



SRef.:SPIRE
 CRef.: HSO-CDF-LI-042
 Issue: 1.0
 Date:11 February 2003
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**300mK Strap Supports & Light Baffles -
 Declared Materials and Parts List**

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Declared Materials and Parts List

SPIRE Ref.:
 Cardiff Ref.: HSO-CDF-LI-042
 Issue: 1.0

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 Last Modified on: 11 February 2003
 Approved by:

Distribution list

Update history

Date	Version	Remarks
08/02/03	1.0	First Issue for DDR

List of Acronyms

Term	Meaning	Term	Meaning
AD	Applicable Document	IR	Infrared
ADC	Analogue to Digital Converter	IRD	Instrument Requirements Document
AIV	Assembly, Integration and Verification	IRTS	Infrared Telescope in Space
AME	Absolute Measurement Error	ISM	Interstellar Medium
AOCS	Attitude and Orbit Control System	JFET	Junction Field Effect Transistor
APART	Arizona's Program for the Analysis of Radiation Transfer	ISO	Infrared Space Observatory
APE	Absolute Pointing Error	LCL	Latching Current Limiter
ASAP	Advanced Systems Analysis Program	LIA	Lock-In Amplifier
ATC	Astronomy Technology Centre, Edinburgh	LVDT	Linear Variable Differential Transformer
AVM	Avionics Model	LWS	Long Wave Spectrometer (an instrument used on ISO)
BDA	Bolometer Detector Array	MAC	Multi Axis Controller
BFL	Back Focal Length	MAIV	Manufacturing, Assembly, Integration and Verification
BRO	Breault Research Organization	MCU	Mechanism Control Unit = HSMCU
BSM	Beam Steering Mirror	MGSE	Mechanical Ground Support Equipment
CBB	Cryogenic Black Body	M-P	Martin-Puplett
CDF	Cardiff, Department of Physics & Astronomy	NEP	Noise Equivalent Power
CDMS	Command and Data Management System	NTD	Neutron Transmutation Doped
CDMU	Command and Data Management Unit	OBS	On-Board Software
CDR	Critical Design Review	OGSE	Optical Ground Support Equipment
CEA	Commissariat a l'Energie Atomique	OMD	Observing Modes Document
CMOS	Complimentary Metal Oxide Silicon	OPD	Optical Path Difference
CoG	Centre of Gravity	PACS	Photodetector Array Camera and Spectrometer
CPU	Central Processing Unit	PCAL	Photometer Calibration source
CQM	Cryogenic Qualification Model	PFM	Proto-Flight Model
CVV	Cryostat Vacuum Vessel	PID	Proportional, Integral and Differential (used in the context of feedback control loop architecture)
DAC	Digital to Analogue Converter	PLW	Photometer, Long Wavelength
DAQ	Data Acquisition	PMW	Photometer, Medium Wavelength
DCU	Detector Control Unit = HSDCU	POF	Photometer Observatory Function
DDR	Detailed Design Review	PROM	Programmable Read Only Memory
DM	Development Model	PSW	Photometer, Short Wavelength
DPU	Digital Processing Unit = HSDPU	PUS	Packet Utilisation Standard
DSP	Digital Signal Processor	RAL	Rutherford Appleton Laboratory,
DQE	Detective Quantum Efficiency	RD	Reference Document
EDAC	Error Detection and Correction	RMS	Root Mean Squared
EGSE	Electrical Ground Support Equipment	SCAL	Spectrometer Calibration Source
EM	Engineering Model	SCUBA	Submillimetre Common User Bolometer Array
EMC	Electro-magnetic Compatibility	SED	Spectral Energy Distribution
EMI	Electro-magnetic Interference	SMEC	Spectrometer Mechanics
ESA	European Space Agency	SMPS	Switch Mode Power Supply
FCU	FCU Control Unit = HSFCU	SOB	SPIRE Optical Bench
FIR	Far Infrared	SOF	Spectrometer Observatory Function
FIRST	Far Infra-Red and Submillimetre Telescope	SPIRE	Spectral and Photometric Imaging Receiver
FOV	Field of View	SRAM	Static Random Access Memory
F-P	Fabry-Perot	SSSD	SubSystem Specification Document
FPGA	Field Programmable Gate Array	STP	Standard Temperature and Pressure
FPU	Focal Plane Unit	SVM	Service Module
FS	Flight Spare	TBC	To Be Confirmed
FTS	Fourier Transform Spectrometer	TBD	To Be Determined
FWHM	Full Width Half maximum	TC	Telecommand
GSFC	Goddard Space Flight Center	URD	User Requirements Document
HK	House Keeping	UV	Ultra Violet
HOB	Herschel Optical Bench	WE	Warm Electronics
HPDU	Herschel Power Distribution Unit	ZPD	Zero Path Difference
HSDCU	Herschel-SPIRE Detector Control Unit		
HSDPU	Herschel-SPIRE Digital Processing Unit		
HSFCU	Herschel-SPIRE FPU Control Unit		
HSO	Herschel Space Observatory		
IF	Interface		
IID-A	Instrument Interface Document - Part A		
IID-B	Instrument Interface Document - Part B		
IMF	Initial Mass Function		

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1. Scope

This document identifies the material types that will be used in the SPIRE 300mK strap supports and light baffles. The data is based on mature designs and is practically complete.

2. Documents

2.1. *Applicable documents*

All applicable documents are listed in the AD chapter of the CIDL (HSO-CDF-LI-029).

2.2. *Reference documents*

RD1	ECSS-Q-70A	Materials Mechanical Parts and Processes
RD2	ESA PSS-01-700	The Technical Reporting and Approval Procedure for Materials and Processes

3. Table description for the declared materials

The format of the materials table is as described in RD2.

3.1. *Material Categories*

The following list identifies all the categories of materials:-

1. Aluminium and Aluminium Alloys
2. Copper and Copper Alloys
3. Nickel and Nickel Alloys
4. Titanium and Titanium Alloys
5. Steels
6. Stainless Steels
7. Filler Metals and Solders
8. Miscellaneous Metallic Materials
9. Optical Materials
10. Adhesives, Coatings and Varnishes
11. Adhesive tapes
12. Paints, Primers and Inks
13. Lubricants
14. Potting Compounds, Sealants, Foams
15. Reinforced Plastics
16. Rubbers and Elastomers
17. Thermoplastics
18. Thermoset Plastics
19. Wires and Cables
20. Miscellaneous Non-metallic Materials

3.2. *Column description*

1. Item number
2. Commercial Identification
3. Nature and Type of Product
4. Procurement Information
5. Summary of Processing Parameters
6. Use and Location
7. Environmental Code
8. Size Code
9. Approval Status
10. ESA Comments

NOTES:

Column 7: Environmental Code

Radiation (R)		Ambiance (A)	Temperature (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 100K 2 = 101 to 200K 3 = 210 to 300K etc

Column 8: Size code

AREA	A (cm ²)	0 = 0<1
VOLUME	V (cm ³)	1 = 1<10
MASS	W (g)	2 = 10<100
		3 = 100<1000
		etc

3.3. Abbreviations

N/A = Not applicable

TBA= To be advised

Issue No 1		<u>DECLARED MATERIALS LIST</u>						HSO-CDF-LI-042-1.0			
PROJECT:		Herschel Space Observatory									
EXPERIMENT:		SPIRE									
EXPERIMENTER:		Cardiff University									
PREPARED BY:		P. Hargrave									
CATEGORY: 1. Aluminium and Aluminium Alloys											
Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environment Code R A T			Size Code	Approval Status	ESA Comments
1-1	Aluminium alloy 6082	6082-T6 Commercial product Extrusion/plate & rod	Orchard Materials Ltd, Bristol BS 1470/1474	Machining. Alocrom 1200 finish.	Photometer support base, Light baffle base, baffle	B	V	1	W2	ESA & NASA approved	

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EXPERIMENTER:		Cardiff University									
PREPARED BY:		P. Hargrave									
CATEGORY: 6. Stainless Steels											
Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environment Code			Size Code	Approval Status	ESA Comments
						R	A	T			
5-1	Stainless Steel 304L	304L Commercial product Drawn bars	Cogne UK Ltd, Sheffield. F304L1	Machined. Electropolished (not capstans)	Hubs, photometer support sides, struts, light baffle inner & outer rings, capstans	B	V	1	W1	ESA & NASA approved	

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EXPERIMENTER:		Cardiff University									
PREPARED BY:		P. Hargrave									
CATEGORY: 10. Adhesives, Coatings and Varnishes											
Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environment Code			Size Code	Approval Status	ESA Comments
						R	A	T			
10-1	Cardiff Black Coating	Epotek-920 epoxy base, 3% by mass Carbon particles added. Proprietary mixture – HSO-CDF-PR-xxx	Epotex-920, Epoxy Technologies, MA, USA. Carbon lampblack – best quality, product #33068, BDH LTD, Poole, UK	HSO-CDF-PR-xxx	High emissivity coating. Light baffle cover and inner hub light baffle.	B	V	1	N/A	In qualification	Epotek-920 epoxy on ESA & NASA approved list.
10-2	Epotek-920	Epotek-920 two part epoxy. Commercial product.	Epotex-920, Epoxy Technologies, MA, USA.	HSO-CDF-PR-xxx	Encapsulation of free ends of Kevlar cords	B	V	1	N/A	ESA & NASA approved.	

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PROJECT: Herschel Space Observatory
EXPERIMENT: SPIRE
EXPERIMENTER: Cardiff University
PREPARED BY: P. Hargrave

CATEGORY: 17. Thermoplastics

Item No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environment Code			Size Code	Approval Status	ESA Comments
						R	A	T			
17-1	Torlon 4203L	Poly(amide-imide) engineering polymer.	Torlon 4203L BP Amoco Polymers, Inc., Georgia, USA	Machined	Covers Kevlar guide holes in inner hub. Inner light trap.				W0		

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EXPERIMENTER:		Cardiff University									
PREPARED BY:		P. Hargrave									
CATEGORY: 20. Miscellaneous Non-metallic Materials											
Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environment Code			Size Code	Approval Status	ESA Comments
						R	A	T			
20-1	Kevlar 11	Aromatic polyamide fibre. Formed into "ropes" of ~291 Tex	DuPont. Cousin Filterie	HSO-CDF-PR-xxx	Suspension of photometer support hub and light baffle hub				W0	In qualification	