



SPIRE & PACS
Sorption Coolers
Declared Processes List

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SERVICE DES BASSES TEMPERATURES (CEA/DSM/DRFMC/SBT)

SPIRE & PACS Sorption Coolers
DECLARED PROCESSES LIST
(D.P.L.)

SBT internal ref : SBT/CT/2001-20

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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 Bonding										
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- 033	1- Pump 2- Gluing of charcoal onto/into Pump housing	N/A	1- N/A 2- 10-1	Not Critical	Common practice @ SBT		
				1- SCO 2- Gluing of Thermal Parts	N/A		Not Critical	Common practice @ SBT Performance Test		
				1- SCO 2- Gluing of covers onto filling tubes after crimping	N/A		Not Critical	Common practice @ SBT		
				1- Pump 2- Gluing of Grid & Grid Cover	N/A		Not Critical	Common practice @ SBT		



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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				Justif. for Approval	Status	
5-1	Cleaning of individual items	1- SBT 2-	HSO-SBT-PR-026	1- all single items 2- Cleaning of individual items before assembly/integration	N/A	1- N/A 2- 1-1,1-2, 2-1, 2-2, 4-1, 4-2, 6-1,6-2	Not Critical			



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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	
6-1	TIG Welding	1- SNLS 2- subcontractor specification		1- Evaporator 2- Assembly of Evaporator _ sphere (S8)	SNLS		Not Critical	LeakTightness Test		
				1- Pump 2- Assembly of Pump _ sphere (S6)	SNLS		Not Critical	LeakTightness Test		
				1- Evaporator 2- Assembly of Evaporator _ sphere (S7)	SNLS		Not Critical	LeakTightness Test		
				1- Braided Copper & Copper Ends 2- Welding of Braided Copper onto Copper Ends	SNLS		Not Critical			
6-2	Silver Soldering	1- SNLS 2- subcontractor specification	BRASV_01_11	1- Pumping Line 2- Mounting of Thermal Shunt & Crimped Tube (B3, B4 & B5)	SNLS		Not 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	
				1- Evaporator 2- Assembly of Evaporator _ sphere (B2)	SNLS		Not Critical	LeakTightness Test		
				1- Pump 2- Assembly of Pump _ sphere (B1)	SNLS		Not Critical	LeakTightness Test		
6-3	EB Welding	1- TECHMETA 2-	FA 09001	1- Pumping Line 2- Pump & Evaporator Pre-assembly (S1, S2 & S3)	TECHMETA		Not Critical	LeakTightness Test		
				1- Cooler Heart 2- Closing of Cooler (S4, S5)	TECHMETA		Not 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-034	1- Manganin Wires 2- Removal of protective varnish before soldering	N/A	1- N/A 2- 19-1	Not Critical			
7-2	Crimping of filling Tubes	1- SBT 2-	HSO-SBT-PR-030	1- Cooler 2- Crimping of filling Tubes after filling of Cooler with 3He	N/A		Not Critical	Common practice @ SBT Leaktightness Test		
				1- Heat Switch 2- Crimping of filling Tubes after filling of Heat Switch with 3He	N/A		Not 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		1- Mech.Part 2- Material		Justif. for Approval	Status	
8-1	Soldering of Heaters, Thermometers & Connectors wires	1- SBT 2-	HSO-SBT-PR-034	1- Manganin Wires, Heaters, Thermometers & Connectors 2- Soldering of Heaters, Thermometers & Connectors wires	N/A	1- Mech.Part 2- Material	Not 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- TERMOCOMPACT 2- subcontractor specification		1- Copper Parts 2- Gold Plating of Copper Parts to avoid corrosion	N/A	1- Mech.Part 2- Material	Not 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- subcontractor specification		1- see Drawing List 2- Machining of Mechanical Parts (wire machining, classical machining)	N/A	1- Mech.Part 2- Material	Not Critical	Dimensional Check & Certificate of Conformity		
11-2	Final Machining of Structure after welding	1- OMG 2- subcontractor specification		1- Structure 2- Removal of excess material in order to reach dimensional specification			Not 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				Justif. for Approval	Status	
13-1	Baking of SCO under vacuum	1- SBT 2-	HSO-SBT-PR-035	1- SCO 2- Removal of polluting particles, greases, water	N/A	1- Mech.Part 2- Material	Not Critical	Cleanliness & Contamination monitoring (TBD)		
	Baking of Vegetal Charcoal			1- Vegetal Charcoal 2- Removal of water	N/A		Not Critical			
	Baking of PROCELIT			1- PROCELIT 2- Removal of water	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- IDLas 2	HSO-SBT-SP-039	1- all removable items 2- Marking of Individual Items	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		1- Mech.Part 2- Material		Justif. for Approval	Status	
16-1	Assembly of Kevlar suspension system	1- SBT 2-	HSO-SBT-PR-028	2- Suspension of cooler heart into structure			Critical			
16-2	Filling of Cooler & HS with 3He	1- SBT 2-	HSO-SBT-PR-029 & 036	Filling of Cooler & HS with 3He			Not 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-025	Inspection of Pump & Evaporator after EB Welding	1- Pump & Evaporator 2- see 4	N/A	1- Mech.Part 2- Material	Not Critical	LeakTightness Test		
17-2	Verification of tension into Kevlar cords	1- SBT 2	HSO-SBT-PR-028	1- Kevlar cords 2- To verify tension into Kevlar cords	N/A	1- Mech.Part 2- Material	Critical			