



SPIRE & PACS
Sorption Coolers
Declared Processes List

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(D.P.L.)

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Prepared	P. Dupont – PA Manager	April 25th, 2001	
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QA Check	P. Dupont – PAManager	April 25th, 2001	
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List of Acronyms

AD / RD	Applicable / Reference Document		
ADP (EIDP)	Acceptance (End Item) Data Package		
AIT / (M)AIV	(Manufacturing,) Assembly, Integration & Test / Verification		
CADM	Configuration and Data Management		
CDR (DDR)	Critical (Detailed) Design Review	Revue de conception détaillée	RCD
CEA	Commissariat à l' Energie Atomique		
CIDL / ABCL	(As Built) Configuration Items Data List		
CN	Change Notice	Demande de Modification	DM
CQM	Cryogenic Qualification Model		
DML / DPL	Declared Material / Process List		
DRB	Delivery Review Board	Revue de Qualification	RQ
EM / (P)FM / FS	Engineering / (Proto)Flight / Spare Model		
ETF	Environmental Test Facility		
EV	Evaporator		
FIRST	Far Infrared and Submillimetre Telescope		
FMECA	Failure Mode Effects and Criticity Analysis		AMDEC
(M)GSE	(Mechanical) Ground Support Equipment		
H/W	Hardware		
HIFI	Heterodyne Instrument for First		
HSE	Heat Switch (on evaporator)		
HSP	Heat Switch (on sorption pump)		
ICD	Interface Control Document	Dossier de Contrôle des Interfaces	DCI
KIP / MIP	Key / Mandatory Inspection Point		
MRB	Material Review Board		
N/A	Not Applicable		
NCR	Non Conformance Report	Fiche d'Anomalie	FA
PACS	Photoconductor. Array Camera and Spectrometer		
PDR	Preliminary Design Review	Revue de Définition Préliminaire	RDP
PTR	Post Test Review	Comité de Revue et d'essai	CRE
PFM	ProtoFlight Model		
QA / PA	Quality / Product Assurance	Assurance Qualité / Produit	AQ / AP



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RFA	Request For Approval		
SAP	Service d'Astrophysique		
SBT	Service des Basses Températures		
SCO	Sorption Cooler (full unit)		
S/C	SpaceCraft		
SP	Sorption pump		
SPIRE	Spectral & Photometric Imaging Receiver		
TRR	Test Readiness Review	Bilan Technique	BT



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1. SCOPE OF THE DOCUMENT

This document lists all the processes to be used all along the SBT Sorption Coolers Project.



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2. DOCUMENTS

2.1 Applicable documents

All Applicable Documents are listed in the AD chapter of the CIDL (HSO-SBT-LI-010).

2.2 Reference documents

	<i>Title</i>	<i>Reference</i>	<i>Iss</i>	<i>Rev</i>	<i>Date</i>
RD01	Materials, Mechanical Parts & Processes	ECSS-Q-70A			19/04/96
RD02	Guide pour les Projets Scientifiques				



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3. DECLARED PROCESSES LIST

The SCO Declared Processes List, which consists of multiple arrays of 10 columns that shall be completed as indicated in doc. Ref. [RD01] & [RD02], is presented herebelow.

Processes should be grouped as explained in the table below:

<i>Group Type</i>	<i>Used</i>
1. Adhesive Bonding	✓
2. Composite Manufacturing	N/A
3. Encapsulation / Molding	N/A
4. Painting / Coating	N/A
5. Cleaning	✓
6. Welding / Brazing	✓
7. Crimping / Stripping / Wire Wrapping	✓
8. Soldering	✓
9. Surface Treatment	N/A
10. Plating	✓
11. Machining	✓
12. Forming	N/A
13. Heat Treatment	✓
14. Special Fabrication	N/A
15. Marking	✓
16. Miscellaneous Processes	✓
17. Inspection Procedure	✓



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Group 1 – Adhesive Bounding										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use		1- Mech.Part 2- Material		Justif. for Approval	Status	
1-1	Use of STYCAST 2850/FT9	1- SBT 2- HSO-SBT-PR-xxx	Gluing of charcoal onto/into Pump housing	1- Pump 2- see 4	N/A	1- N/A 2- 10-1	Not Critical	Common practice @ SBT		
			Gluing of Thermal Parts	1- SCO 2- see 4	N/A		Critical	Common practice @ SBT Performance Test		
			Gluing of covers onto filling tubes after crimping	1- SCO 2- see 4	N/A		Not Critical	Common practice @ SBT		
			Gluing of Grid & Grid Cover	1- Pump 2- see 4	N/A		Not Critical	Common practice @ SBT		
1-2	Use of Loctite 270	1- SBT 2- HSO-SBT-PR-xxx			N/A					



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Group 5 – Cleaning										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				1- Mech.Part 2- Material	Justif. for Approval	
5-1	Cleaning of individual items	1- SBT 2- HSO-SBT-PR-xxx	Cleaning of individual items before assembly/integration	1- all single items 2- see 4	N/A	1- N/A 2- 1-1, 2-1, 2-2, 4-1, 4-2, 4-3, 6-1	Not Critical			
5-2	Cleaning of SCO	1- SBT 2- HSO-SBT-PR-xxx	Cleaning of Complete Cooler to remove particular & molecular contaminants	1- SCO 2- see 4	N/A		Critical	Cleanliness & Contamination monitoring (TBD)		



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Group 6 – Welding / Brazing										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
				1- Equipment 2- Use				1- Mech.Part 2- Material	Justif. for Approval	
6-1	TIG Welding	1- SNLS 2- Specification	Assembly of Evaporator _ sphere (S8)	1- Evaporator 2- see 4	SNLS		Critical	LeakTightness Test		
			Assembly of Pump _ sphere (S6)	1- Pump 2- see 4	SNLS		Critical	LeakTightness Test		
			Assembly of Evaporator _ sphere (S7)	1- Evaporator 2- see 4	SNLS		Critical	LeakTightness Test		
			Welding of Braided Copper onto Copper Ends	1- Braided Copper & Copper Ends 2- see 4	SNLS		Not Critical			
6-2	Silver Soldering	1- SNLS 2- Specification	Mounting of Thermal Shunt & Crimped Tube (B3, B4 & B5)	1- Pumping Line 2- see 4	SNLS		Critical	LeakTightness Test		
			Assembly of Evaporator _ sphere (B2)	1- Evaporator 2- see 4	SNLS		Critical	LeakTightness Test		
			Assembly of Pump _ sphere (B1)	1- Pump 2- see 4	SNLS		Critical	LeakTightness Test		



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Group 6 – Welding / Brazing										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use		1- Mech.Part 2- Material		Justif. for Approval	Status	
6-3	EB Welding	1- TECHMETA 2- Specification	Pump & Evaporator Pre-assembly (S1, S2 & S3)	1- Pumping Line 2- see 4	TECHMETA		Critical	LeakTightness Test		
			Closing of Cooler (S4, S5)	1- Cooler Heart 2- see 4	TECHMETA		Critical	LeakTightness Test & Pressure Test @ 200 bars		



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Group 7 – Crimping / Stripping / Wire Wrapping										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use		1- Mech.Part 2- Material		Justif. for Approval	Status	
7-1	Stripping of Manganin Wires	1- SBT 2- HSO-SBT-PR-xxx	Removal of protective varnish before soldering	1- Manganin Wires 2- see 4	N/A	1- N/A 2- 19-1	Critical			
7-2	Crimping of filling Tubes	1- SBT 2- HSO-SBT-PR-xxx	Crimping of filling Tubes after filling of Cooler with 3He	1- Cooler 2- see 4	N/A		Critical	Common practice @ SBT Leaktightness Test		
			Crimping of filling Tubes after filling of Heat Switch with 3He	1- Heat Switch 2- see 4	N/A		Critical	Common practice @ SBT Leaktightness Test		



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Group 8 – Soldering										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
8-1	Soldering of Heaters, Thermometers & Connectors	1- SBT 2- HSO-SBT-PR-xxx	Soldering of Heaters, Thermometers & Connectors	1- Manganin Wires, Heaters, Thermometers & Connectors 2- see 4	N/A	1- Mech.Part 2- Material	Critical	Performance Test		



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Group 10 - Plating										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
10-1	Gold Plating of Copper Parts	1- SBT 2- HSO-SBT-PR-xxx	Gold Plating of Copper Parts to avoid corrosion	1- Copper Parts 2- see 4	N/A	1- Mech.Part 2- Material	Critical			



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Group 11 - Machining										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
11-1	Machining of Mechanical Parts	1- OMG 2- Specification	Machining of Mechanical Parts (wire machining, classical machining)	1- see Drawing List 2- see 4	N/A	1- Mech.Part 2- Material	Critical	Dimensional Check & Certificate of Conformity		
11-2	Final Machining of Structure after welding	1- OMG 2- Specification	Removal of excess material in order to reach dimensional specification	1- Structure 2- see 4			Critical	Dimensional Check & Certificate of Conformity		



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Group 13 – Heat Treatment										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use		1- Mech.Part 2- Material		Justif. for Approval	Status	
13-1	Baking of SCO under vacuum	1- SBT 2- HSO-SBT-PR-xxx	Removal of polluting particles, greases, water	1- SCO 2- see 4	N/A	1- Mech.Part 2- Material	Critical	Cleanliness & Contamination monitoring (TBD)		
	Baking of Vegetal Charcoal	1- SBT 2- HSO-SBT-PR-xxx	Removal of water	1- Vegetal Charcoal 2- see 4	N/A		Not Critical			
	Baking of PROCELIT	1- SBT 2- HSO-SBT-PR-xxx	Removal of water	1- PROCELIT 2- see 4	N/A		Not Critical			



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Group 15 - Marking										
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Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
15-1	Marking of Individual Items	1- TBD 2- Specification	Marking of Individual Items	1- all items 2- see 4	N/A	1- Mech.Part 2- Material	Not critical			



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Group 16 – Miscellaneous Processes										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
16-1	Verification of tension into Kevlar cords	1- SBT 2- HSO-SBT-PR-xxx	To verify tension into Kevlar cords	1- Kevlar cords 2- see 4	N/A	1- Mech.Part 2- Material	Critical			



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Group 17 – Inspection Procedure										
1	2	3	4	5	6	7	8	9		10
Item #	Process Id.	Specification	Process Description	Location & Use	Subcontractor Name	Associated Item	Criticality of Process	Approval Status		Comment
		1- Manufacturer 2- Specification		1- Equipment 2- Use				Justif. for Approval	Status	
17-1	Welding Inspection	1- SBT 2- HSO-SBT-PR-xxx	Inspection of Pump & Evaporator after EB Welding	1- Pump & Evaporator 2- see 4	N/A	1- Mech.Part 2- Material	Critical	LeakTightness Test		