SUBJECT:	COMBINED DECLARED MECHANICAL PARTS LIST	
PREPARED BY:	**E A Clark**	
DOCUMENT No:	**SPIRE-RAL-PRJ-001094**	
APPROVED BY:	**Name**	**Signature & Date**
Project Manager	**K.J. King**	Digitally signed by Ken King Date: 2006.01.12 09:43:32 Z
Instrument Development Manager	**E. Sawyer**	Signature Not Verified Digitally signed by Eric Sawyer Date: 2006.01.09 16:50:17 Z
Product Assurance Manager	**Eric Clark**	Digitally signed by Eric Clark Date: 2006.01.09 16:17:54 Z

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CHANGE RECORD

ISSUE	DATE	CHANGE
1	30 Jan 2002	First Issue
2	15th May 2003	Updated for IHDR 07/03
3	06 November 04	Updated for the IQR & CQM EIDP
3.1	07 December 04	Error found Replace SAP DML with SAP DMPL
3.2	12th December 05	Updated at ESA request

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DOCUMENT LIST

Note 1

Where a Sub-Systems / Institutes has combined some or all of their Declared lists and / or EEE parts etc into one document, that documents details are recorded below. Only the applicable pages are included in this document.

Note 2

The IFSI combined List DPU: "DCL + DML+ DPL" updated to SPIRE-IFS-DOC-001031 Iss 2: has been sent to ESA for approval, however CGS have subsequently issued these as individual documents, and it is this Declared List that replace the IFSI one in this document

Sub-System	Document	
Institute	**Title**	**Number**
ATC	DECLARED MECHANICAL PARTS LIST BSM	SPIRE-ATC-PRJ-000709 Iss 1.3
CEA/SAp	DECLARED MECHANICAL PARTS LIST DRCU. SPIRE- SAp-NC-0100-03 Iss 1.0	SPIRE-SAP-DOC-001610 Iss 1.0
CEA/SAp	DECLARED MECHANICAL PARTS LIST DCU.	**Not available Yet**
CEA/SAp	DECLARED MECHANICAL PARTS LIST FCU.	**Not available Yet**
CEA/SBT	DECLARED MECHANICAL PARTS LIST	**Not Applicable**
CGS (IFSI)	DECLARED MECHANICAL PARTS DMPL	SPIRE-CGS-DOC-002199 Iss Draft
CSA/USK	**Not Applicable**	**Not Applicable**
JPL	COMBINED DECLARED LIST's JFET's & BDA's (MATERIALS) DML, DMPL, DPL: JPL D-25725 REV_B	SPIRE-JPL-DOC-002201 Iss 2
LAM (LAS)	DECLARED MECHANICAL PARTS LIST	**Not Applicable**
MSSL	DECLARED MECHANICAL PARTS LIST	**Not Applicable**
UCF	DECLARED MECHANICAL PARTS LIST	SPIRE-UCF-PRJ-002152 Iss 1.0

Document numbers (No's not allocated) in bold text have not been supplied at the time of issuing this combined List

INTRODUCTION

Mechanical Parts used by RAL Space Science Technical Department (SSTD) and co-producers / sub-system suppliers are listed on spreadsheets,

SCOPE
This document lists the "Declared Mechanical Parts" used in the provision of the supplied parts of **Spire** Instrument from the following sub system suppliers. See Table 1.

Table 1

Sub-System / Institute		List Supplied
Acronym	**Name**	**Yes / No / NA**
ATC	Astronomy Technology Centre	**Yes**
CEA/SAp	CEA, Service d'Astrophysique Saclay DRCU	**Yes**
CEA/SAp	CEA, Service d'Astrophysique Saclay DCU	**No**
CEA/SAp	CEA, Service d'Astrophysique Saclay FCU	**No**
CEA/SBT	(CEA) Service du Basse Temperatures Grenoble	**No**
CSA/USK	Canadian Space Agency (CSA) University of Saskatchewan Canada	**N/A**
CGS (IFSI)	Carlo Gavazzi Space	**Yes**
JPL	JPL/Caltech, Pasadena	**Yes**
LAM (LAS)	Laboratoire d'Astonomie Spatiale, Marseille	**N/A**
MSSL	Mullard Space Science Lab Surrey	**N/A**
UCF)	Department of Physics and Astronomy, University of Wales, Cardiff,	**Yes**

Appendix A to this document is a printout from that spreadsheet showing the mechanical parts on the hardware provided for **Spire** by the above sub-system suppliers

The spreadsheet printout is compliant with **ESA: PSS-01-700 Issue 2**, each mechanical part has an individual identification number, the first digit being the group type as follows.

51. Spacing Parts (Washers, Spacers,....)
52. Connecting Parts (Bolts, Nuts, Rivets, Inserts, Clips,....)
53. Bearing Parts (Ball-Bearings, Needle Bearings,....)
54. Separating Parts (Pyrotechnics, Springs, Cutters,....)
55. Control (Gears,....)
56. Fluid Handling Parts (Diffusers,....)
57. Heating Parts
58. Measuring Instruments (Gauges, Thermocouples,....)
59. Optical Passive Equipment
60. Magnetic Parts
61. Other Parts

CONTENT OF THE MECHANICAL PARTS LIST

Extract from **ESA PSS -01 -700 Issue 2 (August 1993) ANNEX C**

The mechanical Parts list consists of 10 columns, which shall be completed as indicated below. If a particular item does not apply, write N.A. (Not Applicable).

COLUMN 1 : Item Number
Sequential item number in each group of the list. One only per mechanical part type. Does not change during the life of the mechanical parts list.

COLUMN 2 : Commercial Identification
As required :
- type and number
- specification number (whether national, ESA, company in-house, etc.) and issue status. This document must be available for sending to ESA on request.
- materials

COLUMN 3 : Type of Part
Use a standard nomenclature, in order to ensure correct grouping of similar parts,
e.g.: Value, one way
Value , two ways
and not one-way value or two-way value.

COLUMN 4 : Procurement Information
- Manufacturer/supplier : name of the manufacture and the name of the supplier if different.
- Specification : reference of the procurement specification with issue and revision. It may be replaced by a national specification number if this exists and makes source of procurement irrelevant.

COLUMN 5 : Elementary Function, Main Characteristics
- function to be ensured by the mechanical part
- main characteristics: e.g. number of revolutions per minute for a ball bearing

COLUMN 6 : Use and Location
indicate in which subsystem, equipment or box the mechanical part is used + subcontractor's name/abbreviation.

- **COLUMN 7 :** Environmental Code

Radiation /UV/ATAXIA (1) (R)		Ambience (A)	Temperature (2) (T)
G = Geostationnary L = Low Orbit B = Radiation Belts I = Interplanetary	S = Outside Shadow L = Outside Light	V = Vacuum H = Hermetic M = Manned E = Elevated Pressure	1 = 0 to 100 2 = 101 to 200K 3 = 201 to 300 K “ etc.

(1) For parts inside the spacecraft, choose a letter from the left-hand side column. For parts on the surface of the spacecraft, combined this letter with “L” or “S”.
(2) Thermal cycle to be indicated by two values, e.g. 3/5.

(3) “RT” can be accepted as a code between 238 K (10°C) and 313 K (40°C).

Parts which are at a boundary between environments shall be described by two sets of codes.

- **COLUMN 8 :** Criticality & Hazards

Mark here all parts participating in a safety-critical and/or reliability-critical function

- **SUBCOLUMN 9.1 :** Justification for Approval

The purpose of this sub column is to enter any additional information that may be necessary in order to achieve customer approval. This information is reference of the Requests For Approval; reference of justificatory file for materials approved for other space or aeronautical programmes meeting the specific needs of the programme, reference of the evaluation report or waivers etc. These documents must be made available to ESA on request.

SUBCOLUMN 9.2 : Approval Status of the Contractor

A - Approved = All Mechanical Parts classified "A" may be used without restriction.

Y - Approved with restriction = These Mechanical Parts require the preparation of QC test specimens or a treatment before use: potting, coating, test specimens...

W - Approved with a waiver = These Mechanical Parts do not meet the requirements but are used for functional reasons. The use of such materials shall be reduced to a minimum. All the waivers shall be approved by ESA. The waiver number shall be entered in Subcolumn 9.2.

P - Pending a decision = Mechanical Parts for which an evaluation report or a waiver is awaiting the contractor's provisional or definitive approval.

O - Open = New Mechanical Parts or Mechanical Parts for which investigations and qualification are in progress.

D - Deleted = This clarification is used for a Mechanical Part, which is no longer used.

- **COLUMN 10 :** ESA Approval and Comments

This column will be completed by ESA in accordance with the standard comments list in Annex E.

APPENDIX A

DECLARED MECHANICAL PARTS LIST (DMPL)		ORIGINATOR: UK ATC	
SPACECRAFT / PROJECT:	Herschel	Doc. Number	SPIRE-ATC-PRJ-709
SYSTEM / EXPERIMENT:	SPIRE	Sheet No	Page 1 of 3
SUB-SYSTEM:	BSM	Issue: Last CTD 0326	1.3
		Date:	15-Jun-2004

Declared Part ID No.	Description	Manufacturer/ Supplier	Country	Specification	Quality	Notes	Project approval	ESA approval
1.	DISC-SPRING-ID-3.2mm stainless steel	Reliance Gear Co.Ltd	E.U	Austenitic, DIN A2, Grade 70	ISO 9002, COC, BATCH TRACEABLE			
2.	CERNOX-THERMISTOR COPPER-CANISTER	Lakeshore	U.S	CX-1030-CU		Supplied via SPIRE Project office		
3.	CAP-HD-SCREW-SS-M2-5X12	Reliance Gear Co.Ltd	E.U	Austenitic, DIN A2, Grade 70	ISO 9002, COC, BATCH TRACEABLE			
4.	**Deleted**							
5.	CAP-HD-SCREW-SS-M2-5X25							
6.	CAP-HD-SCREW-SS-M2-5X6							
7.	**Deleted**							
8.	CAP-HD-SCREW-SS-M2-5X8							
9.	CAP-HD-SCREW-SS-M2X10							
10.	CAP-HD-SCREW-SS-M4X10					MSSL to supply flight screws for BSM-Strucyre interface		
11.	CSK-HD-SCREW-SS-M2-5X5							

DECLARED MECHANICAL PARTS LIST (DMPL)		ORIGINATOR: UK ATC	
SPACECRAFT / PROJECT:	Herschel	Doc. Number	SPIRE-ATC-PRJ-709
SYSTEM / EXPERIMENT:	SPIRE	Sheet No	Page 2 of 3
SUB-SYSTEM:	BSM	Issue: Last CTD 0326	1.3
		Date:	15-Jun-2004

Declared Part ID No.	Description	Manufacturer/ Supplier	Country	Specification	Quality	Notes	Project approval	ESA approval
12.	CAP-HD-SCREW-SS-M2-5x7							
13.	CAP-HD-SCREW-SS-M2-5x6	Reliance Gear Co.Ltd	E.U	Austenitic, DIN A2, Grade 70	ISO 9002			
14.	CAP-HD-SCREW-SS-M2-5x12							
15.	P-CLIPS BRASS (TBC)	Not used	E.U					
16.	P-CLIP FASTENERS	Reliance Gear Co.Ltd	E.U	Austenitic, DIN A2, Grade 70	ISO 9002, , COC, BATCH TRACEABLE	Probably M2.5		
17.	LOCKING INSERTS	WTI Fasteners Inc	E.U	Austenitic, DIN A2, Grade 70	ISO 9002, , COC, BATCH TRACEABLE			
18.	DOWEL pins 2mm dia 8mm long	Reliance Gear Co.Ltd	E.U	Austenitic, DIN A2, Grade 70	ISO 9002, , COC,			
19.	LACING TAPE, BRAIDED DACRON 22DPTH	See DML	E.U	Gude-Space PT/MIL-T-43435B		RAL PREVIOUS USE		
20.	Flex Pivot : LUCAS 5010-600	Lucas TRW	U.S.	5010-600, Stainless steel, brazed	COTS, COC, BATCH TRACEABLE	upscreened by UK ATC		
21.	Flex Pivot : LUCAS 5010-800	Lucas TRW	U.S.	5010-600, Stainless steel, brazed	COTS, COC, BATCH TRACEABLE	upscreened by UK ATC		

DECLARED MECHANICAL PARTS LIST (DMPL)		ORIGINATOR: UK ATC	
SPACECRAFT / PROJECT:	Herschel	Doc. Number	SPIRE-ATC-PRJ-709
SYSTEM / EXPERIMENT:	SPIRE	Sheet No	Page 3 of 3
SUB-SYSTEM:	BSM	Issue: Last CTD 0326	1.3
		Date:	15-Jun-2004

Declared Part ID No.	Description	Manufacturer/ Supplier	Country	Specification	Quality	Notes	Project approval	ESA approval
22.	ALTERNATE Flex Pivot	C-Flex	U.S.	E-10 CuBe brazed	COTS, COC, BATCH TRACEABLE	upscreened by UK ATC		
23.	ALTERNATE Flex Pivot	C-Flex	U.S.	E-20 CuBe brazed	COTS, COC, BATCH TRACEABLE	upscreened by UK ATC		
24.	TERMINAL_PIN_571-4015	LOGIC ELECTRONIC COMPONENTS INC	E.U.	CAMBION 571-4015-01-0519	COTS, COC, BATCH TRACEABLE	MATERIALS : BRASS, PTFE, SILVER		
25.	PACS type slim magnet	Magnet Sales and Service Limited Unit 31, Blackworth Industrial Estate Highworth Swindon SN6 7NA	E.U.	N42 disc dia 10mm +/- 0.1 x 2.0 +/- 0.1 mm (A), Nickel coated ON ALL FACES.	COTS, COC, BATCH TRACEABLE	Upscreened by UK ATC Materials: NdFeB to DIN 388/111. Data sheet stored as SPI-BSM-NOT-0020		

Note: EEE parts covered by separate document.

CARLO GAVAZZI SPACE SpA

HERSCHEL DPUs/ICU

Tipo Doc.: *Doc.Type:*			N° DRD: *DRD N°:*
N° Doc.: *Doc. N°:* SPIRE-CGS-DOC-002199	Ediz.: *Issue:* **DRAFT**	Data: *Date:*	Pagina *Page* **1** Di *Of* **8**
Titolo : *Title :* HERSCHEL SPIRE DPU UNIT DECLARED MECHANICAL PARTS LIST			

	Nome & Funzione *Name & Function*	Firma *Signature*	Data *Date*
Preparato da: *Prepared by:*			
Approvato da: *Approved by:*			
Applicazione autorizzata da: *Application authorized by:*			
Customer / Higher Level Contractor			
Accettato da: *Accepted by:*			
Approvato da: *Approved by:*			

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N=Number of copy A=Application I=Information

Gestione documenti:
Data Management: ---------- Firma / *Signature* Data / *Date*

File: Herschel_SPIRE_DMPL_draft.doc

REGISTRAZIONE DELLE MODIFICHE / *CHANGE RECORD*			
EDIZIONE *ISSUE*	DATA *DATE*	AUTORIZZAZIONE *CHANGE AUTHORITY*	OGGETTO DELLA MODIFICA E SEZIONI AFFETTE *REASON FOR CHANGE AND AFFECTED SECTIONS*
DRAFT			

LISTA DELLE PAGINE VALIDE / *LIST OF VALID PAGES*

PAGINA *PAGE*	EDIZIONE *ISSUE*	PAGINA *PAGE*	EDIZIONE *ISSUE*	PAGINA *PAGE*	EDIZIONE *ISSUE*	PAGINA *PAGE*	EDIZIONE *ISSUE*	PAGINA *PAGE*	EDIZIONE *ISSUE*
1 - 8	DRAFT								
ANNEX A A1 – A3	DRAFT								

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1. SCOPE

The scope of this document is to define all mechanical parts 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

3. RESPONSIBILITY

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

4. METHODOLOGY FOR THE COMPILATION OF THE DMPL

The mechanical parts list consist of 11 columns which shall be completed as indicated below. Furthermore, mechanical shall be classified as specified in table:

GROUP	MECHANICAL PARTS
51	Spacing parts (washers, spacers, etc.)
52	Connecting parts (bolts, nuts, rivets, inserts, clips, etc.)
53	Bearing parts (ball-bearings, needle bearings, etc.)
54	Separating parts (pyrotechnics, springs, cutters, etc.)
55	Control parts (gears, etc.)
56	Fluid handling parts (diffusers, etc.)
57	Heating parts
58	Measuring instruments (gauges, Thermocouples, etc.)
59	Optical passive equipment
60	Magnetic parts
61	Other parts

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 mechanical part type).

Column 2:Commercial identification
As follow:

- type and number.
- specification number.
- material.

Column 3:Type of part
Indicate a standard nomenclature.

Column 4:Procurement information
Manufacturer/supplier:this identifies the abbreviated name of the manufacturer and name of the supplier if different.
Proc. Spec.:reference of the procurement specification with issue and revision.

Column 5:Elementary function/Main characteristics
Function to be ensured by the mechanical part and relevant main characteristics.

Column 6:Use/location
Indicate in which subsystems, equipment or box the mechanical part is used.

Column 7:Environmental code

Radiation/UV/ATOX(1)		Ambiance	Temperature
G=Geostationnary L=Low orbit B=Radiation belts I=Interplanetary	S=Outside shadow L=Outside light	V=Vacuum H=Hermetic M=Manned E=Elevated pressure	1=0 to 100 K 2=101 to 200 K 3=201 to 300 K etc.

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

Column 8:Criticality and hazards
Indicate all parts participating in a safety-critical and/or reliability-critical function.

Column 9:Justification for approval and Prime comments
The purpose of this column is to enter any additional information that may be necessary in order to achieve customer’s approval. This information is reference and issue of the Requests For Approval, reference of justificatory file for parts approved for other space or aeronautical programmes meeting the specific needs of the programme and waivers, reference NASA/MSFC MAPTIS databases codes, etc..

Column 10:Contractor’s approval (Prime App.)
A=Approved. All mechanical parts classified A may be used without restriction.
W=Approved with a waiver. The use of such mechanical parts shall be reduced to a minimum. These mechanical parts do not meet the requirements but are used for functional reasons. The waiver number shall be entered in column 9.
P=Pending a decision. Mechanical parts for which an evaluation report or a waiver is awaiting the Contractor’s provisional or definitive approval.
O=Open. New mechanical parts or mechanical parts for which investigations and qualification are in progress.
D=Deleted. This classification is used for a mechanical part which is no longer used in the spacecraft.

Column 11:Customer approval and comments (Customer App)
This column will be completed by Customer in accordance with the standard comments listed in [RD 1] annex F.

5. DECLARED MECHANICAL PARTS LIST

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

Declared Mechanical Parts List

1	2	3	4	5	6	7	8	9	10	11
Group No / Item No:	**Commercial identification**	**Type of part**	**Procurement Info: 1) Manufacturer 2) Supplier 3) Proc. Spec. Issue/Rev**	**1) Elementary function 2) Main characteristics**	**1) Use 2) Location**	**Environment. Code 1) Radiation 2) Ambiance 3) Temp.**	**Criticality and hazards**	**Justification for approval and Prime comments**	**Prime App.**	**Customer App.**
Group 51: SPACING PARTS										
51/01	Washer DIN 125A 1.4401	See colunm 2	CNR-IFSI, CGS / Bossard Switzerland / DIN125A	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
51/02	Washer DIN 433 1.4401	See colunm 2	CNR-IFSI, CGS / Bossard Switzerland / DIN433	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
51/03	Spring Washer DIN 127B 1.4401	See colunm 2	CNR-IFSI, CGS / Bossard Switzerland / DIN127B	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
Group 52: CONNECTING PARTS										
52/01	Hex nut DIN 439B 1.4401	See column 2	CNR-IFSI, CGS / Bossard Switzerland / DIN439B	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
52/02	Screw DIN 912 1.4401	See column 2	CNR-IFSI, CGS / Bossard Switzerland / DIN912 - ISO 4762	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		

Declared Mechanical Parts List

1	2	3	4	5	6	7	8	9	10	11
Group No / Item No:	**Commercial identification**	**Type of part**	**Procurement Info: 1) Manufacturer 2) Supplier 3) Proc. Spec. Issue/Rev**	**1) Elementary function 2) Main characteristics**	**1) Use 2) Location**	**Environment. Code 1) Radiation 2) Ambiance 3) Temp.**	**Criticality and hazards**	**Justification for approval and Prime comments**	**Prime App.**	**Customer App.**
52/03	Screw DIN 965A 1.4401	See column 2	CNR-IFSI, CGS / Bossard Switzerland / DIN965A	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
52/04	Screw DIN 85A 1.4401	See column 2	CNR-IFSI, CGS / Bossard Switzerland / DIN85A - ISO 1580	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10370		
52/05	Card-lok retainer MHA260-4.80 ETM2L rev.:N/C	See column 2	CALMARK CORP. CA-USA / ASTM-B221	Blocking of PCBs in the box	Mechanical assembly of PCBs in the box	I V 3, 4		NASA/MSFC MAPTIS: 50643		
52/06	Elastic Pin DIN 1481 1.4301	See column 2	CNR-IFSI, CGS / Bossard Switzerland / DIN1481 (Passivation treatment as per QQ-P-35)	Blocking of Bonding Stud	Assembly of Bonding Stud	I V 3, 4		NASA/MSFC MAPTIS: 10351		
52/07	Heli-Coil self locking LN 9499 1,4301	See column 2	CNR-IFSI, CGS / Bolhoff Germany / LN9499 DIN29782	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10351		
52/08	Heli-Coil LN 9039 1,4301	See column 2	CNR-IFSI, CGS / Bolhoff Germany / LN9039	Assembly of mechanical parts	Assembly of mechanical parts	I V 3, 4		NASA/MSFC MAPTIS: 10351		

Declared Mechanical Parts List

1	2	3	4	5	6	7	8	9	10	11
Group No / Item No:	Commercial identification	Type of part	Procurement Info: 1) Manufacturer 2) Supplier 3) Proc. Spec. Issue/Rev	1) Elementary function 2) Main characteristics	1) Use 2) Location	Environment. Code 1) Radiation 2) Ambiance 3) Temp.	Criticality and hazards	Justification for approval and Prime comments	Prime App.	Customer App.
Group 53: BEARING PARTS										
53/01	NONE									
Group 54: SEPARATING PARTS										
54/01	NONE									
Group 55: CONTROL PARTS										
55/01	NONE									
Group 56: FLUID HANDLING PARTS										
56/01	NONE									
Group 57: HEATING PARTS										
57/01	NONE									
Group 58: MEASURING INSTRUMENTS										
58/01	NONE									
Group 59: OPTICAL PASSIVE EQUIPMENT										
59/01	NONE									
Group 60: MAGNETIC PARTS										
60/01	NONE									
Group 61: OTHER PARTS										
61/01	NONE									

HERSCHEL/SPIRE

DRCU
Declared Mechanical Parts List (DMPL)

Reference: SAp-SPIRE-NC-0100-03
Issue: 1.0
Date: 11/02/03

	Function	Name	Date	Visa
Prepared by	Mechanics Product Assurance	Nathalie Colombel	11/02/03	
Verified by	Mechanical Engineer	Thierry Tourrette		
Approved by	PA Manager			
Authorized by	Project Manager	Jean-Louis Auguères		

DOCUMENT STATUS and CHANGE RECORD

Date	Issue	Affected pages
19/11/01	0.0	Draft
11/02/03	1.0	1 "Preliminary" removed from document title 8 Addition of item 51-3 9 Precision item 52-1 Addition of item 52-3 10 61-3 removed item 61-1 & 61-2 Subcontractor not known yet

List of acronyms

AD / RD	Applicable / Reference Document
ADP	Acceptance Data Package
CDR	Critical Design Review
CEA	Commissariat à l'Energie Atomique
DCU	Detector Control Unit
DML	Declared Material List
DMPL	Declared Mechanical Part List
DPL	Declared Processes List
DRCU	Detector Readout and Control Unit
EIDP	End Item Data Package
FCU	FPU Control Unit
FIRST	Far InfraRed and Sub millimeter Telescope
FM	Flight Model
FMECA	Failures Modes Effects & Criticality Analysis
FPU	Focal Plane Unit
FS	Flight Spare
GSE	Ground Support Equipment
HIFI	Heterodyne Instrument for FIrst
ICD	Interface Control Document
LAM	Laboratoire d'Astrophysique de Marseilles
MAIV	Manufacturing, Assembly, Integration Verification
MCU	Mechanisms Control Unit
MGSE	Mechanical Ground Support Equipment
N/A	Not Applicable
PA / QA	Product / Quality Assurance
PACS	Photoconductor Array Camera & Spectrometer
PCB	Printed Circuit Board
PDR	Preliminary Design Review
PSU	Power Supply Unit
QM	Qualification Model
RFA	Request For Approval
RT	Room Temperature
S/C	SpaceCraft
SAp	Service d'Astrophysique
SCU	Subsystems Control Unit
SPIRE	Spectral & Photometric Imaging Receiver
TBC	To Be Confirmed
TBD	To Be Defined

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1 Purpose

This document lists the mechanical parts expecting to be used in the SPIRE DRCU QM, FM, FS.

2 Documentation

2.1 Applicable documents

If necessary, the following documents will describe subsystems physically contained in the DRCU. These documents are to be written.

MCU DMPL	Subsystem under LAM Marseilles responsibility physically contained in the FCU box.
PSU DMPL	Subsystem to be furnished by a subcontractor (with spatial experience) under SAp responsibility.

2.2 Reference documents

ECSS-Q-70A	Materials, mechanical parts and processes
PSS-01-700 2.0	The technical reporting and approval procedure for materials and processes

CNES Guide for science projects EEE, Materials, Processes Lists

3 Subassembly and equipment codes

Subassembly codes			Names	Responsibility
DRCU			Detector Readout and Control Unit	SAp
	FCU		FPU (Focal Plane Unit) Control Unit	SAp
		MCU	Mechanisms Control Unit	LAM
		SCU	Subsystems Control Unit	SAp
		PSU	Power Supply Unit	SAp
	DCU		Detector Control Unit	SAp

4 Codes used in the list

4.1 Environment codes

These codes are used to indicate the type of environment to which the material is subjected.

'Radiation' Code	
Code	**Meaning**
G	Geostationary orbit
L	Low Earth orbit
B	Radiation belt
I	Interplanetary
P	Planetary

For components, which are attached outside the satellite, 'S' is added for Shadow if the material is in the shade or 'L' for Light if the material is in the illuminated area.

'Environment' Code	
Code	**Meaning**
V	Vacuum
H	Hermetic
M	Manned
E	High pressure

'Temperature' Code	
Code	**Meaning**
1	0 ≤ 100 K
2	101 ≤ 200 K
3	201 ≤ 300 K
etc.	etc.

The given temperature code correspond to the operating temperature. If needed, the thermal cycle is described by two values, e.g.: 3/5.

4.2 Approval codes

These codes refer to:

- Comments made by the user or sub-contractor laboratory on use of the material in question;
- Comments from the 'higher level' (the instrument manager in charge of drawing up the list).

'Approval' Code	
Code	**Meaning**
A	Approved: use without restriction.
D	Approved with waiver: the mechanical part does not comply with requirements but is used for fonctionnal reasons. Waiver number is entered in subcolumn 9-1.
P	Decision pending: mechanical part for which an evaluation report or waiver is necessary.
O	Open: new mechanical part for which an examination or evaluation is under way.
C	Eliminated: mechanical part, which is no longer used.

5 Mechanical parts groups

Code	Group	Used
51	Spacing parts (washers, spacers,…)	☒
52	Connecting parts (bolts, nuts, rivets, inserts, clips, …)	☒
53	Bearing parts (ball-bearings, needle bearings, …)	☐
54	Separating parts (pyrotechnics, spring, cutters, …)	☐
55	Control parts (gears, …)	☐
56	Fluid handling parts (diffusers)	☐
57	Heating parts	☐
58	Measuring instruments (gauges, thermocouples, …)	☐
59	Optical passive equipment	☐
60	Magnetic parts	☐
61	Other parts	☒

Group 51 – Spacing parts										
1	2	3	4	5	6	7	8	9		10
								9.1	9.2	
Item no.	Trade identification or standard description	Type of part	1. Manufacturer 2. Distributor 3. Proc. Spec. no. Issue / Revision	1. Elementary functions 2. Main characteristics	1. Sub-system code 2. Equipment code 3. Use	1. Rad 2. Env 3. Temp	Criticality [i]	1. Justification 2. Subcontractor comments	Approval status	Comments ESA approval
51-1		Stainless steel Flatwasher	To be filled out	o		R I E V T 3/4	Not critical	1. Common use	A	
51-2		Stainless steel Lockwasher	To be filled out	o		R I E V T 3/4	Not critical	1. Common use	A	
51-3		Stainless steel ondulated washer	To be filled out	o Used to compensate the difference between thermal expansion coefficient		R I E V T 3/4	Not critical	1. Common use	A	

[i] As defined in ECSS-Q-70A §4.1.4 Criticality analysis

Group 52 – Connecting parts										
1	2	3	4	5	6	7	8	9		10
								9.1	9.2	
Item no.	Trade identification or standard description	Type of part	1. Manufacturer 2. Distributor 3. Proc. Spec. no. Issue / Revision	1. Elementary functions 2. Main characteristics	1. Sub-system code 2. Equipment code 3. Use	1. Rad 2. Env 3. Temp	Criticality [i]	1. Justification 2. Subcontractor comments	Approval status	Comments ESA approval
52-1	Card-lock retainer Series 260 V260-4.80ET2K http://www.calmark.com/pdfs/260.pdf	Clampling device	1. Calemark® Ireland 2. BCF MKM (France) 3.	o Clamping of electronic cards. o http://www.calmark.com/pdfs/260.pdf	1. DRCU 2. DCU FCU/(MCU+SCU) 3. To clamp the electronic boards in the electronic boxes	R I E V T 3/4	Not critical	1. Already used in space applications Rosette Project landing module (MPE) Glove box control equipment one space station (Bradford Engineering Holland)	A	
52-2	A4-80 screw	Stainless steel screw	To be filled out			R I E V T 3/4	Not critical	1. Common use	A	
52-3	Heli Coil® inserts	Stainless steel AISI 302/304 inserts	To be filled out	o Installed in thread holes of pieces made of aluminium o Size indicative colour ink removed by dipping in isopropyl alcohol	1. DRCU 2. DCU FCU/(MCU+SCU) 3.	R I E V T 3/4	Not critical	1. Common use for spatial application	A	

[i] As defined in ECSS-Q-70A §4.1.4 Criticality analysis

Group 61 – Other parts										
1	2	3	4	5	6	7	8	9		10
								9.1	9.2	
Item no.	Trade identification or standard description	Type of part	1. Manufacturer 2. Distributor 3. Proc. Spec. no. Issue / Revision	1. Elementary functions 2. Main characteristics	1. Sub-system code 2. Equipment code 3. Use	1. Rad 2. Env 3. Temp	Criticality [i]	1. Justification 2. Subcontractor comments	Approval status	Comments ESA approval
61-1	Multilayer FR4 PCB	Printed circuit Board with Epoxy glass FR4 isolator	1. Subcontractor 2. Subcontractor 3. Subcontractor procedure to be filled out	o See column 3	1. DRCU 2. DCU electronic boards, FCU/(MCU+SCU) electronic boards 3. PCB	R I E V T 3/4	Not critical	1. Space qualified subcontractor 2. Could be used for non-flying models	A	
61-2	Multilayer KERIMID PCB	Printed circuit Board with KERIMID isolator	1. Subcontractor 2. Subcontractor 3. Subcontractor procedure to be filled out	o See column 3	1. DRCU 2. DCU electronic boards, FCU/(MCU+SCU) electronic boards 3. PCB	R I E V T 3/4	Not critical	1. Space qualified subcontractor 2. Used for FM & FS	A	

[i] As defined in ECSS-Q-70A §4.1.4 Criticality analysis

Mechanical Parts Section Only
from Combined JPL list

Materials and Processes List

SPIRE

JPL D-25725

REV B
1/05/04

Reviewed by: _____
M. Knopp M&P Engineer

Declared Mechanical Part List

SPIRE-BDA **Group 51: Spacing Parts**

1	2	3	4	5	6		7	8		9
Item No	Commercial Identification	Type of Part	1) Manufacturer 2) Procurement Spec.	1) Elementary Function 2) Main Characteristics	6.1 1) Location 2) Application	6.2 User Code	1) Criticality 2) Reason/ Control	8.1 1)Justification for approval 2) Supplier Comments	8.2 Supplier Approval Status	ESA App.
1	B0187-010	Washer, Belleville, CRES 302		1)Assembly 2)Sring Washer	1)BDA Middle Ring			MSFC-HDBK-527		A
2	5720-1R-25	Washer, Phosphur Bronze		1)Assembly 2) Washer	1)BDA Middle Ring			1) MSFC-HDBK-527 2) Alloy C51000		A
3	W00CE	Washer	1)J.I. Morris	1)Assembly	1)BDA Assembly			1) MSFC-HDBK-527 2) (CRES 303)		A
4	MDP2-2	Pin, Dowel		1) Assembly	1)BDA Assembly			1) MSFC-HDBK-527 2) (CRES 300 series)		A

Declared Mechanical Part List

SPIRE-BDA **Group 52: Connecting Parts**

1	2	3	4	5	6		7	8		9
					6.1	6.2		8.1	8.2	
Item No	Commercial Identification	Type of Part	1) Manufacturer 2) Procurement Spec.	1) Elementary Function 2) Main Characteristics	1) Location 2) Application	User Code	1) Criticality 2) Reason/ Control	1)Justification for approval 2) Supplier Comments	Supplier Approval Status	ESA App.
1.001	KNCM 4x.7	Insert, Threaded, CRES A286	1)Keensert	1)Assembly	1)Light Seal, BDA			MSFC-HDBK-527 Used on past flight projects	A	
1.002	KNCM 4x.7	Insert, Threaded, CRES A286	1)Keensert	1)Assembly	1)JFET Housings			MSFC-HDBK-527 Used on past flight projects	A	
2	Screw, Socket Head	Fastener, CRES A286	2)STM12307	1)Assembly	1)JFET Housings			MSFC-HDBK-527 Used on past flight projects	A	
3	Stud-Lock	Stud, A286 CRES	2)ST12391	1)Assembly	1)JFET Housings			MSFC-HDBK-527 Used on past flight projects	A	
4	Nut	Nut, Selflocking A286	2) STM12304	1)Assembly	1)BDA Detector Array 2) Assembly			MSFC-HDBK-527 Used on past flight projects	A	
5	934-A2	Nut, M1.6, CRES 303		1)Assembly	1)Middle Ring Assembly			MSFC-HDBK-527 Used on past flight projects	A	
6	MS171432	Spring Pin	2)NASM171432	1)Assembly	1)Middle Ring Assembly			MSFC-HDBK-527 Used on past flight projects	A	

Declared Mechanical Part List

SPIRE-BDA **Group 52: Connecting Parts**

1	2	3	4	5	6		7	8		9
					6.1	6.2		8.1	8.2	
Item No	Commercial Identification	Type of Part	1) Manufacturer 2) Procurement Spec.	1) Elementary Function 2) Main Characteristics	1) Location 2) Application	User Code	1) Criticality 2) Reason/ Control	1)Justification for approval 2) Supplier Comments	Supplier Approval Status	ESA App.
7	NA0069	Fastener, A286	2)NA0069	1)Assembly	1)BDA			MSFC-HDBK-527 Used on past flight projects	A	
8	Nut, Hex	Nut, Hex, A286	2)MS21043	1)Assembly	1)BDA			MSFC-HDBK-527 Used on past flight projects	A	
9	MS24693	Screw, Machine Head	2)NASM24693	1)Assembly	1)BDA			MSFC-HDBK-527 Used on past flight projects	A	
10	NAS1351	Screw, Socket Head, Cap	2)NAS1351C00	1)Assembly	1)BDA			MSFC-HDBK-527 Used on past flight projects	A	
11	NAS671	Nut	2)NAS671C0	1)Assembly	1)BDA			MSFC-HDBK-527 Used on past flight projects	A	
12	1589332-1	Screw, Pan Head, A286		1)Assembly	1)Flex Cable, Center			MSFC-HDBK-527 Used on past flight projects	A	
13	TR-23081	Insert, Threaded, Locking, A286	1)Tridair	1)Assembly	1)BDA 2)Assembly			MSFC-HDBK-527 Used on past flight projects	A	

Declared Mechanical Part List

SPIRE-BDA **Group 52: Connecting Parts**

1	2	3	4	5	6		7	8		9
					6.1	6.2		8.1	8.2	
Item No	Commercial Identification	Type of Part	1) Manufacturer 2) Procurement Spec.	1) Elementary Function 2) Main Characteristics	1) Location 2) Application	User Code	1) Criticality 2) Reason/ Control	1)Justification for approval 2) Supplier Comments	Supplier Approval Status	ESA App.
14	NA0068	Fastener, A286, Offset Cruciform	2)NA0068	1) Assembly	1)BDA 2)Assembly			MSFC-HDBK-527 Used on past flight projects	A	
15	STM12308	Fastener, A286, Flat Head	2)STM12308N020 010	1)Assembly	1)BDA Detector Array 2) Assembly			MSFC-HDBK-527 Used on past flight projects	A	

Declared Mechanical Part List

SPIRE-BDA

Group 54: Springs

1	2	3	4	5	6		7	8		9
Item No	Commercial Identification	Type of Part	1) Manufacturer 2) Procurement Spec.	1) Elementary Function 2) Main Characteristics	6.1 1) Location 2) Application	6.2 User Code	1) Criticality 2) Reason/ Control	8.1 1)Justification for approval 2) Supplier Comments	8.2 Supplier Approval Status	ESA App.
1	C0057-008	Spring, Coil, Cres 302		1)Component Pre-load	1)BDA 2)Suspension Assy			MSFC-HDBK-527	A	

Declared Mechanical Parts List
Cardiff Deliverables for SPIRE-PFM

SPIRE Ref.: SPIRE-UCF-PRJ-002152
Cardiff Ref.: HSO-CDF-LI-075
Issue: 1.0

19 October 2004

Prepared by:-	Peter Hargrave – Cardiff SPIRE technical manager		14th September 2004
Approved by:-	Ian Walker – Cardiff AIG programme manager		

Update history

Date	Version	Remarks
20th September 2004	1.0	First issue of Cardiff combined list

Table of Contents

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INTRODUCTION 4
CONTENT OF THE MECHANICAL PARTS LIST 5

SCOPE

This document lists the “Declared Mechanical Parts” used in the provision of the deliverables for the **SPIRE-PFM and FS** instrument from Cardiff University

INTRODUCTION

Mechanical Parts used by Cardiff University are listed in the accompanying tables, which are compliant with ESA: PSS-01-700 Issue 2. Each mechanical part has an individual identification number, the first digit being the group type as follows:-

51. Spacing Parts (Washers, Spacers,....)
52. Connecting Parts (Bolts, Nuts, Rivets, Inserts, Clips,....)
53. Bearing Parts (Ball-Bearings, Needle Bearings,....)
54. Separating Parts (Pyrotechnics, Springs, Cutters,....)
55. Control (Gears,....)
56. Fluid Handling Parts (Diffusers,....)
57. Heating Parts
58. Measuring Instruments (Gauges, Thermocouples,....)
59. Optical Passive Equipment
60. Magnetic Parts
61. Other Parts - Note: "EEE Parts are included in this Section"

CONTENT OF THE MECHANICAL PARTS LIST

Extract from ESA PSS -01 -700 Issue 2 (August 1993) ANNEX C

The mechanical Parts list consists of 12 columns, which shall be completed as indicated below. If a particular item does not apply, write N.A. (Not Applicable).

COLUMN 1 : Item Number
Sequential item number in each group of the list. One only per mechanical part type. Does not change during the life of the mechanical parts list.

COLUMN 2 : Commercial Identification
As required :

- type and number
- specification number (whether national, ESA, company in-house, etc.) and issue status. This document must be available for sending to ESA on request.
- materials

COLUMN 3 : Type of Part
Use a standard nomenclature, in order to ensure correct grouping of similar parts,
e.g.: Value, one way
Value , two ways
and not one-way value or two-way value.

COLUMN 4 : Procurement Information

- Manufacturer/supplier : name of the manufacture and the name of the supplier if different.
- Specification : reference of the procurement specification with issue and revision. It may be replaced by a national specification number if this exists and makes source of procurement irrelevant.

COLUMN 5 : Elementary Function, Main Characteristics

- function to be ensured by the mechanical part

- main characteristics: e.g. number of revolutions per minute for a ball bearing

COLUMN 6 : Use and Location
Indicate in which subsystem, equipment or box the mechanical part is used + subcontractor's name/abbreviation.

COLUMN 7 : Environmental Code

Radiation /UV/ATAXIA (1) (R)		Ambience (A)	Temperature (2) (T)
G = Geostationnary L = Low Orbit B = Radiation Belts I = Interplanetary	S = Outside Shadow L = Outside Light	V = Vacuum H = Hermetic M = Manned E = Elevated Pressure	1 = 0 to 100 2 = 101 to 200K 3 = 201 to 300 K " etc.

(1) For parts inside the spacecraft, choose a letter from the left-hand side column. For parts on the surface of the spacecraft, combined this letter with "L" or "S".
(2) Thermal cycle to be indicated by two values, e.g. 3/5.
(3) "RT" can be accepted as a code between 238 K (10°C) and 313 K (40°C).
Parts which are at a boundary between environments shall be described by two sets of codes.

COLUMN 8 : Criticality & Hazards
Mark here all parts participating in a safety-critical and/or reliability-critical function

SUBCOLUMN 9.1 : Justification for Approval
The purpose of this sub column is to enter any additional information that may be necessary in order to achieve customer approval. This information is reference of the Requests For Approval; reference of justificatory file for materials approved for other space or aeronautical programmes meeting the specific needs of the programme, reference of the evaluation report or waivers etc. These documents must be made available to ESA on request.

SUBCOLUMN 9.2 : Approval Status of the Contractor

A - Approved = All Mechanical Parts classified "A" may be used without restriction.

Y - Approved with restriction = These Mechanical Parts require the preparation of QC test specimens or a treatment before use: potting, coating, test specimens...

W - Approved with a waiver = These Mechanical Parts do not meet the requirements but are used for functional reasons. The use of such materials shall be reduced to a minimum. All the waivers shall be approved by ESA. The waiver number shall be entered in Subcolumn 9.2.

P - Pending a decision = Mechanical Parts for which an evaluation report or a waiver is awaiting the contractor's provisional or definitive approval.

O - Open = New Mechanical Parts or Mechanical Parts for which investigations and qualification are in progress.

D - Deleted = This clarification is used for a Mechanical Part, which is no longer used.

COLUMN 10 : ESA Approval and Comments
This column will be completed by ESA in accordance with the standard comments list in Annex E.

COLUMN 11 : ESA sign-off

COLUMN 12 : Project sign-off

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	**Herschel-SPIRE**		
Institute:	**Cardiff University**		
Prepared by:	**Peter Hargrave**		
Category:	**51**	**Spacing parts**	

Item #	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
51-1	S105204	Stainless steel Belleville spring washer	Precision Technology Supplies LTD, The Birches industrial estate, Imberhorne Lane, East Grinstead, West Sussex. RH19 1XZ. Batch # 19135	Spring-loading Kevlar-suspended hub. Maintenance of Kevlar tension.	300mK Photometer bus-bar supports. (LTS-PFM-100, LTS-PFM-200) 300mK light baffles (LTS-PFM-300, LTS-PFM-400)	I	V	1	Not critical	Common use	ISO 9002			
51-2	D6-20	Stainless steel Belleville spring washer	Unimatic Linear, 130 Granville road, London NW2 2LN Trace # 7197-36813-1-040902	Maintenance of bolt torque upon cooling – compensation for difference in thermal expansion coefficients	300mK Photometer bus-bar supports. (LTS-PFM-100, LTS-PFM-200) 300mK light baffles (LTS-PFM-300, LTS-PFM-400) Spectrometer calibration source SCAL-PFM-000 Photometer calibration source PCAL-PFM-000	I	V	1	Not critical	Common use	ISO 9002			
51-3	D6-21	Stainless steel Belleville spring washer	Unimatic Linear, 130 Granville road, London NW2 2LN Trace # 7197-32925-2-02210	Maintenance of bolt torque upon cooling – compensation for difference in thermal expansion coefficients	Spectrometer calibration source SCAL-PFM-000	I	V	1	Not critical	Common use	ISO 9002			

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	**Herschel-SPIRE**		
Institute:	**Cardiff University**		
Prepared by:	**Peter Hargrave**		
Category:	**52**	**Connecting parts (sheet 1)**	

Item #	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
52-1	3585-02CNX.129	Helicoil screwlock insert 2-56 x 1.5D (stainless steel)	Armstrong fastening systems, Foster St., Hull. HU8 8BT Lot# 158398	Thread liner for tapped holes in Aluminium. Provides screw locking.	300mK Photometer bus-bar supports. (LTS-PFM-100, LTS-PFM-200) 300mK light baffles (LTS-PFM-300, LTS-PFM-400) Spectrometer calibration source SCAL-PFM-000	I	V	1	Not critical	Common use	ISO 9001			
52-2	3585-02CNX.172	Helicoil screwlock insert 2-56 x 2D (stainless steel)	As above. Lot# 152509	Thread liner for tapped holes in Aluminium. Provides screw locking.	Spectrometer calibration source SCAL-PFM-000 Photometer calibration source PCAL-PFM-000	I	V	1	Not critical	Common use	ISO9001			
52-3	MRM5254 Hexagonal jackpost assembly	2-56 UNC Jacking screw for MDM connector	Glenair PO Box 37 Mansfield Nottinghamshire UK	Fixing of MDM37SSB connectors to SCal body. Provision of cable attachment jack-posts	Spectrometer calibration source SCAL-PFM-000	I	V	1	Not critical	Common use	ISO9001			
52-4	Screw 2-56UNC x 3/16 cap HD	Stainless steel cap head bolt	Precision Technology Supplies LTD, The Birches industrial estate, Imberhorne Lane, East Grinstead, West Sussex. RH19 1XZ. Batch # 18338	General assembly	Spectrometer calibration source SCAL-PFM-000	I	V	1	Not critical	Common use	ISO 9002			

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	**Herschel-SPIRE**		
Institute:	**Cardiff University**		
Prepared by:	**Peter Hargrave**		
Category:	**52**	**Connecting parts (sheet 2)**	

Item #	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
52-5	Screw 2-56UNC x 1/4 cap HD	Stainless steel cap head bolt Batch # 17953	Precision Technology Supplies LTD, The Birches industrial estate, Imberhorne Lane, East Grinstead, West Sussex. RH19 1XZ.	General assembly	300mK Photometer bus-bar supports. (LTS-PFM-100, LTS-PFM-200) 300mK light baffles (LTS-PFM-300, LTS-PFM-400) Spectrometer calibration source SCAL-PFM-000	I	V	1	Not critical	Common use	ISO 9002			
52-6	Screw 2-56UNC x 3/8 cap HD	Stainless steel cap head bolt Batch # 17010		PCal source mounting & cable clamp	Photometer calibration source PCAL-PFM-000	I	V	1	Not critical	Common use				
52-7	2.0mm x 16mm dowel pins (stainless steel)	Stainless steel dowel pin Batch # 19607		Fixed capstan retention	300mK Photometer bus-bar supports. (LTS-PFM-100, LTS-PFM-200)	I	V	1	Not critical	Common use				
52-8	Screw M1.6 x 6 Pozi csk	Stainless steel CSK head bolt Batch # 17398		Assembly of 300mK filter clamp rings (photometer side)	Photometer detector filter clamps FILT-PFM-230, FILT-PFM-240, FILT-PFM-250	I	V	1	Not critical	Common use				
52-9	Screw M1.6 x 8 Pozi csk	Stainless steel CSK head bolt Batch # 17398		Assembly of 300mK filter clamp rings (spectrometer side)	Spectrometer detector filter clamps FILT-PFM-210, FILT-PFM-220	I	V	1	Not critical	Common use				
52-10	Screw 2-56unc x 1/4 csk	Stainless steel CSK head bolt Batch # 26469		PCal source mounting	PCAL-PFM-000	I	V	1	Not critical	Common use				

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**53**	**Bearing parts**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**54**	**Separating parts**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**55**	**Control parts**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	Herschel-SPIRE		
Institute:	Cardiff University		
Prepared by:	Peter Hargrave		
Category:	56	Fluid handling parts	

Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	Herschel-SPIRE		
Institute:	Cardiff University		
Prepared by:	Peter Hargrave		
Category:	57	Heating parts	

Item #	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
57-1	Vishay-Sfernice High precision resistor PHR0805Y5000BB +/- 0.1% Screened to ESA Level C Variant 03	500 Ω chip resistor	Charcroft Electronics, Dol-y-Coed, Llanwrtyd Wells, Powys, LD5 4TH Lot# 00020037 / 5541P7 C of C# 03181	Heating SCal sources from 4K to ~100K. Maximum power dissipation <5mW (rated 100mW)	SCal heated sources SCAL-PFM-000	I	V	1	Not critical	ESA approved part	ISO 9002			

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**58**	**Measuring instruments**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**59**	**Optical passive equipment**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST										HSO-CDF-LI-075		
Project:	**Herschel-SPIRE**													
Institute:	**Cardiff University**													
Prepared by:	**Peter Hargrave**													
Category:		**60**	**Magnetic parts**											
Item#	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
					NONE									

Issue # 1		DECLARED MECHANICAL PARTS LIST	HSO-CDF-LI-075
Project:	**Herschel-SPIRE**		
Institute:	**Cardiff University**		
Prepared by:	**Peter Hargrave**		
Category:	**61**	**Other parts**	

Item #	Commercial ID	Type of part	Procurement information	Elementary function. Main characteristics.	Use & location	Environment code			Criticality & hazards	Approval status		ESA approval & comments	Project sign	ESA sign
						R	A	T		Justification	Status of contractor			
61-1	Space Grade Micro-D Socket Connector GS83513/02-FN-429B	37 socket Micro-D connector (solder bucket) MDM37SSB	Glenair UK Ltd 40 Lower Oakham way Oakham business park Mansfield Nottinghamshire NG18 5BY C of C# 676521	SCal prime & redundant electrical connectors	SCal assembly SCAL-PFM-000	I	V	1	Not critical	Certified to NASA 311-INST-001 Level 1	ISO9001			
61-2	Custom-built sapphire sheet Al_2O_3 99.9% 2.0mm x 4.0mm x 0.25mm	Insulator plate (custom made)	Goodfellow Cambridge Ltd, Huntingdon, PE29 6WR C of C# LS 236675/1	Electrical isolation of SCal heaters and thermometers from source body	SCal source assemblies SCAL-PFM-200, SCAL-PFM-300, SCAL-PFM-400, SCAL-PFM-500	I	V	1	Not critical	Approved material	ISO9001			
61-3	Lakeshore Cryotronics Cernox thermometer CX-1030-SD-HT-4L	Cernox resistance thermometer sensor (high temperature annealed)	Elliot Scientific, 3 Allied business centre, Coldharbour lane, Harpenden, Herts AL5 4UT C of C# 14200, 14119	Monitoring of SCal source and body temperatures	SCal assembly SCAL-PFM-000	I	V	1	Not critical	Common part used for general SPIRE thermometry	ISO9001			
61-4	PCal thermal source HBI-6	Custom made thermal emitter	Haller-Beeman Associates, 5020 Santa-Rita road, El Sobrante, CA 94803 USA	Thermal source (prime and redundant) for PCal Heated Nichrome film on Sapphire	PCal assembly PCAL-PFM-000	I	V	1	Not critical	Similar device flown on Spitzer-MIPS. Qualified at unit and system level. Refs.				
61-5	Solder terminals 572-4882-01-05-16	Insulated solder turret. Insulator - diallyl phthalate (blue) C fo C# 0240025	Wearnes Cambion Ltd, Peveril House, Mill bridge, Castleton, Hope Valley. S33 8WR	Termination / connection of PCal source leads	PCal assembly PCAL-PFM-000	I	V	1	Not critical		ISO9001			

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