DOCUMENT CHANGE REQUEST

DCR number 696	Changes required for: General	Originator: Steve Jeffery
Date: 2013/12/05	Date sent: 2012/01/05	Organisation: ESCC Executive
Status: IMPLEMENTED		

Title:	Generic Specification for Thermistors (Resistors Thermally Sensitive)		
Number:	4006	Issue:	1

Other documents affected:

Page:

All pages are affected.

Paragraph:

ESCC Generic Specification has been totally re-written as Issue 2 as part of the ongoing conversion of legacy ESA/SCC Generic Specifications to the ESCC format.

Original wording:

Proposed Wording of Change

ESCC Generic Specification No. 4006 Issue 1 is extensively amended to incorporate various editorial, technical and policy amendments/corrections which are summarised below.

The layout, format and general content of ESCC 4006 Issue 2 is based on ESCC Generic Specification No. 3403 (which, in itself, is based on ESCC Generic Specification No. 9000 Issue 6 as amended by DCRs 50, 138, 148, 182 and 400) as amended by DCRs 648 and 667 plus recent format, layout and editorial changes which have been, or are in the process of being, applied to the existing published Generics 3001, 3009, 3401, 3402, 3502, 3601, 3602, 4001, 4008, 4009, 5000, 5010 and 9020.

The technical content of ESCC 4006 Issue 2 remains closely based on ESCC 4006 Issue 1 (originally ESA/SCC 4006 Issue 3A).

For full details of the proposed contents of ESCC 4006 Issue 2 see the attached draft Generic Specification ESCC 4006 Draft 2B. Please note that ESCC 4006 Draft 2B has been discussed with, and agreed by, Measurement Specialties (formerly Betatherm) of Ireland, who are currently the only manufacturer known to support the 4006 series of ESCC Specifications.

Proposed wording:

Change Details

A) Main General Changes which are similar to those already incorporated into ESCC 3403 Issue 4:

1. The specification has been made applicable and fully usable for procurement of unqualified components as well as for ESCC Qualified components.

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2. Paras. 4.1, 4.1.1, 4.1.3 and 4.1.4 have been re-worded to account for the changes to the ESCC system & latest ESA policy, e.g. ESA/SCC testing level C has been deleted and there is now only a single ESCC testing level which is equivalent to old ESA/SCC level B. The ESCC testing level does not require, and therefore has not been given, a specific designation.

3. Para. 4.2 has been re-named Qualification and Qualification Maintenance Requirements on a Manufacturer (was Qualification Approval Requirements on a Manufacturer) and amended to include components qualified using a Qualified Technology Flow.

4. Para. 4.3 revised - Subparagraphs 4.3.1 (ESCC Qualified Components) and 4.3.2 (ESCC Components) have been added.

5. Para. 4.3.1, Lot Failure, has been re-numbered 4.1.3 accordingly and revised:
Re-worded to account for the changes to the ESCC system;
Lot failure notification method has been updated (telex is a redundant system), and the maximum allowed delay for Lot Failure notification (provided by the manufacturer) is now 5 working days (was 2).

6. Para. 4.3.2, Testing and Lot Acceptance Levels, has been deleted because there is now a single testing level; also Lot Acceptance Tests are no longer performed (effectively replaced by Lot Validation Tests.).

7. Para. 4.4, Marking, has been simplified from All components procured and delivered to this specification from a source qualified according to ESA/SCC Basic Specification No. 20100 shall be marked in accordance with ESA/SCC Basic Specification No. 21700. Thus, they shall bear the ESA symbol to signify their conformance to the ESA/SCC qualification approval requirements and full compliance with the requirements of this specification and the Detail Specification. Components procured from sources which are not ESA/SCC qualified, provided that they fully comply with the procurement requirements of this specification and the Detail Specification, may bear the SCC marking with the exception of the ESA symbol. to All components procured and delivered to this specification shall be marked in accordance with ESCC Basic Specification No. 21700..

8. Para. 4.5, Materials and Finishes, has been re-worded as follows:
Was All non-metallic materials and finishes, that are not within a hermetically sealed enclosure, of the components specified herein shall meet the outgassing requirements as outlined in ESA PSS-01-702. Specific requirements for materials and finishes are specified in the Detail Specification.;
Is now Specific requirements for materials and finishes are specified in the Detail Specification. Where a definite material or finish is not specified a material or finish shall be used so as to ensure that the component meets the performance requirements of this specification and the Detail Specification. Acceptance or approval of any constituent material or finish does not guarantee acceptance of the finished product. All non- metallic materials and finishes of the components specified in the Detail Specification shall meet the outgassing requirements as outlined in
ECSS-Q-ST-70-02..

9. Para. 5.1, the General paragraph of the Production Control section, has been re-worded to account for the changes to the ESCC system.

10. The General Flow Chart I is replaced by Chart F1; it clarifies the flow of components for Procurement.

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11. Section 6 has been deleted because the ESCC spec system has no Final Production tests; ESCC Generic Specs have Special In-Process Controls which are part of Production Control.

12. The Burn-in and Electrical Measurements section has been re-named Screening Tests.

13. Definition of failures during Screening has been corrected to include Visual failures.

14. The Qualification, Approval and Lot Acceptance Tests section has been re-named Qualification, Qualification Maintenance and Lot Validation Testing.

15. Paragraphs 7.2 Qualification Within a Technology Flow and 7.3 Qualification Maintenance (Periodic Testing) are required for an ESCC Generic Spec in accordance with ESCC policy requirements. Therefore these paragraphs have been added accordingly.

16. The Lot Acceptance Testing Paragraph has been re-named Lot Validation Testing and has been re-worded to account for the changes to the ESCC system. Lot Validation Testing is confirmed as not mandatory and it shall only be performed if specifically stipulated by the Orderer in their PO.

17. Definition of failures during Qualification, Qualification Maintenance and Lot Validation Testing has been corrected to include Visual, Mechanical and Handling failures.

18. The Lot Failure criteria for all subgroups of Qualification and Periodic Testing is now no failures are permitted which brings this aspect of the spec into line with ESCC Standard Policy. These failure requirements for the Qualification and Periodic Tests are also defined in the new Chart F4.

19. The Test Methods and Procedures paragraph has been re-worded and now describes requirements for both unqualified as well as ESCC Qualified components.

20. A Paragraph which defines the conditions for Burn-in is necessary and has been introduced accordingly (Para. 8.4).

21. The Data Documentation paragraphs have been amended as follows:
Re-worded to be in accordance with the new ESCC Format (e.g. the minimum required delivered documentation to the customer for procurement is a Certificate of Conformity and a Cover Sheet);
To homogenise the Data Documentation sections in all converted Generic Specs.

22. The Delivery paragraph has been re-written to be in accordance with the new ESCC Format, and homogeneity is maintained across all converted Generic Specs.

B) Other Editorial and/or Technical Changes which are specific to ESCC 4006:

23. The Applicable Documents paragraphs have been revised:

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References to ESCC Basic Specs 23100 (ESCC Recommendations on the use of the ESCC Specification System for the Evaluation and Procurement of Unqualified Components) and 25400 (Requirements for the Technology Flow Qualification of Electronic Components for Space Application) have been added;
References to the sampling procedures MIL-STD-105 and MIL-STD-414 have been deleted (specific sampling requirements have been defined in Chart F4 and Sections 5 or 8 as applicable and in accordance with ESCC policy);
The document number of the Thermal Vacuum Test for the Screening of Space Materials has been corrected from ESA PSS-01-702 to ECSS-Q-ST-70-02.

24. Para. 4.1.5, Pre-encapsulation Inspection, has been deleted: There is considered to be no technical reason for Customers to either witness or perform pre- encapsulation inspections on thermistors; furthermore the ESA (ECSS) Standard Requirements for initial customer source inspection (precap) do not specifically mention thermistors (both space qualified and non-space qualified) as a part type requiring precap.

25. In the ESCC Spec System, all Special In-Process Controls are stipulated and controlled by the Generic Spec. Thus Where applicable, special in-process controls shall apply as specified in the Detail Specification has been deleted from Para. 5.2 and Subparagraphs 5.2.1 to 5.2.7, listing the required Special In-Process Controls and their Documentation requirements, have been added. The sample requirement for Dimension Check has been changed from 5pcs to 3pcs (3pc sample is the standard for a range of converted Generics and it is considered to be adequate for thermistors).

26. The check for lot failure requirement during Screening has been clarified:
Lot Failure during Screening, (100%) Testing, is verified as failures subsequent to Burn-in;
Lot Failure during Sample Testing has been simplified from A lot shall be considered as failed if the number of allowable failures during sample testing, in accordance with General Inspection Level II of MIL-STD-105 and the applicable AQL as specified in the Detail Specification, is exceeded. In the case where an LTPD to MIL-STD-414 is specified in the Detail Specification, a lot shall be considered as failed if the number of failures allowed is exceeded (see Annexe I for LTPD sampling plan). If a lot failure occurs in either case, a 100% testing may be performed with the lot failure criteria given in Para. 7.4.1. to A lot shall be considered as failed if the number of allowable failures during sample testing, as specified herein or in the Detail Specification, is exceeded. Unless otherwise specified, if a lot failure occurs, a 100% testing may be performed but the cumulative percent defective shall not exceed that specified in Para. 6.4.1..

27. Chart II – Final Production Tests and Chart III – Burn-in and Electrical Measurements have been revised and have been incorporated into Chart F2 – Production Control and Chart F3 – Screening Tests.

28. Charts IV and V, Qualification and Lot Acceptance Testing Charts, have been modified and incorporated into a single Qualification and Periodic Tests Chart, Chart F4. The maximum period between the performance of certain Endurance tests - principally Operating Life Testing - has been fixed at 12 months per ESA policy (formerly, under the ESA/SCC System, a maximum period of 24 months for all Qualification and Lot Acceptance Testing applied).

29. Para. 9.2, Thermal Shock, has been re-written: A simpler layout has been implemented, along with some editorial changes. There are more conditions than those specified in ESCC No. 4006 Issue 1 because there are more types of thermistor included under ESCC 4006 now than there were when ESCC 4006 was last updated (April 1999), and therefore the Test Conditions for Thermal Shock testing shall be specified in each Detail Specification.

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30. Para. 9.3.1, Electrical Measurements: The layout and format of Zero Power Resistance, Dissipation Constant and Thermal Time Constant have been completely revised. In addition, Figure I has been deleted, and Figures IIA and IIB have been subjected to a few minor editorial changes and incorporated into the Subparagraph for Thermal Time Constant, Para. 8.3.1.3.

31. Paras. 9.4 (Dimension Check) and 9.5 (External Visual Inspection) are combined, with some editorial changes, into a new Paragraph External Visual Inspection and Dimension Check.

32. Para. 9.7, Shock (Specified Pulse), has been re-written to include the sections Mounting Method, Number and Direction of Applied Shocks, Initial Measurements and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

33. Para. 9.8, Vibration, has been re-written to include the sections Mounting Method, Direction of Motion, Initial Measurements and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

34. Para. 9.9, Immersion, has been re-written to include the section Data Points. Other editorial changes have been made to improve readability and clarity.

35. Para. 9.10, Dielectric Withstanding Voltage, has been re-named (Voltages instead of Voltage) and re-formatted, with some editorial changes. Dielectric Withstanding Voltage At Atmospheric Pressure and Dielectric Withstanding Voltage At Reduced Barometric Pressure are considered to be individual tests; they have therefore been incorporated as Subparagraphs.

36. Para. 9.11, Resistance to Soldering Heat, has been re-written to include the conditions/sections Requirements for Sample Selection, Depth of Immersion in Molten Solder, Temperature of Solder, Duration of Immersion and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

37. Para. 9.12, Moisture Resistance, has been re-written to include the sections Mounting, Initial Measurements, Loading, Post-Humidity Conditioning and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

38. Para. 9.13, Terminal Strength (for both Disk and Bead-Type Thermistors and Rod-Type Thermistors), has been re-written to include the section Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

39. Para. 9.14, Operating Life, has been revised:
The Subparagraph 'Operating Life During Lot Acceptance Testing' is redundant and has therefore been deleted;
The remaining Subparagraph has been re-written to include the sections Method of Mounting, Test Circuit, Operating Life Conditions and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

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40. Para. 9.15, Short Time Load, has been re-written to include the conditions/sections Ambient Temperature, Maximum Power Rating, Power Supply, Method and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

41. Para. 9.16, Low Temperature Storage, has been re-written to include the sections Method of Mounting, Procedure and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

42. Para. 9.17, High Temperature Storage, has been re-written to include the conditions/sections Duration, Method of Mounting, Test Conditions and Data Points. Other editorial changes have been made to improve readability and clarity. Reference to Table 6 of the Detail Specification for post-test inspection requirements has been amended accordingly.

43. Para. 9.18, Solderability, has been re-written to include the conditions/sections Requirements for Sample Selection, Number of Terminations to be tested for each Thermistor and Depth of Immersion in Flux and Solder. A few editorial changes have also been made to improve readability and clarity.

44. Para. 9.19, Final Assembly, is not a Test Method nor a Test Procedure; it merely states that the encapsulation process is performed per the Manufacturer's PID during Special In-Process Controls. The paragraph is therefore unnecessary and has been deleted accordingly.

45. Annexe I (the LTPD Sampling Plan) is redundant and has been deleted accordingly.

Justification:

All changes have been defined and included to serve the purposes of technical improvement, clarification, accuracy, completeness, simplification and consistency. The aim is to simplify and improve the content and interpretation of the specification and its requirements whilst maintaining an efficient and acceptable technical baseline. ESCC 4006 Issue 2 closely follows the layout, format and general content of the latest ESCC 3403 (Issue 4). All justifications for the changes which are common to DCRs 50, 138, 148, 182, 400 and 648 also apply to this DCR. In addition, certain justifications for changes are described in the section above.

Attachments:
4006_draft_2d.docx, null
Modifications:
Draft 2D of the Generic Specification has been prepared which incorporates all necessary changes and corrections. As per PSWG 59 27-6-2013 unanimously approved with a disposition of chart F4 commented by ESA/Astrium-CNES common analysis (see there last page of PSWG 58 Annex No. 2.)
Approval signature:
Date signed:
2013-12-05