



**REVISIONS ( Δ DENOTES CHANGE)**

REV.	DATE (YYYY/MM/DD)	RCN NO	DESCRIPTION OF CHANGE	UPDATED BY
-	2000/04/20	RLSD	INITIAL RELEASE	J. VANDEUSEN
A	2004/07/11	11715	Update/clarification IAW ISO 9000-2000, AS9100	J. VANDEUSEN
B	2010/01/21	16865	Add 5.1.9 flow down to subtier	J. VANDEUSEN
C	2011/09/13	18483	Correct temperature callout in 4.4.2	J. VANDEUSEN
D	2014/01/03	20757	Add 5.1.10 Requirements for record retention	J. VANDEUSEN
E	2015/02/27	176066	Tie in Anaren Doc. #81000, general clarification, remove redundant information now located in 81000.	J. VANDEUSEN
F	2015/04/02	176715	Add detail drawing requirements and delete redundant information	J. VANDEUSEN
G	2016/10/25	188289	Add thin film to title block; add thin film dwg tie in (paragraph 3.3)	J. VANDEUSEN
H	2021/01/21	309973	Update procurement specification formats, remove MIL-STD-981, Clarify EE data IAW MIL-PRF-38534 Rev L release.	J. VANDEUSEN



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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES -TOLERANCES-		FRACTIONS    DECIMALS    ANGLES			PROCUREMENT SPECIFICATION FOR THICKFILM/THINFILM SUBSTRATES	
DRAWN BY	DATE (YYYY/MM/DD)	THIRD ANGLE PROJECTION  				
J. VANDEUSEN	2000/04/20		A	31597	1026-8309	
DESIGNER N/A			SCALE	DOC CODE	REV	SHEET
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APPROVAL SIGNATURES ON FILE			DOC TYPE N/A			

**1.0 PURPOSE:**

The purpose of this document is to define the requirements for procurement of thinfilm or thickfilm substrates manufactured by a supplier and used in hybrids/MCM's. This document is used in conjunction with Document #81000.

**2.0 APPLICATION:**

This procedure shall apply to all thickfilm substrates as follows:

- 2.1 Condition A** - Elements to be used in "fully" compliant hybrid products as defined in MIL-PRF-38534 Class H. Purchase order shall not delete any of the requirements of this specification. Substrate element evaluation shall be performed by the substrate manufacturer prior to shipment of the lot.
- 2.2 Condition B** - Elements intended to be used in full compliance with MIL-PRF-38534 Class H or K but element evaluation will be the responsibility of the user.
- 2.3 Condition C** - Elements to be used on devices which do not impose MIL-PRF-38534.
- 2.4 Condition D** - Elements to be used in "fully" compliant hybrid products as defined in MIL-PRF-38534 Class K. Purchase order shall not delete any of the requirements of this specification. Substrate element evaluation shall be performed by the substrate manufacturer prior to shipment of the lot.

**3.0 REFERENCE DOCUMENTS:**

- 3.1** Purchase order.
- 3.2** Applicable Detail Drawings for the thickfilm substrates
  - 3.2.1** Printed Subassembly: 1829-XXXXX
  - 3.2.2** Outsource Thickfilm Print Requirement Form: 8356A.XX (NA for Anaren Ceramics)
  - 3.2.3** Ceramic Substrate Drawing: 1013-XXXX
  - 3.2.4** Substrate fabrication flow chart 2422-1563 (NA for Anaren Ceramics)
- 3.3** Applicable detail drawing for thinfilm substrates
  - 3.3.1** Substrate Drawing: 1013-XXXX
- 3.4** MIL-PRF-38534
- 3.5** MIL-STD-883 TM2032
- 3.6** ISO 14644-1, -2 or MIL-STD-209
- 3.7** TTM supplier requirements for Quality, Design & Manufacturing, Document #81000

**4.0 DEFINITIONS:**

- 4.1 Element** - A constituent of the hybrid microcircuit that contributes directly to its operation.
- 4.2 Substrate Inspection Lot** - Substrate inspection lot will consist of homogeneous printed substrates (thick or thinfilm) having the same number of layers, manufactured using the same facilities, processes, materials and vacuum deposited, plated or printed as one lot.
- 4.3 Element Evaluation** - As applicable to this specification and shall consist of substrate evaluation IAW MIL-PRF-38534 for Class H or K (as applicable).
- 4.4 Environmentally controlled area:**
  - 4.4.1** Class 8 per ISO 14644-1, -2 or Class 100,000 per MIL-STD-209.
  - 4.4.2** Temperature 25°C +3, -5°C
  - 4.4.3** Pressure .01" water column or greater.
  - 4.4.4** Humidity - RH 30 to 65%.
  - 4.4.5** Element storage shall be in a nitrogen atmosphere dry box.

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**5.0 REQUIREMENTS:**

**5.1 General:**

- 5.1.3 All material and processes used by the supplier (for thickfilm or thinfilm) will be suitable for polymeric adhesive, soldering or eutectic die mounting where specified. As applicable to the substrate design, pad metallization shall be suitable for thermosonic, ultrasonic and/or thermo compression bonding of gold or aluminum wire and shall be capable of withstanding a pull test as specified per MIL-STD-883 Method 2011.
- 5.1.4 For thickfilm substrates, all material and processes used by the supplier will be suitable for hybrid/MCM assembly. Materials shall be specified in the applicable drawing. The basic thickfilm substrate fabrication process shall be in accordance with substrate fabrication flow chart drawing 2422-1563 latest revision. Any deviation to this process shall be documented and approved in writing prior to beginning the substrate fabrication.
- 5.1.5 All electrical test and visual inspection shall be done at the element level with rejects identified and removed from the lot.

**6.0 PROCEDURE:**

**6.1 Condition A:**

- 6.1.1 The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.
- 6.1.2 The supplier shall perform 100% visual to TM2032, Class H in an environmentally controlled area and ensure compliance to all visual, electrical and mechanical specifications. The supplier shall perform 100% electrical testing (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or Drawing.
- 6.1.3 Element evaluation shall be performed by the supplier for each substrate inspection lot in accordance with MIL-PRF-38534 for Class H devices to ensure compliance with the electrical characteristics and/or applicable Drawing.

Element evaluation documentation and test samples will be provided with each lot.

**6.1.4 Delivery Conditions:**

- 6.1.4.1 The supplier is responsible for ensuring that elements are packaged properly so as to avoid damage during shipment. Thickfilm and thinfilm substrates shall have protection between each substrate top side surface.
- 6.1.4.2 The Dwg number, name of manufacturer, quantity and lot number are to be clearly marked on each container.
- 6.1.4.3 **Certificate of Compliance**, as defined in Document #81000.
- 6.1.4.4 Element evaluation data (as required) shall be supplied for each substrate inspection lot.
- 6.1.4.5 **Documentation** - Evidence of the supplier's inspection documentation shall be maintained at the suppliers facility. The evidence maintained should include the following:
  - a. Name of operation, specification number and revision of each process or test.
  - b. Part number and manufacturer internal lot identification number (s).
  - c. Date(s) of test and operator identification.
  - d. Calibration control number and calibration due date of all major equipment components used for test.
  - e. Quantity tested and rejected for each process or test and actual quantity tested if sampled.
  - f. Specific major conditions of test that are verifiable by operator including times, temperatures and inspection magnification.
  - g. For electrical test, test program number and revision levels (as applicable).

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**6.2 Condition B:**

- 6.2.1 The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.
- 6.2.2 The supplier shall perform 100% visual inspection to TM2032 Class H and K in an environmentally controlled area and ensure compliance to all visual and mechanical specifications.
- 6.2.3 The supplier shall perform 100% electrical test (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or Drawing.
- 6.2.4 Substrates shall be capable of passing substrate element evaluation in accordance with MIL-PRF-38534 Class H or K.
- 6.2.5 Delivery conditions shall be in accordance with paragraph 6.1.4.

**6.3 Condition C:**

- 6.3.1 The supplier shall guarantee performance that the substrates shall conform to the electrical, mechanical and visual specifications of the applicable Drawing.
- 6.3.2 Delivery conditions shall be in accordance with paragraph 6.1.4.

**6.4 Condition D:**

- 6.4.1 The supplier shall have an accepted internal document for visual inspection to MIL-STD-883, Method 2032.
- 6.4.2 For MIL-PRF-38534, the supplier shall perform 100% visual to TM2032 Class K in an environmentally controlled area and ensure compliance to all visual, electrical and mechanical specifications. The supplier shall perform 100% electrical testing (resistor measurement as applicable) at 25°C to ensure compliance to the manufacturer's electrical characteristics and/or Drawing.
- 6.4.3 Element evaluation shall be performed by the supplier for each substrate inspection lot in accordance with MIL-PRF-38534 for Class K devices to ensure compliance with the manufacturer's electrical characteristics and/or applicable Drawing.

Element evaluation documentation and test samples will be provided with each lot.

**6.4.4 Delivery Conditions:**

- 6.4.4.1 Delivery conditions shall be in accordance with paragraph 6.1.4.

**7.0 ACCEPT/REJECT CRITERIA:**

- 7.1 Accept all lots which pass the applicable paragraphs of this procedure and the drawing.
- 7.2 Reject any device(s) and separate it from the lot which fails an electrical parameter or visual/mechanical criteria.
- 7.3 Reject any lot which does not pass element evaluation.

**8.0 QUALITY ASSURANCE PROVISIONS:**

- 8.1 TTM reserves the right to perform testing in accordance with paragraph 2.0 and any failure of the material to meet the requirements of this document shall be cause for rejection of the shipment.
- 8.2 TTM reserves the right to review any vendor program, process and data to assure conformance to the requirements of this specification, the purchase order and the applicable Drawing.

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