REVISIONS			
SYMBOL	DESCRIPTION	DATE	APPROVAL
-	Original Release	11-12-02	T. J. PERRY

SHEET REVISION STATUS																				
SH	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
REV	--	--	--	--	--	--	--	--												
SH	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV																				

Originator T J Perry T. J. Perry/562/QSS	DATE 11-07-02	FSC: 5950
Approved V. B. Patel V. B. Patel/562/GSFC	11-07-02	Detail Specification for a 0.6 mH Filter Inductor
GLAST LAT Approval N.K. Virmani/Code 543.0/Swales	11-08-02	
GLAST ACD Approval Dail Sheppard D.A. Sheppard/Code 564.0/GSFC	11-07-02	
GLAST ACD Approval Glenn Unger G.L. Unger/Code 564.0/GSFC	11-07-02	S-311-320-LATACD-0004
GLAST ACD Approval T.E. Johnson/Code 556.0/GSFC	11/7/02	

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CAGE CODE: 25306

1. SCOPE

1.1 Scope. The complete requirements for procuring or manufacturing the filter inductor described herein shall consist of this detail specification and the issue in effect GSFC specification S-311-320. This specification slash sheet has been written for use by the GLAST project in the LAT Anticoincidence Detector (ACD) subsystem.

1.2 Goddard Part Number. The inductors shall be identified by the following part number:

S311320-	LATACD/	0004	B
(Goddard Designator)	(ACD Project Identifier)	(Construction Code)	(Class B)

2. APPLICABLE DOCUMENTS

2.1 Applicable documents: The following documents, of the issue in effect on the date the purchase order is established, form a part of this specification to the extent specified herein.

Specifications

Federal

J-W-1177	Wire, Magnet, Electrical

NASA/GSFC

S-311-320A	General Specification for Simple Custom Electromagnetic Assemblies

3. REQUIREMENTS

3.1 Item requirements. The individual item requirements shall be as specified herein. Unless otherwise specified the general item requirements shall be in accordance with the GSFC Specification S-311-320A.

3.2 Design and Construction

3.2.1 Outline dimensions and terminal Connections. The device outline dimensions and terminal connections shall be as shown in Figure 1.

3.2.2 Weight. 5 grams, maximum

Table 1. Device Outline

Dimension	Inches
A	0.513 (typ.)
B	0.299 (typ.)
C	0.260 (typ.)

Table 2 List of Materials

Material	Part Number	Manufacturer	Description	Procurement Specification
#26 Magnet Wire	B-2262213	MWS Wire Industries	Bifilar	
Core	YW-41306-TC	Magnetics	Core, Parylene coated	N/A
Cleaning Solvent	Ethanol (1)	N/A	N/A	N/A
Impregnating Compound	Epon 828/Versamid 125 (70/30)		Epoxy	

(1) A procedure shall be used to limit and control the use of ethanol for cleaning cores and wires.

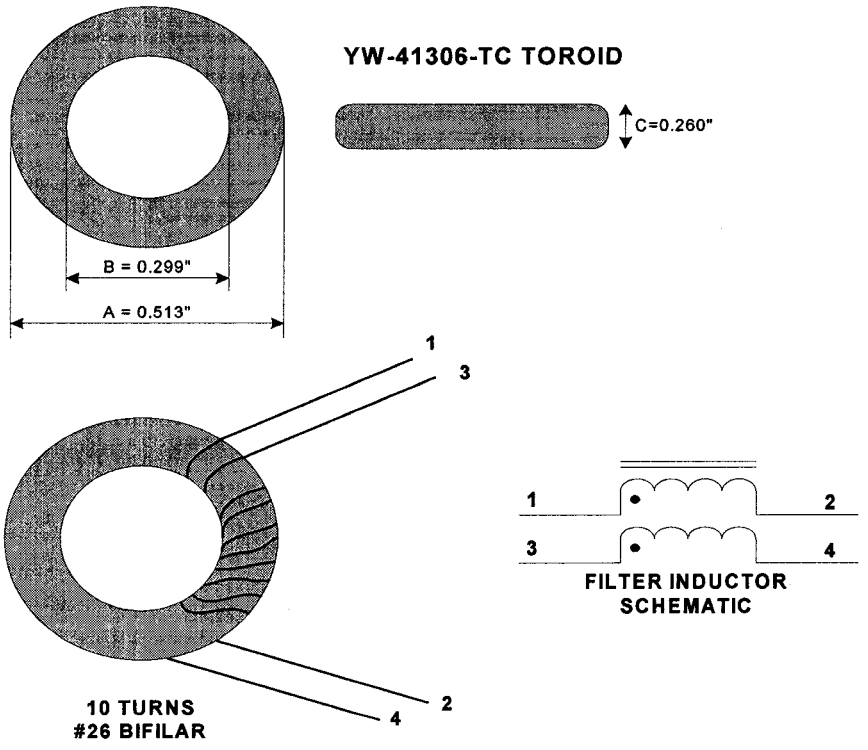

Figure 1. Filter Inductor

3.2.3 Terminals. Self lead, solderable
Length: 2.0 inches

3.2.4 Temperature.
Operating (ambient): -20°C to +60°C
Storage -40°C to +85°C

3.3 Materials of Construction. Materials shall conform to the requirements of GSFC S-311-320 specification and as specified in Table 2 herein.

3.4 Performance Characteristics and Requirements

3.4.1 Environmental Performance Requirements. The environmental performance requirements of the inductor shall be as specified in Table 3.0.

Table 3.0 Environmental Performance Requirements

Attribute	Data Value	Units
Maximum Operating Frequency	1	MHz
Maximum Current	2.5	Amps
Dielectric Withstanding Voltage (DWV)@ Atmospheric Pressure	250	Vrms
Insulation Resistance at +25°C	100	Mohms (min)
Operating Temperature Range (Ambient)	-20 to +60	°C
Storage Temperature Range	-40 to+85	°C
Temperature Rise (maximum)	+20	°C
Thermal Shock	-40 to +85	°C

3.4.2 Electrical Performance Requirements. The electrical performance requirements shall be as specified in Table 3.1.

Table 3.1 Electrical Performance Requirements Note 1

Wire Number		DC Winding Resistance (mOhms)		Winding Inductance (mHenrys)	
Start	End	min.	max.	min.	max.
1,3	2,4	30	80	0.45	0.75

Note 1 Measurements in Table 3.1 to be taken with Wayne/Kerr Model 3240 Inductance Analyzer or equivalent. Inductance shall be measured at 1 kHz.

3.5 Part marking. The part shall be fully identified on the part or package as applicable. The following information is required to maintain part identification and traceability: part number (see 1.2), serial number, terminal identification and lot date code.

3.6 Data Requirements. All test data shall be traceable to each inductor by serial number and lot date code. All d.c. resistance, inductance and insulation resistance measurements shall be read and recorded.

3.7 Radiographic Inspection. Applicable, reference Appendix A of S-311-320.

4. Product Assurance Provisions.

4.1 Qualification Inspection. Devices designed and manufactured in accordance with this specification shall meet the qualification requirements described in Table 4 and paragraphs 4.1.1 through 4.1.5 herein.

4.1.1 Visual and dimensional examination (external). All inductors shall be visually inspected under a 10X magnification. Construction, physical dimensions, weight, and part marking shall be as specified in Figure 1, Table 1 and paragraphs 3.2.2 and 3.2.3 herein .

4.1.2 Thermal Shock. The thermal shock test shall be performed in accordance with Method 107 of MIL-STD-202. The following details and exception shall apply:

a. Test temperature: -40°C to +85°C
b. Test cycles: 10 minimum
c. Measurement before and after cycling: DC winding resistance and winding inductance (see 4.1.4.2 and 4.1.4.3 below)
d. Examination after test: After cycling, visually examine the devices for evidence of any physical damage to the core and wire.

4.1.3 Burn-in. All inductors shall be subjected to a no load burn-in for 24 hours minimum. The following requirements shall apply:

a. Temperature: +85°C
b. Voltage or current: Not applicable
c. Examination after test: DC winding resistance and inductance. The inductor shall be stabilized at room temperature before measurement.

4.1.4 Electrical characteristics. Each inductor shall be subjected to the electrical tests specified herein. Test data shall be taken for each unit and individual readings of observed values shall be recorded by device serial number. Electrical parameters shall not exceed the limits specified in Tables 3.0 and 3.1 above. The measurements shall be performed at 25 ± 0.5°C, a pressure of no less than one standard atmosphere and a relative humidity of between 30 and 70 percent.

4.1.4.1 Insulation resistance. Each inductor shall be tested in accordance with Method 302 of MIL-STD-202 with the following details and exceptions:

a. Voltage: 100 Vdc
b. Measurement: Winding-to-Winding
c. Method: The potential shall be applied between each winding with lead 1 shorted to lead 2 and lead 3 shorted to lead 4.
d. Test duration: 2 minutes ± 30 seconds.
e. Resistance: 100 Mohms minimum.

4.1.4.2 DC winding resistance. The dc resistance of each winding shall be measured and recorded. The resistance value shall be within the limits specified in Table 3.1. Calculate the change in resistance after the thermal shock exposure. The change in resistance shall not exceed ± 10 percent in accordance with the following: $\Delta R = ((R_{initial} - R_{final}) / R_{initial}) \times 100$.

4.1.4.3. Winding inductance. The inductance of each winding shall be measured and recorded. The inductance value shall be within the limits specified in Table 3.1. Calculate the change in inductance after the thermal shock exposure. The change in inductance shall not exceed ± 25 percent in accordance with the following: $\Delta L = ((L_{initial} - L_{final})/L_{initial}) \times 100$.

4.1.5 Test Data. All test data shall be traceable to each device by serial number. All DC resistance, inductance, insulation resistance and visual inspection shall be read and recorded. A traveler for recording this data is provided on page 8 herein.

4.2 Quality Conformance Inspection. Quality conformance inspection shall be performed on 100% of the devices built to this specification and shall be in accordance with paragraphs 4.5.1, 4.5.2, and 4.5.3 of GSFC S-311-320 and Table 4 herein. Lot acceptance shall be in accordance with the criteria given in paragraph 4.5.2 of S-311-320.

Table 4. Qualification Inspection Tests

Test	Inspection Conditions (paragraph herein)
Visual and Dimensional Examination (external)	4.1.1
Thermal Shock	4.1.2
Burn-In (No Load)	4.1.3
Electrical Characteristics	4.1.4
Insulation Resistance	4.1.4.1
DC Winding Resistance	4.1.4.2
Winding Inductance	4.1.4.3

Inductor Process Traveler

Part Name: _____

Serial Number: _____

Operations	Operator	Date	No. Passed	No. Failed
Inductor Winding				
Impregnation				
Visual Inspection Dimensions Weight	_____ _____	_____ _____	_____ _____	_____ _____
Electrical Test Insulation Winding resistance Winding inductance	_____ _____ _____	_____ _____ _____	_____ _____ _____	_____ _____ _____
Thermal Shock				
Burn-in				
Final review and Sign Off				

ELECTRICAL TEST DATA

Part Number: _____

Date: _____

Serial No.	Winding Start	Winding End	Insulation Resistance ____ Vdc	Winding Resistance mOhms			Winding Inductance mHenrys		
				Initial	Final	ΔR	Initial	Final	ΔL