REVISIONS

SYMBOL	DESCRIPTION	DATE	APPROVAL
D	• Added Pure Tin Plated Finish Prohibition and Note. • Added allowance for alternate test sequence for electrical measurements. • Added Clarification that testing shall be conducted in accordance with the appropriate MIL spec (either MIL-PRF-6106, MIL-PRF-39016 or MIL-PRF-83536). • Change of Custodian from Code 311 to Code 562. • General Specification Reformatting.	09/25/98	

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	D	D	D	D	D	D	D	D	D	D	D	D	D	D	D					
SH	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
REV																				

ORIGINATOR: **T. Perry/Paramax**	**DATE** **03/09/92**	**FSC: 5945**
APPROVED: **S. Archer-Davies/Paramax**	**03/09/92**	Relays, Electromagnetic, General Specification for
CODE 311 APPROVAL: **P. Jones/GSFC**	**03/11/92**	
CODE 311 SUPERVISORY APPROVAL: **G.P. Kramer, Jr./GSFC**		
ADDITIONAL APPROVAL:		**S-311-P-754**

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
GODDARD SPACE FLIGHT CENTER
GREENBELT, MARYLAND 20771

CAGE CODE: 25306

1. SCOPE

1.1 Scope. This specification covers the general requirements for electromagnetic relays used by Goddard Space Flight Center (GSFC) in critical (Grade 1) applications. This document specifies Quality Conformance Inspection (QCI) for relays similar to select MIL qualified relays and provides qualification and QCI requirements for certain relays not listed in any military Qualified Products List (QPL).

1.2 Types. Relays procured to this specification are classified into four types.

1.2.1 Type 1 relays. Similar to relays listed in the MIL-PRF-39016 QPL and qualified to failure rate level "M". Type 1 relays are essentially identical in construction and processing to their military counterparts with the following exceptions:

a) Cleaning and small particle inspection have been invoked.
b) PIND testing has been invoked.
c) QCI is performed in accordance with the requirements of Table 1 herein.
d) Painted enclosures and use of any materials on the outside surface that do not meet GSFC outgassing requirements in NASA Reference Publication 1124 are prohibited.
e) Parts are marked with the GSFC part number (see 1.3).

1.2.2 Type 2 relays. Similar to relays listed in the MIL-PRF-6106 QPL and qualified to failure rate level "M". Type 2 relays are essentially identical in construction and processing to their military counterparts with the following exceptions:

a) Cleaning and small particle inspection per MIL-PRF-83536 have been invoked.
b) PIND testing has been invoked.
c) QCI is performed in accordance with the requirements of Table 1 herein.
d) Painted enclosures and use of any materials on the outside surface that do not meet GSFC outgassing requirements in NASA Reference Publication 1124 are prohibited.
e) Parts are marked with the GSFC part number (see 1.3).

1.2.3 Type 3 relays. Similar to relays listed in the MIL-PRF-83536 QPL and qualified to failure rate level "M". Type 3 relays are essentially identical in construction and processing to their military counterparts with the following exceptions:

a) Cleaning and small particle inspection have been invoked.
b) PIND testing has been invoked.
c) QCI is performed in accordance with the requirements of Table 1 herein.
d) Painted enclosures and the use of any materials on the outside surface that do not meet GSFC outgassing requirements in NASA Reference Publication 1124 are prohibited.
e) Parts are marked with the GSFC part number (see 1.3).

1.2.4 Type 4 relays. Relays that are not similar to any listed in the QPL for MIL-PRF-39016, MIL-PRF-6106 or MIL-PRF-83536. Type 4 relays must meet the general requirements of MIL-PRF-83536 and the following:

a) Qualification per 4.4 herein.
b) Cleaning and small particle inspection per MIL-PRF-83536.
c) PIND testing per MIL-PRF-83536.
d) QCI per Table 1.
e) Painted enclosures and the use of any materials on the outside surface that do not meet GSFC outgassing requirements in NASA Reference Publication 1124 are prohibited.
f) Parts must be marked with the GSFC part number (see 1.3).

1.3 Goddard part number. Relays procured in complete compliance with the requirements of this specification shall be identified by a Goddard part number of the following form.

G311P754	/35	-001
Goddard Designator	Detail Specification Sheet Number (see 1.4)	Dash Number (see 1.4)

1.4 Detail specification sheets. Specific requirements for each relay type (see 1.2) and dash numbers are contained in detail specification sheets.

2. APPLICABLE DOCUMENTS

2.1 Documents. The following documents, of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

MIL-PRF-6106	Relays, Electromagnetic (Including Established Reliability (ER) Types), General Specification for
MIL-PRF-39016	Relays, Electromagnetic, Established Reliability, General Specification for
MIL-I-45208	Inspection Systems Requirements
MIL-PRF-83536	Relays, Electromagnetic, Established Reliability, General Specification for

STANDARDS

MIL-STD-202	Test Methods for Electronic and Electrical Component Parts
MIL-STD-1285	Marking of Electrical and Electronic Parts

OTHER PUBLICATIONS

ASTM E595	Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment, Standard Test Method for
NASA Reference Publication 1124	Outgassing Data for Selecting Spacecraft Materials
EIA-625	Requirements for Handling Electrostatic-Discharge-Sensitive (ESDS) Devices

2.2 Order of precedence. In the event of any conflict between the text of this specification and the detail specification, the detail specification shall have precedence. In the event of any conflict between the text of this specification or the detail specification and the references cited herein, the text of this specification or detail specification shall take precedence. However, nothing in this text or detail specification shall supersede applicable laws and regulations unless a specific exemption has been obtained.

2.3 Copies of documents. Copies of federal and military documents can be obtained from the Standardization Document Order Desk, 700 Robbins Avenue, Building #4-Section D, Philadelphia, PA 19111-5094. Copies of ASTM publications are available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103. Copies of EIA publications are available from the Electronic Industries Association, Engineering Dept., 2001 Pennsylvania Avenue N.W., Washington, D.C. 20006.

3. REQUIREMENTS

3.1 Qualification. Relays furnished to this specification shall be product which has been granted qualification approval by NASA/GSFC. Qualification approval shall be based on the following criteria.

3.1.1 Design and source approval (Type 4 only). Prior to qualification, the manufacturer's facility shall be subjected to survey at the option of GSFC, by the Office of Flight Assurance, GSFC. Compliance with MIL-I-45208, or equivalent, is required. In addition, the history and detailed engineering of the specific relay design will be reviewed, as will the documented manufacturing and quality control procedures. Only those sources approved in the design and source approval phase shall be eligible for qualification or award of contract under this specification. Source approval and design approval do not constitute part qualification or an equivalent thereof.

3.1.2 Part qualification (Types 1, 2, and 3). Qualification by similarity is extended based on the listing of the military equivalent relay at failure rate level "M" on the Qualified Products List for MIL-PRF-39016, MIL-PRF-6106, or MIL-PRF-83536. Relays supplied under this specification must be manufactured using the same production equipment, labor, materials (unless otherwise specified), processes and controls as their military counterparts.

3.1.3 Part qualification (Type 4 only). Relay product granted qualification shall be that which has passed the qualification inspection requirement of this specification. This requirement may be satisfied by passing the qualification inspection (see 4.4).

3.1.4 Requalification. Requalification shall be imposed following any changes in design, manufacture, materials or quality control procedures as reviewed and approved during qualification. Requalification shall be required if it is demonstrated that any stipulations initially presented in the manufacturer's certification no longer apply. Inspection discrepancies which are not suitably explained by analysis, or by other means, shall be considered a basis for disqualification by GSFC.

3.2 Materials.

3.2.1 Materials. Materials shall be as specified in the applicable MIL specifications and the applicable detail specification sheet herein. However, when a definite material is not specified, a material shall be used which will enable the relays to meet the performance requirement of this specification. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of finished product.

3.2.2 Thermal outgassing. All materials used in the construction of relays that are exposed to the outer surface, such as adjunct sealers, marking inks, paints, etc., must meet outgassing requirements of 1.0% total mass loss (TML) maximum and 0.1% collected volatile condensable materials (CVCM) maximum when tested in accordance with 4.6.21. Certification of compliance for use of acceptable materials listed in NASA Reference Publication 1124 may be substituted in lieu of testing.

3.2.3 Plated Finishes (see 6.4).

a) Pure tin plating is prohibited internally and externally. Use of tin-lead finishes are acceptable provided that the minimum lead content is 3 percent. Other tin-lead alloys are acceptable as approved by the qualifying activity.
b) Pure zinc plating is prohibited internally and externally.
c) Pure cadmium plating is prohibited internally and externally.

3.3 Design and construction. Relays shall be of the design, construction and dimensions depicted in the applicable MIL detail specification and the applicable detail specification herein (see 1.4).

3.4 Pre-cap (cleaning and small particle inspection). Prior to hermetic sealing of the relay header to the relay can, the relays and cans shall be cleaned and examined for small particle contaminants as specified in 4.6.1. A copy of the manufacturer's procedure for cleaning and small particle inspection shall be submitted to Goddard Space Flight Center for approval (see 4.4.4).

3.5 Seal. When relays are tested as specified in 4.6.3, the leak rate shall meet the requirement in the applicable detail specification sheet.

3.6 Electrical characteristics.

3.6.1 Coil resistance. When relays are tested as specified in 4.6.4, the coil resistance shall meet the requirement in the applicable detail specification sheet.

3.6.2 Pickup and dropout voltage (applicable to nonlatching relays only). When relays are tested as specified in 4.6.5, the pickup and dropout voltage shall meet the requirements in the applicable detail specification sheet.

3.6.3 Contact resistance or contact voltage drop. When relays are tested as specified in 4.6.6, the contact resistance or contact voltage drop shall meet the requirement in the applicable detail specification sheet.

3.6.4 Operate and release time (applicable to nonlatching relays only). When relays are tested as specified in 4.6.7, the operate and release time shall meet the requirements in the applicable detail specification sheet.

3.6.5 Bounce time. When relays are tested as specified in 4.6.8, the bounce time shall meet the requirement in the applicable detail specification sheet.

3.6.6 Coil transient suppression (applicable to dc operated relays with internal coil suppression). When relays are tested as specified in 4.6.9, coils in dc operated relays shall not generate a back EMF greater than specified in the applicable detail specification sheet (as maximum induced transient voltage).

3.6.7 Neutral screen (applicable to two coil latching relays only). Two coil latching relays shall be tested as specified in 4.6.10.

3.6.8 Insulation resistance. When relays are tested as specified in 4.6.11, the insulation resistance shall meet the minimum requirement in the applicable detail specification sheet.

3.6.9 Dielectric withstanding voltage. When tested as specified in 4.6.12, relays shall withstand the test voltage specified without damage. There shall be no leakage current in excess of 1 milliampere (mA), nor evidence of damage due to arcing, flashover, or insulation breakdown.

3.7 Vibration (sinusoidal). When relays are tested as specified in 4.6.13, there shall be no opening of closed contacts in excess of 10 microseconds, and there shall be no closure or abnormal bridging of open contacts in excess of 1 microsecond. Also, there shall be no evidence of mechanical or electrical damage to the relay.

3.8 Vibration (random) (when specified). When specified in the applicable detail specification, relays shall be tested according to 4.6.14. There shall be no opening of closed contacts in excess of 10 microseconds, and there shall be no closure or abnormal bridging of open contacts in excess of 1 microsecond. Also, there shall be no evidence of mechanical or electrical damage to the relay.

3.9 Particle impact noise detection (PIND). When relays are tested as specified in 4.6.15, there shall be no evidence of free moving particulate contamination. As an alternative, a copy of the manufacturer's procedure for PIND testing shall be submitted to Goddard Space Flight Center for approval (see 4.4.4).

3.10 Internal moisture. When relays are tested as specified in 4.6.16, the insulation resistance shall meet the minimum requirement in the detail specification sheet.

3.11 High temperature soak (when specified). When specified in the applicable detail specification, relays shall be conditioned according to 4.6.17.

3.12 High temperature run-in (when specified). When specified in the applicable detail specification, relays shall be tested according to 4.6.18. The contact miss detector's monitoring level shall not exceed 300 ohms.

3.13 Low temperature run-in (when specified). When specified in the applicable detail specification, relays shall be tested according to 4.6.19. The contact miss detector's monitoring level shall not exceed 300 ohms.

3.14 Room temperature run-in (when specified). When specified in the applicable detail specification, relays shall be tested according to 4.6.20. The contact miss detector's monitoring level shall not exceed 300 ohms.

3.15 Marking. Each relay shall be marked with the Goddard part number, source code, manufacturer's name or symbol (optional), date code and schematic. Date and source code shall be in accordance with MIL-STD-1285. The location and number of lines shall be at the discretion of the manufacturer.

3.15.1 Date code. The date code shall be determined by the manufacturer. The common manufacturing record shall include the same date code as that placed on parts covered by the record.

3.16 Workmanship. Relays shall be processed in such a manner to be uniform in quality when inspected in accordance with 4.6.2. Relays shall also be free of any defects affecting life, serviceability or performance.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. The manufacturer is responsible for the performance of all inspection requirements, as specified herein, using his own or any other suitable facility acceptable to Goddard Space Flight Center. Upon receipt of product, Goddard reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to verify conformance to prescribed requirements.

4.2 Classification of inspection. Inspection requirements specified herein are classified as follows:

a) Qualification Inspection (Type 4 only) (see 4.4).
b) Quality Conformance Inspection (see 4.5).

4.3 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.4 Qualification inspection (Type 4 only). Qualification shall be based on the results of qualification inspection to all applicable requirements of Table II of MIL-PRF-83536. Qualification inspection shall be performed by the manufacturer on sample units produced with equipment, processes and procedures normally used in production.

4.4.1 Sample size. The sample size for qualification shall be as specified in Table II of MIL-PRF-83536.

4.4.2 Inspection routine. The inspection routine shall be as specified in Table II of MIL-PRF-83536.

4.4.3 Failures. Failures in excess of those allowed in Table II of MIL-PRF-83536 shall be cause for refusal to grant qualification approval.

4.4.4 Inspection report. Qualification test data and the qualification test samples shall be submitted to the following activity:

NASA/GSFC
Greenbelt, MD 20771
Attn: QPLD Administrator
Code 562

4.5 Quality conformance inspection (see 4.2). Quality Conformance Inspection (QCI) shall be performed on all product furnished to this specification.

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of the QCI inspections listed in Table 1 and shall be performed in the order shown unless otherwise specified.

4.5.2 Inspection lot. An inspection lot shall consist of all relays of the same part number (see 1.3), produced and sealed under essentially the same manufacturing conditions, and offered for inspection at one time within a period not to exceed one month. This shall not preclude the manufacturer from forming sublots at shorter intervals to assure control of critical processes.

4.5.3 Sample size. All relays (100%) supplied under this specification shall be subjected to QCI inspection.

4.5.4 Failures. All relays failing QCI are to be discarded unless otherwise specified.

4.5.5 Lot rejection. In the event that QCI failures exceed 5% of the number of devices subjected to final electrical measurements in Table 1, the lot shall be rejected and shall not be supplied under this specification. Rejected lots shall not be offered for reinspection.

4.5.6 Retention of qualification. As a basis for retention of qualification, the manufacturer will be requested to furnish a summary of QCI inspection results annually. The test summary shall be submitted to the activity specified in 4.4.4.

Table 1. Quality conformance inspection (100%).

Inspection	Requirement Paragraph	Method Paragraph
Pre-cap (Note 1)	3.4	4.6.1
Visual and mechanical inspection (external) (Notes 2, 3 and 7)	3.2, 3.3, 3.15, 3.15.1, 3.16	4.6.2
Initial electrical measurements (Note 7)		
Insulation resistance	3.6.8	4.6.11
Dielectric withstanding voltage	3.6.9	4.6.12
Coil resistance	3.6.1	4.6.4
Pickup and dropout voltage (Note 4)	3.6.2	4.6.5
Contact resistance or voltage drop	3.6.3	4.6.6
Operate and release time (Note 4)	3.6.4	4.6.7
Bounce time	3.6.5	4.6.8
Coil transient suppression (When applicable) (Note 5)	3.6.6	4.6.9
Neutral screen (When applicable) (Note 6)	3.6.7	4.6.10
Vibration (sinusoidal)	3.7	4.6.13
Vibration (random) (when specified)	3.8	4.6.14
PIND	3.9	4.6.15
Internal moisture	3.10	4.6.16
High temperature soak (when specified)	3.11	4.6.17
High temperature run-in (when specified)	3.12	4.6.18
Low temperature run-in (when specified)	3.13	4.6.19
Room temperature run-in (when specified)	3.14	4.6.20

Table 1 (continued.). Quality conformance inspection (100%).

Inspection	Requirement Paragraph	Method Paragraph
Seal	3.5	4.6.3
Final electrical measurements (Note 7)		
Insulation resistance	3.6.8	4.6.11
Dielectric withstanding voltage	3.6.9	4.6.12
Coil resistance	3.6.1	4.6.4
Pickup and dropout voltage (Note 4)	3.6.2	4.6.5
Contact resistance or voltage drop	3.6.3	4.6.6
Operate and release time (Note 4)	3.6.4	4.6.7
Bounce time	3.6.5	4.6.8
Coil transient suppression (When applicable) (Note 5)	3.6.6	4.6.9
Neutral screen (When applicable) (Note 6)	3.6.7	4.6.10

NOTES:

1. Pre-cap (cleaning and small particle inspection) shall not contribute any failures to the inspection lot that has been submitted for QCI.
2. Physical dimensions shall be measured on two samples per lot. In the event of a failure, the entire lot shall be screened for dimensions and rejects discarded.
3. Marking defects shall not contribute any failures to the lot under inspection and may be reworked.
4. Applicable to nonlatching relays only. For latching relays, measure latch/reset voltage and operate time.
5. Applicable to dc operated relays with internal coil suppression.
6. Applicable to two coil latching relays only.
7. Test sequence is optional for visual and mechanical inspection and for electrical measurements.

4.6 Methods of inspection.

4.6.1 Pre-cap (cleaning and small particle inspection) (see 3.4). A qualification activity approved procedure for cleaning and small particle inspection shall be used. Appendix A to MIL-PRF-83536 may be used as a guideline.

4.6.2 Visual and mechanical inspection (external) (see 3.2, 3.3, 3.15, 3.15.1, and 3.16). Relays shall be examined to verify that materials, design, construction, physical dimensions, marking and workmanship are in accordance with the applicable requirements of MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.3 Seal (see 3.5). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.4 Coil resistance (see 3.6.1). Relay coils shall be tested in accordance with Method 303 of MIL-STD-202.

4.6.5 Pickup and dropout voltage (see 3.6.2). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.6 Contact resistance or contact voltage drop (see 3.6.3). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.7 Operate and release time (see 3.6.4). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.8 Bounce time (see 3.6.5). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.9 Coil transient suppression (see 3.6.6). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.10 Neutral screen (see 3.6.7). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.11 Insulation resistance (see 3.6.8). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.12 Dielectric withstanding voltage (see 3.6.9). Relays shall be tested as specified in MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.13 Vibration (sinusoidal) (see 3.7). Relays shall be tested in accordance with Method 204 of MIL-STD-202. The following details and exceptions shall apply:

a) Mounting method: Rigidly mount relays to a nonmagnetic mounting plate using the mounting means built into the relay or soluble cement. Solder flexible stranded wire to the terminals when necessary to make test connections. The use of strain relief loops is recommended to preclude damage to the terminals. After testing, relays shall be thoroughly cleansed of any cement residue, and excess solder shall be removed from the terminals.
b) Electrical load conditions: For nonlatching relays, the test shall be performed first with the coils energized at rated voltage, then repeated with the coil deenergized. For latching relays, switch relay to set position and then repeat with relay switched to reset position.
c) G-level, frequency range, and amplitude: As specified in the applicable detail specification sheet.
d) Contact load: 10 milliamperes maximum at 6 volts maximum (dc or AC peak).
e) Test during vibration: Contacts shall be monitored for chatter in accordance with Method 310 of MIL-STD-202, test-circuit B, test condition A. The test circuit shall verify that no opening of closed contacts in excess of 10 microseconds and no false closure or abnormal bridging of open contacts occurs in excess of 1 microsecond.
f) Scanning method: Sweep the frequency logarithmically, in three mutually perpendicular planes, from low to high limit and back to low. The total sweep time shall be limited to 10 minutes (see 4.6.13b).
g) Inspection after test: For nonlatching relays, prior to removal from the test fixture and without disturbing the relay, apply maximum pickup voltage to the coil and verify that relay contacts transfer. Remove coil voltage and verify that relay contacts transfer again. For latching relays, apply maximum over the temperature range set and then reset voltages to the coils and verify that contacts transfer both ways. In either case, failure of relay contacts to transfer shall be cause for rejection. After removal from the test fixture, the relays shall then be inspected for evidence of structural failure or other damage which might impair the operation of the relay.

4.6.14 Vibration (random) (see 3.8). Relays shall be tested in accordance with Method 214 of MIL-STD-202, test condition 2. The following details and exceptions apply:

a) Mounting method: Same as 4.6.13a.
b) Electrical load conditions: Same as 4.6.13b.
c) Power spectral density and overall RMS g-level: As specified in the applicable detail specification sheet.
d) Contact load: Same as 4.6.13d.
e) Test during vibration: Same as 4.6.13e.
f) Vibration method: In three mutually perpendicular planes with the vibration time limited to 15 minutes (see 4.6.13b).
g) Inspection after test: Same as 4.6.13g.

4.6.15 Particle impact noise detection (PIND) (see 3.9). Relays shall be tested in accordance with either MIL-PRF-39016, MIL-PRF-83536 or a qualification activity approved procedure.

4.6.16 Internal moisture (see 3.10). Relays shall be tested in accordance with MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable.

4.6.17 High temperature soak (see 3.11). Relays shall be conditioned at rated temperature for 16 hours with the coil energized continuously. The following details shall apply:

a) Voltage-rated relay: Energize the coil at 120 percent or greater of the nominal coil voltage rating.
b) Current-rated relay: Energize the coil at 150 percent of the nominal current rating.
c) Energize two coil latching relays by applying voltage alternately to each coil for 4 hours at a time.

4.6.18 High temperature run-in (see 3.12). Relays shall be tested in accordance with MIL-PRF-6106, MIL-PRF-39016, or MIL-PRF-83536, as applicable. The following details and exceptions shall apply:

a) No more than six relay contacts total shall be wired together in series.
b) The test circuit shall have an open-circuit voltage of 50 millivolts and closed-circuit current of 30 microamperes (other values may be approved by GSFC).
c) The test temperature shall be the maximum rated temperature of the device under test.
d) Cycle relays at 60 actuations per minute minimum for a total of 1000 actuations.

4.6.19 Low temperature run-in (see 3.13). Relays shall be tested as specified in 4.6.18 with the following exception:

a) The test temperature shall be -65°C.

4.6.20 Room temperature run-in (see 3.14). Relays shall be tested as specified in 4.6.18 with the following exceptions:

a) The test temperature shall be +25 ± 3°C.
b) The number of actuations shall be 5000.

4.6.21 Thermal outgassing (see 3.2.2). Materials shall be tested in accordance with ASTM E595.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order. Handling and packaging for Electrostatic Discharge (ESD) protection shall be in accordance with EIA-625. The use of "Pink Poly" packing materials should be avoided. The use of black foam packing material that is crosslinked is preferred.

6. NOTES

6.1 Ordering data. Acquisition documents should specify the following:

a) Number, title, and date of this specification.
b) Goddard Part Number
c) Quantity

6.2 Qualification provisions. With respect to product requiring qualification, awards will be made only for product which have been tested and approved by GSFC before the time for opening of bids. The attention of the suppliers is called to the following requirement: manufacturers should arrange to have qualification tests made on product which they propose to offer to GSFC to become eligible for awards of contracts or orders for product covered by this specification. The manufacturer shall bear the cost of qualification inspection to this specification. Information pertaining to qualification of product may be obtained from the activity whose address is listed in 4.4.4.

6.3 NOTICE. When GSFC drawings, specifications, or other data are sent for any purpose other than in connection with a definitely related GSFC procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever. The fact that GSFC might have formulated, furnished or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any person or corporation, or conveying any right or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

6.4 Tin Plated Finishes. Use of pure tin plating is prohibited (see 3.2.3). Use of pure tin finishes can result in tin whisker growth with adverse effects on the operation of electronic equipment systems.

Custodian:

Code 562
Goddard Space Flight Center
Greenbelt, MD 20771