

 		<b>Ref.:SPIRE</b> <b>Issue: 1.0</b> <b>Date:19 October 2004</b> <b>Page 1 of 14</b>
	<b>Declared Mechanical Parts List</b> <b>Cardiff Deliverables for SPIRE-PFM</b>	

**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		14 <sup>th</sup> September 2004
Approved by:-	Ian Walker – Cardiff AIG programme manager		

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# Update history

Date	Version	Remarks
20 <sup>th</sup> September 2004	1.0	First issue of Cardiff combined list

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## **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 = Geostationary 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					

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>53</b>		<b>Bearing parts</b>											
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									

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>54</b>		<b>Separating parts</b>											
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									

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>55</b>		<b>Control parts</b>											
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			

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>58</b>	<b>Measuring instruments</b>												
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									

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>59</b>	<b>Optical passive equipment</b>												
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									

<b>Issue # 1</b>	<b>DECLARED MECHANICAL PARTS LIST</b>										<b>HSO-CDF-LI-075</b>			
<b>Project:</b>	<b>Herschel-SPIRE</b>													
<b>Institute:</b>	<b>Cardiff University</b>													
<b>Prepared by:</b>	<b>Peter Hargrave</b>													
<b>Category:</b>	<b>60</b>	<b>Magnetic parts</b>												
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 <sub>2</sub> O <sub>3</sub> 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			

End of document.