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Herschel/SPIRE

MULLARD SPACE SCIENCE LABORATORY
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SPIRE – STRUCTURE DECLARED MATERIALS LIST

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Change Record

ISSUE	Date	Brief description of change
0.1	September 2001	New document
1.0	November 2001	Issued and Updated
1.1	10 July 2002	Updated to reflect new design changes
2	22 November 2002	Updated to reflect comments from RAL
3	February 2003	Updated to include Silver Solder

CONTENTS

1. INTRODUCTION

This document identifies the material types that will be used in the SPIRE structure. The data is based on mature designs and is practically complete.

2. REFERENCES

2.1 Normative References

NR1	MSSL/SPIRE/PA001	Product Assurance Plan
NR2	ECSS-Q-70A	Materials Mechanical Parts and Processes
NR3	ESA PSS-01-700	The Technical Reporting and Approval Procedure for Materials and Processes

3. QUALITY LEVELS

Material selection shall be as described in NR1, paras 8.1 and 8.2.

4. TABLE DESCRIPTION FOR THE DECLARED MATERIALS

The format of the materials table is as described in NR3.

4.1 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

4.2 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	S = Outside shadow	V = Vacuum	1 = 0 to 100K
L = Low orbit	L = Outside light	H = Hermetic	2 = 101 to 200K
B = Radiation belts		M = Manned	3 = 210 to 300K
I = Interplanetary		E = Elevated pressure	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

4.3 Abbreviations

N/A = Not applicable
TBA= To be advised

Issue No 2	**DECLARED MATERIALS LIST**	**MSSL/SPIRE/PA002**

PROJECT: **Herschel/SPIRE**
EXPERIMENT:
EXPERIMENTER: **MULLARD SPACE SCIENCE LABORATORY (MSSL)**

PREPARED BY: **C Brockley-Blatt**

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	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Aluminium alloy 6082	6082-T6 Commercial product Extrusion/plate & rod	J Smith & Sons London UK BS 1470/1474	Alocrom 1200	Optical Bench, Mirror mounts, detector boxes, filter mounts, covers	B	V	3/4	W4	ESA & NASA	

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CATEGORY: 2. Copper and copper alloys

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Oxygen Free High Conductivity Copper	BS 3839 C103	J Smith & Sons London UK BS 1470/1474	N/A	Thermal Straps, Thermal Busbar	B	V	3/4	W1	ESA & NASA	

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CATEGORY: 4. Titanium and titanium alloys

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments

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CATEGORY: 6. Stainless steels

Item No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Stainless steel AISI 321	Commercial product AISI 321 S12/S20	Various BS 1449	N/A	Instrument supports, Detector box supports	B	V	3/4	W2	ESA & NASA	

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CATEGORY: 7. Filler metals and solders

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Silver Solder	55% Silver 45% made from Copper, Zinc, Tin			Thermal Busbar	B	V	3/4	W1	ESA & NASA	

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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	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Scotch Weld 1838	Commercial product 2 part, epoxy adhesive	3 M's Adhesive Supplies	Mix 1:1 by mass Cure 4hrs @ 60°C		B	V	3/4	W1	ESA & NASA	
2	Stycast 2850FT Black	Commercial product 2 part, epoxy adhesive for cyrogenics			Secure harness mounting points	B	V	3/4	W1	ESA & NASA	

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CATEGORY: 12. Paints, primers and inks

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
2.	Anodising	Commercial product Chromic acid process	Ingram & Glass, Godalming, UK DEF STN 0324	N/A		B	V	3/4	A3	ESA & NASA	
3.	Alocrom 1200	Chromating Commercial product	MSSL	N/A	Optical bench, mounts, covers, detector boxes	B	V	3/4	A3	ESA & NASA	
4.	Chemglaze 9924	Polyvinyl butyral resin - Primer	Hughson Chemicals US	N/A		B	V	3/4	A3		

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CATEGORY: 18. Thermoset plastics

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Vespel SP 1	Polyimide Commercial product Unfilled base resin Bar	Du Pont USA Vespel SP 1	N/A	Thermal insulation	B	V	3/4	W2	ESA & NASA	
2.	Kapton	Polyimide tape Y966 acrylic adhesive coated. Commercial product	Du Pont USA (HPC Stevenage, UK)	N/A		B	V	3/4	W1	ESA & NASA	
3.	PTFE	PTFE Commercial product Plate	Du Pont USA	N/A		B	V	3/4	W1	ESA & NASA	
4.	Kapton H	Polyimide adhesive coated film	Du Pont	N/A		B	V	3/4	W0		

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CATEGORY: 19. Wires and cables

Itm No	Commercial Identification	Chemical Nature Type of Product Form & Condition	Procurement Info., Supplier Spec. Issue	Summary of Processing Parameters	Use & Location	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1	167 Tex Kevlar 29 cable	Part number AR305767. Polyaramid	Goodfellow Cambridge LTD, Huntingdon, PE29 6WR	N/A	300mkl Strap System Supports	B	V	3/4	W1		

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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	Environmental Code R	A	T	Size Code	Approval Status	ESA Comments
1.	Barden patented matl. Bartemp Bearings	Teflon coated glass fibres impregnated with MoS_2	Barden Corp Plymouth Devon UK	N/A		B	V	3/4	W1		
2.	Duroid material	Duroid	SNFA Bearings, Glos. UK	N/A		B	V	3/4	W1	ESA & NASA	
3. .	Gudebrod 450X	Lacing cord	Gudebrod Inc US	N/A		B	V	3/4	W1		