



**COMBINED DECLARED
MECHANICAL PARTS LIST**

**PRODUCT ASSURANCE
Space Science and
Technology Department**

| | | | | | |
|----------------------------|-----------------|---------------------|-----------------------------|-------------|----------|
| Spacecraft/Project: | HERSCHEL | Document No: | SPIRE RAL PRJ 001094 | | |
| Instrument/Model: | SPIRE | Issue No: | 3 | REV: | 1 |
| Subsystem: | FPU | Date: | 07 December 2004 | | |

| | | |
|---------------------------------------|--|-----------------------------|
| SUBJECT: | COMBINED DECLARED MECHANICAL PARTS LIST | |
| PREPARED BY: | E A Clark | |
| DOCUMENT No: | SPIRE-RAL-PRJ-0001094 | |
| | | |
| APPROVED BY: | Name | Signature & Date |
| Project Manager | K.J. King | |
| Instrument Development Manager | E. Sawyer | |
| Product Assurance Manager | Eric Clark | |

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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-000710 Iss 1.5 |
| CEA/SAp | | DECLARED MECHANICAL PARTS LIST DRCU. SPIRE- SAp-NC-0100-03 Iss 1.0 | SPIRE-SAP-DOC-001610 Iss 1.0 |
| 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 | | DECLARED MECHANICAL PARTS LIST | SPIRE-JPL-DOC-00xxxx Iss |
| LAM (LAS) | | DECLARED MECHANICAL PARTS LIST SMEC | SPIRE-LAM-DOC-00xxxx Iss |
| | | DECLARED MECHANICAL PARTS LIST FTS | SPIRE-LAM-DOC-000xxx Iss |
| 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

| | | | | | |
|---|-----------------|--|-----------------------------|--|----------|
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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 |
| UCF (CDF) | Department of Physics and Astronomy, University of Wales, Cardiff, | YES |
| CEA/SAp | CEA, Service d'Astrophysique Saclay | YES |
| CEA/SBT | (CEA) Service du Basse Temperatures Grenoble | No |
| CSA/USK | Canadian Space Agency (CSA) University of Saskatchewan Canada | N/A |
| CGS (IFSI) | Instituto di Fisica dello spazio Interplanetario, Rome | YES |
| JPL | JPL/Caltech, Pasadena | No |
| LAM (LAS) | Laboratoire d'Astronomie Spatiale, Marseille | No |
| MSSL | Mullard Space Science Lab Surrey | N/A |

| | | | | | |
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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

| | | | | | |
|---|--|------------------|--|-----------------------------|----------|
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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.

| | | | | | |
|---|--|------------------|--|-----------------------------|----------|
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| Instrument/Model: | SPIRE | Issue No: | 3 | REV: | 1 |
| Subsystem: | FPU | Date: | 07 December 2004 | | |

- **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.

| | | | | | |
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| Subsystem: | FPU | Date: | 07 December 2004 | | |

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.



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| Subsystem: | FPU | Date: | 07 December 2004 | | |

APPENDIX A

| | | | |
|--------------------------------|-----------------|---------------------------|-----------------------------|
| DECLARED COMPONENT LIST | | ORIGINATOR: UK ATC | |
| SPACECRAFT / PROJECT: | Herschel | Doc. Number | SPIRE-ATC-PRJ-000709 |
| SYSTEM / EXPERIMENT: | SPIRE | Sheet No | Page 1 of 3 |
| SUB-SYSTEM: | BSM | Issue: | 1.1 |
| | | Date: | 12.Aug.02 |

| Declared Part ID No. | Description | Manufacturer/ Supplier | Country | Specification | Quality | Notes |
|----------------------|--------------------------------------|------------------------|---------|------------------------------|--------------------------------|---|
| 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 | TBD | 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. | CAP-HD-SCREW-SS-M2-5X21_8 | | | | | Probably will use 22 or 24mm long - TBC |
| 5. | CAP-HD-SCREW-SS-M2-5X24 | | | | | |
| 6. | CAP-HD-SCREW-SS-M2-5X6 | | | | | |
| 7. | CAP-HD-SCREW-SS-M2-5X7 | | | | | |
| 8. | CAP-HD-SCREW-SS-M2-5X7_75 | | | | | Probably will use 8mm long - TBC |
| 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 COMPONENT LIST | | ORIGINATOR: UK ATC | |
| SPACECRAFT / PROJECT: | Herschel | Doc. Number | SPIRE-ATC-PRJ-000709 |
| SYSTEM / EXPERIMENT: | SPIRE | Sheet No | Page 2 of 3 |
| SUB-SYSTEM: | BSM | Issue: | 1.1 |
| | | Date: | 12.Aug.02 |

| Declared Part ID No. | Description | Manufacturer/ Supplier | Country | Specification | Quality | Notes |
|----------------------|------------------------------------|------------------------|---------|-----------------------------------|----------------------------------|----------------------|
| 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) | TBD | E.U | TBD | TBD | |
| 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 | TBC | E.U | Austenitic, DIN A2, Grade 70 | TBC | |
| 19. | LACING TAPE, BRAIDED DACRON 22DPTH | TBC | E.U | Gude-Space PT/MIL-T-43435B | TBD | 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 COMPONENT LIST | | ORIGINATOR: UK ATC | |
| SPACECRAFT / PROJECT: | Herschel | Doc. Number | SPIRE-ATC-PRJ-000709 |
| SYSTEM / EXPERIMENT: | SPIRE | Sheet No | Page 3 of 3 |
| SUB-SYSTEM: | BSM | Issue: | 1.1 |
| | | Date: | 12.Aug.02 |

| Declared Part ID No. | Description | Manufacturer/ Supplier | Country | Specification | Quality | Notes |
|-----------------------------|-----------------------|--|----------------|---|----------------------------|--|
| 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.

| | | |
|---|---|---|
|  | DRCU Declared Mechanical Parts List (DMPL) |  SAp-SPIRE-NC-0100-03 Issue: 1.0 Date: 11/02/03 Page: 1/10 |
|---|---|---|

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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|---|---|---|
|  | DRCU Declared Mechanical Parts List (DMPL) |  SAp-SPIRE-NC-0100-03 Issue: 1.0 Date: 11/02/03 Page: 5/10 |
|---|---|---|

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 | $0 \leq 100$ K |
| 2 | $101 \leq 200$ K |
| 3 | $201 \leq 300$ 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,...) | <input checked="" type="checkbox"/> |
| 52 | Connecting parts (bolts, nuts, rivets, inserts, clips, ...) | <input checked="" type="checkbox"/> |
| 53 | Bearing parts (ball-bearings, needle bearings, ...) | <input type="checkbox"/> |
| 54 | Separating parts (pyrotechnics, spring, cutters, ...) | <input type="checkbox"/> |
| 55 | Control parts (gears, ...) | <input type="checkbox"/> |
| 56 | Fluid handling parts (diffusers) | <input type="checkbox"/> |
| 57 | Heating parts | <input type="checkbox"/> |
| 58 | Measuring instruments (gauges, thermocouples, ...) | <input type="checkbox"/> |
| 59 | Optical passive equipment | <input type="checkbox"/> |
| 60 | Magnetic parts | <input type="checkbox"/> |
| 61 | Other parts | <input checked="" type="checkbox"/> |



DRCU
Declared Mechanical Parts List (DMPL)



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Issue: 1.0
Date: 11/02/03
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Group 51 – Spacing parts

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | | 10 |
|----------|--|----------------------------------|---|---|---|-----------------------------|--------------------------|---|-----------------|--------------------------|
| 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 ¹ | 9.1 | 9.2 | Comments ESA approval |
| | | | | | | | | 1. Justification 2. Subcontractor comments | Approval status | |
| 51-1 | | Stainless steel Flatwasher | To be filled out | ° | | R I E V T 3/4 | Not critical | 1. Common use | A | |
| 51-2 | | Stainless steel Lockwasher | To be filled out | ° | | R I E V T 3/4 | Not critical | 1. Common use | A | |
| 51-3 | | Stainless steel ondulated washer | To be filled out | ° Used to compensate the difference between thermal expansion coefficient | | R I E V T 3/4 | Not critical | 1. Common use | A | |

¹ As defined in ECSS-Q-70A §4.1.4 Criticality analysis



DRCU
Declared Mechanical Parts List (DMPL)



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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 ¹ | 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 | Clamping device | 1. Calemark@ Ireland 2. BCF MKM (France) 3. | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | |

¹ As defined in ECSS-Q-70A §4.1.4 Criticality analysis



DRCU
Declared Mechanical Parts List (DMPL)



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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 ¹ | 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 | |

¹ As defined in ECSS-Q-70A §4.1.4 Criticality analysis



CARLO GAVAZZI SPACE SpA

HERSCHEL DPU_s/ICU

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Doc. Type:

N° DRD:
DRD N°:

N° Doc.:
Doc. N°: SPIRE-CGS-DOC-002199

Ediz.: **DRAFT**
Issue:

Data:
Date:

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Titolo : **HERSCHEL SPIRE DPU UNIT DECLARED MECHANICAL PARTS LIST**
Title :

| | Nome & Funzione <i>Name & Function</i> | Firma <i>Signature</i> | Data <i>Date</i> | LISTA DI DISTRIBUZIONE <i>DISTRIBUTION LIST</i> | N | A | I |
|---|---|---------------------------|---------------------|--|---|---|---|
| Preparato da: <i>Prepared by:</i> | | | | Interna / <i>Internal</i> | | | |
| Approvato da: <i>Approved by:</i> | | | | | | | |
| Applicazione autorizzata da: <i>Application authorized by:</i> | | | | | | | |
| Customer / Higher Level Contractor | | | | Esterna / <i>External</i> | | | |
| Accettato da: <i>Accepted by:</i> | | | | | | | |
| Approvato da: <i>Approved by:</i> | | | | | | | |
| | | | | N=Numero di copie A=Applicazione I=Informazione <i>N=Number of copy A=Application I=Information</i> | | | |

Gestione documenti:

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

File: Herschel_SPIRE_DMPL_draft.doc

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HERSCHEL DPUs/ICU

HERSCHEL SPIRE DPU UNIT DECLARED MECHANICAL PARTS LIST

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REGISTRAZIONE DELLE MODIFICHE / *CHANGE RECORD*

| EDIZIONE <i>ISSUE</i> | DATA <i>DATE</i> | AUTORIZZAZIONE <i>CHANGE AUTHORITY</i> | OGGETTO DELLA MODIFICA E SEZIONI AFFETTE <i>REASON FOR CHANGE AND AFFECTED SECTIONS</i> |
|--------------------------|---------------------|---|--|
| DRAFT | | | |
| | | | |
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|--------------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|----------------|-------------------|
| 1 - 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 |
| | | | |

| | | | | |
|---|--|--------------------|-----------|----------------|
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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=Geostationary | S=Outside shadow | V=Vacuum | 1=0 to 100 K |
| L=Low orbit | L=Outside light | H=Hermetic | 2=101 to 200 K |
| B=Radiation belts | | M=Manned | 3=201 to 300 K |
| I=Interplanetary | | E=Elevated pressure | etc. |



CARLO GAVAZZI SPACE SpA


HERSCHEL DPUs/ICU

HERSCHEL SPIRE DPU UNIT DECLARED MECHANICAL
PARTS LIST

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| | HERSCHEL SPIRE DPU UNIT DECLARED MECHANICAL PARTS LIST | Ediz.: DRA Data: <i>Issue:</i> FT <i>Date:</i> | |
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(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 column 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 column 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 column 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 | | |

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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 th September 2004 |
| Approved by:- | Ian Walker – Cardiff AIG programme manager | | |
| | | | |
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|---|--|
| Astronomy Instrumentation Group, Department of Physics & Astronomy, University of Wales, Cardiff, 5 The Parade, Cardiff CF24 3YB +44 (0)2920 876682 | K:\Product Assurance\Declared Lists\CDF\HSO-CDF-LI-075-DMPLa.doc |
|---|--|

Update history

| Date | Version | Remarks |
|---------------------------------|---------|--------------------------------------|
| 20 th 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 | | | | |
| | | | | | | | | | | | | | | | |
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| 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 | | | |
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| 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 | | | |
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| 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 | | | |
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| 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 | | |
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| 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 | | |
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| 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 | | | |
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| Issue # 1 | DECLARED MECHANICAL PARTS LIST | | | | | | | | | | HSO-CDF-LI-075 | | | |
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| 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 | | | |
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| 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 | | | |
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| 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 | | |
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| 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 ₂ O 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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