 19/05	Critical for reliability	PA082 Is.1, ECSS-Q-70-26A		



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5.8 GROUP N° 8 – SOLDERING/BRAZING

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01	Soldering	GD-PL-CGS-016, ECSS-Q-70-08A	Soldering of high reliability electrical connections	Electrical components on PCBs of the electronic box	CNR-IFSI, CGS	DML: 19/01 to 19/05, 20/01 and 20/02	Critical for reliability	GD-PL-CGS-016, ECSS-Q-70-08A		
02	SMT Soldering	GD-PL-CGS-016, ESA PSS-01-738 is.1	High-reliability soldering for surface-mount and mixed-technology printed-circuit boards	Electrical components on PCBs of the electronic box	CGS	DML:20/01 and 20/02	Critical for reliability	GD-PL-CGS-016, ESA PSS-01-738 is.1 SMT ESA approval ref.: QM/02-440/BD Tables 1 and 2		



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5.9 GROUP N° 9 – SURFACE CONVERSION TREATMENTS

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01	Chemical conversion coating on aluminum alloy with Alodine 1200	MIL-C-5541C class 3	Surface treatment of aluminum alloy to prevent corrosion	Mechanical parts	CNR-IFSI	DML:01/01 to 01/06	Critical	MIL-C-5541C class 3		
02	Anodic coating on aluminum alloy	MIL-A-8625 class 2 type III	Surface treatment of aluminum alloy to prevent corrosion	Mechanical parts	CNR-IFSI	DML:01/01 to 01/06	Critical	MIL-A-8625 class 2 type III		
03	Passivation treatment for corrosion-resistant steel	QQ-P-35C	Surface Passivation treatment for corrosion-resistant steel	Mechanical parts	CNR-IFSI	DML:06/01 and 06/02	Critical	QQ-P-35C		



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5.10 GROUP N° 10 – PLATING

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01	Nickel plating (electro deposited)	QQ-N-290 A	Surface plating of copper alloy to prevent corrosion	Thermal dissipators on PCBs and/or conductor bridge on PCBs	CNR-IFSI	DML:02/01 and 02/02	Not critical	QQ-N-290 A		



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5.11 GROUP N° 11 – MACHINING

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01	Mechanical parts machining		Construction of mechanical parts	All mechanical parts	CNR-IFSI	DML:01/01 to 01/06, 02/01 and 02/02, 06/01 and 06/02	Not critical			
02	PCBs manufacturing	ECSS-Q-70-10A, ECSS-Q-70-11A	Manufacturing of double side and multilayer PCBs	PCBs of electronic box	PRINTCA Denmark, ZINCOCELERE DIVISION CSI Italy	DML:20/01 and 20/02	Not critical	ECSS-Q-70-10A, ECSS-Q-70-11A		



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5.12 GROUP N° 12 – FORMING

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	NONE									



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5.13 GROUP N° 13 – HEAT TREATMENT

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	NONE									



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5.14 GROUP N° 14 – SPECIAL FABRICATION

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	NONE									



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5.15 GROUP N° 15 – MARKING

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5.16 GROUP N° 16 – MISCELLANEOUS PROCESSES

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01	Repair and modification of PCB and solder joints	PA063 Is.1, ECSS-Q-70-28A	See column 2	PCBs of Electronic box	CGS	DML:20/01 and 20/02	Critical for reliability	PA063 Is.1, ECSS-Q-70-28A		
02	Flight electronic equipment production and inspection control plan	GD-PL-CGS-016 Is.1	Flight electronic equipment production and inspection control plan	Equipment production and inspection control plan	CGS	All items	Not critical	GD-PL-CGS-016 Is.1		
03	Cabling	ECSS-Q-70-26A, Technical cabling doc.	Electrical Isolation of connection by mean shrinkable tubes THERMOFIT RT876	Cabling inside of the box	CNR-IFSI	DML:19/01 to 19/03	Not critical	ECSS-Q-70-26A		



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5.17 GROUP N° 17 – INSPECTION PROCEDURES

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01	Incoming inspection procedure	GD-PR-CGS-070 Is.1	Incoming inspection of HI-REL parts	Electronic box	CGS	All items	Not Critical	GD-PR-CGS-070 Is.1		
02	MIP and KIP inspection plan	GD-PL-CGS-003 Is.1	MIP and KIP inspection	Electronic box	CGS	All items	Not Critical	GD-PL-CGS-003 Is.1		
03	Inspection on assembled PCBs	PA005 Is.1	See column 2	PCBs of Electronic box	CGS	DML:20/01 and 20/02	Not Critical	PA005 Is.1		
04	Ultrasonic inspection on mechanical parts	MIL-STD-2154	See column 2	Semimanufactured mechanical materials	CNR-IFSI	DML:01/01 to 01/06	Not Critical	MIL-STD-2154		
05	NDI inspection on mechanical parts	ASTM-E-1417	See column 2	Mechanical critical parts	CNR-IFSI	DML:01/01 to 01/06	Not Critical	ASTM-E-1417		