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REQUIREMENTS AND GUIDELINES FOR

THE "PROCESS IDENTIFICATION DOCUMENT"

(P.I.D.)

ESA/SCC Basic Specification No. 22700

space components
coordination group

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		SCCG Chairman	ESA Director General or his Deputy
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DOCUMENTATION CHANGE NOTICE

Rev. Letter	Rev. Date	Reference	CHANGE Item	Approved DCR No.
		This Issue supersedes Issue 3 and incorporates all modifications defined in the following DCR's:-		
		Cover page		None
		DCN		None
		Table of Contents	: Amended as relevant	None
		Para. 2	: Reference to ESA/SCC Basic Specification No. 20200 deleted	23581
			: Reference to ESA/SCC Basic Specification No. 21300 added	221020
		Para. 4.3	: Last sentence about interchangeability of components added	221020
		Para. 5.9	: 'Section 9' changed to 'Section 8'	23581
'A'	Sept. '95	P1. Cover page	: Page count amended	None
		P2. DCN		None
		P3. T of C	: Numbering 5.8.1 to 5.8.3 and page number corrected	21079
		P4. Para. 2	: Reference to ESA/SCC Basic Specification No. 24600 added	21079
		P5. Para. 5.1	: Second subparagraph deleted. New text inserted	21079
		P6. Para. 5.1	: Remainder of second subparagraph deleted	21079
		P8. Para. 5.6	: New subparagraph 5.6(c) added. Existing 5.6.(c) changed to 5.6(d).	21084
		P9.	: New page added. Paras. 5.8.3, 5.9 and 6 moved from page 8.	None

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1. SCOPE

This specification defines the general requirements for the "Process Identification Document" (P.I.D.) in terms of content, layout, configuration control and procedure for updating.

2. APPLICABLE DOCUMENTS

The following ESA/SCC Specifications form part of, and shall be read in conjunction with, this specification. The relevant issues shall be those in effect on the date of preparation of the P.I.D..

- No. 20100, Requirements for the Qualification of Standard Electronic Components for Space Application.
- No. 21300, Terms, Definitions, Abbreviations, Symbols and Units.
- No. 24300, Requirements for the Capability Approval of Electronic Component Technologies for Space Application.
- No. 24600, Minimum Quality System Requirements.

3. INTRODUCTION

The purpose of the P.I.D. is to ensure that a precise reference is established for an electronic component qualified or capability approved in accordance with the ESA/SCC System.

This reference shall comprise the component's design configuration, materials used in manufacture, manufacturing processes and controls, and completely define all inspections and tests to be carried out during and after manufacture. The document shall enable the Qualifying Space Agency (QSA) to control the component's manufacture and ensure that all future components or capability approved products supplied by the Manufacturer will be identical to those for which approval was originally granted.

The P.I.D. shall also provide a standard reference against which any anomalies occurring after qualification approval can be examined and resolved.

4. REQUIREMENTS

4.1 APPROVAL AND CONTENTS

Formal approval of the P.I.D. shall be granted by the QSA and they shall sign the document as approved. Prior to this formal approval being granted, the Manufacturer's quality assurance representative shall sign the document to authenticate the contents.

The QSA shall identify the items in the P.I.D. that are to be maintained under Manufacturer's configuration control (e.g. Manufacturer's in-house inspection procedures) and shall specify those it wishes to hold in the P.I.D. as a part thereof.

4.1.1 Requirements for Component Qualification

The Manufacturer of the component to be qualified shall prepare the P.I.D. in accordance with the requirements of Para. 5.1.1 of ESA/SCC Basic Specification No. 20100 and to the satisfaction of the QSA.

4.1.2 Requirements for Capability Approval

The Manufacturer for the capability approval shall prepare the P.I.D. as required by Para. 6.2 of ESA/SCC Basic Specification No. 24300.

4.2 PROPRIETARY INFORMATION

The QSA shall treat proprietary information as strictly confidential and shall not disclose any such information to a third party. Where proprietary processes are involved, the Manufacturer shall provide only such information as necessary for quality assurance purposes.

The Manufacturer shall, however, demonstrate that adequate documentation is available for processes declared confidential and that such documents are included in his configuration control system. These documents shall be referenced in the P.I.D. as "Company Confidential" and their title, document reference number, issue number and date shall be stated. During routine line surveys, the inspectors shall verify that the issues of these documents in use are the same as those declared in the P.I.D.

A third party is defined as anyone not belonging to the immediate ESA/SCC qualifying authority concerned.

4.3 P.I.D. UPDATING

A P.I.D. shall represent the currently accepted manufacturing controls and inspection procedures. For this reason, the P.I.D. must be updated each time the QSA concerned has approved the modification of a particular item in the document.

The P.I.D. and the documents referenced therein shall have their issues held at those effective on the date of approval of the P.I.D. by the QSA. Any intended modification of the P.I.D. or referenced documents held under the Manufacturer's configuration control, together with any quality and reliability implications, shall be brought to the attention of the QSA for review and approval before implementation. Such modifications shall require a re-issue of the P.I.D. and the relevant referenced documents.

When an intended modification of the P.I.D. affects the interchangeability of the components, a new ESA/SCC variant or a new ESA/SCC component is created.

4.4 ACCESS TO THE P.I.D.

Members of QSA personnel involved with the component or product under capability approval concerned and ESA/ESTEC staff shall have access to the P.I.D. at all times. Any Users may have access to the P.I.D. at the Manufacturer's plant.

The Manufacturer may disclose all or part of his P.I.D. to Users of this products without the permission of the QSA. Inspectors from industry, who are "on loan" to the QSA may have access to the P.I.D. only after the Manufacturer has given written permission to the QSA concerned.

Proprietary information shall be covered in all cases and at all times by the requirements specified in Para. 4.2.

5. P.I.D. STRUCTURE

5.1 GENERAL

The P.I.D. shall be compiled in such a manner that efficient and speedy configuration control can be maintained and that any necessary amendment, modification and updating will require the minimum of effort.

The P.I.D. shall be written, as closely as practicably, in the Manufacturer's standard format for documents and shall meet the Document Control requirements of ESA/SCC Basic Specification No.▮24600.

Unless otherwise agreed by the relevant QSA (and, in the interest of standardisation, this should be limited to special cases), all information to be recorded in the P.I.D. shall be grouped into appropriate sections. The following paragraphs detail the sections required. The sections and their contents are not necessarily exhaustive and are intended to give the Manufacturer and QSA a guide to the minimum mandatory information to be included in the P.I.D.

5.2. SECTION 1 - GENERAL

This section shall comprise the title page(s), revision or amendment record sheet and the list of contents of the P.I.D.. In addition to a suitable title, fully referencing the component, series of components (see Para. 5.8.2) or capability domain and its boundaries (see Para. 5.5.3).

Provision shall be made for the approval signatures on behalf of the Manufacturer and the QSA and the dates of such signatures.

The revision sheet shall follow normal practice and provide for the date of revision or amendment, section and pages affected and a short description of the change(s).

The list of contents shall detail the sections and their content to the degree necessary for easy reference to essential items.

5.3 SECTION 2 - MANUFACTURING ORGANISATIONS

This section shall comprise an organigram of the manufacturing plant in relation to management, engineering, production, quality assurance and marketing as applicable to the component(s) or capability domain and its boundaries which is/are the subject of the P.I.D.

5.4 SECTION 3 - MANUFACTURE AND TESTING

For qualification of components, concise details of the appropriate manufacture and testing areas shall be included in this section.

For capability approval, concise details of the appropriate manufacture and testing areas in accordance with the requirements specification for capability approval of the relevant technology shall be included in this section.

This section shall also include:

- A flow chart showing how applicable purchase orders are processed;
- A specimen of each route sheet or "traveller" used during manufacture and testing.

5.5 SECTION 4 - DESCRIPTION

5.5.1 General

For qualification approval, the P.I.D. shall include a Section 4 'Component Description' as defined in Para. 5.5.2 below.

For capability approval, the P.I.D. shall include a Section 4 'Capability Domain and Boundaries Description' as defined in Para. 5.5.3 below.

5.5.2 Section 4 for Qualification Approval- Component Description

This section shall comprise all the information necessary to fully define the component and its construction. It shall include an outline of the technologies involved, piece part composition and construction details. Drawings or photographs detailing the component and each of its constituent elements shall be included.

5.5.3 Section 4 for Capability Approval - Capability Domain and Boundaries Description

This section shall comprise all the information necessary to fully define the capability domain and its boundaries as described in Para. 6.1 of ESA/SCC Basic Specification No. 24300. It shall include an outline of the technology involved, compositions and construction details. Drawings or photographs detailing the test structures and each of their constituent elements shall be included.

5.6 SECTION 5 - CONTROL DOCUMENTATION

This section shall comprise the list of specifications, process flow chart and collection of specifications as follows:-

(a) List of Specifications

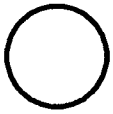
List of specifications and procedures used for each process step, control inspection and test given in the production flow chart - with reference to the appropriate point of the flow chart and identified by issue status and date. Each activity shall be defined in such detail that it can be correctly performed, controlled and repeated. Specific reference shall be made to associated material, piece parts or inspection equipment.

(b) Production Flow Chart

The production flow chart shall identify all piece parts and all process, assembly, inspection and test operations applicable to production of the component (see Note 1). The points of application of quality controls shall be clearly indicated. The chart shall present these schematically in their correct sequence and, for each operation, make reference to the relevant identification, process, assembly or inspection document. The issue and date of documents applicable at the time of preparation of the flow chart shall be stated.

When preparing the chart, the following symbols are preferred:

- For process and assembly operations.



- For inspection and test operations.

- For quality control operations.

NOTES

1. For capability approval, this, shall be understood as the range of components within the defined domain capable of fabrication.

(c) Wafer Lot Acceptance

Semiconductor Manufacturers shall prepare a Wafer Lot Acceptance (WLA) procedure. This shall describe the Manufacturer's approach to WLA and identify the quantitative criteria for the quality control gate releasing the wafer lot for further processing. It shall be based on inspections and tests on completed wafers and, where applicable, results from in process inspections and tests and from process monitors and test structures.

The procedure shall be driven by quality targets taking into account control possibilities and resources and shall, to the extent applicable to the technology, cover the following items:-

(i) The in-process monitoring programme identifying critical process steps, the parameters and critical dimensions to be measured and the applicable limits.

(ii) Where applicable, the analysis of data from process monitoring programmes by appropriate Statistical Process Control (SPC) methods to determine control effectiveness.

(iii) The visual inspection and wafer probe acceptance criteria including wafer yield and, where applicable, wafer lot yield limits.

(iv) Where applicable, the process monitors and other test structures used to verify that process parameters and critical dimensions are within the specified limits.

(d) Collection of Specifications

Collection of specifications containing those specifications, generally of inspection and control, which the Manufacturer and QSA have agreed jointly to be part of the P.I.D. to be delivered to the QSA. If in-house documents have been accepted in lieu of the applicable ESA/SCC Specifications, such documents shall be included in this collection of specifications.

5.7 SECTION 6 - INSPECTION AND TEST EQUIPMENT

This section shall contain a list of all inspection, test and measuring equipment used for the manufacture and testing of the component (see Note 1) in accordance with the control documentation, including failure analysis. Where relevant, the listed equipment shall be adequately cross-referenced to the production flow chart and/or the activities for which it is used.

NOTES

1. For capability approval, this shall be understood as the range of components within the defined domain capable of fabrication.

5.8 SECTION 7 - APPROVAL BY SIMILARITY AND SPECIFICATION OF TEST STRUCTURES

5.8.1 General

For qualification approval, the P.I.D. shall include a Section 7 'Qualification Approval by Similarity' as defined in Para. 5.8.2 below.

For capability approval, the P.I.D. shall include a Section 7 'Specification of Test Structures' as defined in Para. 5.8.3 below.

5.8.2 Section 7 for Qualification Approval - Qualification Approval by Similarity

This section is only applicable when one or more components have been granted qualification approval on the basis of its/their similarity to a component to which qualification approval has been granted after a full test programme and which is the major subject of the P.I.D.

In this section, all the components shall be described in terms of similarity to the component used as the test vehicle or example, and the extent of their agreed similarity specified. Full details of the rules applicable to the determination of the similarity shall be included together with any additional or reduced inspections and tests for the components concerned. In the case of semiconductors or

integrated circuits, a photograph of each chip shall be included and shall form part of the basis for assessment of similarity. The photographs shall be to such a scale that the geometry and individual active elements may be identified.

5.8.3 Section 7 for Capability Approval - Specification of Test Structures

See Paras. 6.3.1 and 8.3 of ESA/SCC Basic Specification No. 24300.

5.9 SECTION 8 - COMPONENT TYPES FOR CAPABILITY APPROVAL

Component types qualified to capability approval and manufactured in accordance with the relevant P.I.D. shall be listed in this section.

6. DISTRIBUTION

One copy of the P.I.D., properly amended and maintained, shall be held by the Manufacturer, the relevant QSA and in the central records at ESA/ESTEC. The Manufacturer may, at his discretion, prepare and maintain copies of the P.I.D. for other holders.