



SLOVENSKI STANDARD
SIST EN 123000:2002/A2:2002
01-junij-2002

Generic specification: Printed boards

Generic Specification: Printed boards

Fachgrundspezifikation: Leiterplatten

Spécification générique: Cartes imprimées

Ta slovenski standard je istoveten z: EN 123000:1991/A2:1996

[SIST EN 123000:2002/A2:2002](https://standards.iteh.ai/catalog/standards/sist/b3715bca-9d79-44ec-94db-90e9b474ebe3/sist-en-123000-2002-a2-2002)

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ICS:

31.180 Printed circuits and boards

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NORME EUROPÉENNE
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EN 123000/A2

November 1996

ICS 31.180

Descriptors: Printed boards, generic specification, capability approval, quality conformance inspection, preparation of detail specifications

English version

**Generic Specification:
Printed boards**

Spécification générale:
Cartes imprimées

Fachgrundspezifikation:
Leiterplatten



REPUBLIKA SLOVENIJA

MINISTRSTVO ZA ŠOLSTVO, ZNANOST IN ŠPORT

Urad RS za standardizacijo in meroslovje

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SIST. EN 123000/A2

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PREVIEW
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This amendment A2 modifies the European Standard EN 123000:1991; it was approved by CENELEC on 1996-10-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this amendment the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This amendment exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

This amendment was prepared by CLC/TC CECC/SC 52 (former WG 23).

The text of the draft was submitted to the Unique Acceptance Procedure and was approved by CENELEC as amendment A2 to EN 123000:1991 on 1996-10-01.

This document is a guide to the preparation of a Capability Manual for Printed Boards and has been prepared in accordance with the requirements of CECC 00 114/III, Annex B.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 1997-03-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 1997-03-01

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Appendix E

Guide to the preparation of a Capability Manual for Printed Boards

E0 General requirements

For EN 123000 approval it is a requirement that a description of capability is presented. A Capability Manual prepared in accordance with this Guide will satisfy that requirement.

The Capability Manual is confidential and its contents will not be divulged to any other party without permission from the originator.

E0.1 Form of the capability manual

The manual should be self contained. It is preferred that the documentation be prepared on A4 size paper and in loose leaf form, with each section beginning on a new page and with section titles and their sequence as given in this guide and Table 1.

The document shall be given a document identity within the manufacturer's quality assurance system and have suitable provision for showing its issue and state of amendment. A record of the distribution of the manual is to be maintained.

Discussion with the relevant ONS specialist is recommended at an early stage of drafting. Draft issues of the capability manual shall be given alphabetical issue references until accepted by the ONS. It shall then be raised to Issue 1 at the stage at which capability approval is recommended.

Amendments shall not be made in handwritten form. When changes are required, new pages showing the relevant amendment number shall be issued.

The capability manual shall be raised in issue when a change is made. In addition the manufacturer has the option to give an issue status to each page or to each section. Where the scope of capability is extensive and the description is accordingly complicated; it is usually advantageous to give each page a discreet issue status.

There shall be a means for recording that amendments have been incorporated and a means for summarising the nature or purpose of the amendments. These shall be subject to the change note procedures laid down in the manufacturer's quality manual. There shall be an index or "contents list". This may conveniently show the issue status of each section, or page, as the case may be. The issue of the index page shall be at the issue of the whole manual.

There will be a need to draw upon documentation contained within the Quality Manual (e.g., route cards and process specifications). This may be achieved by making reference to them, or by their inclusion.

E0.1.1 Definitions and abbreviations

CQC	Capability Qualifying Component. Component used for the demonstration of capability and the subsequent maintenance of capability.
Specimen	An individual circuit pattern used to assess limits of approval.
CTP	Composite test pattern. The arrangement of individual specimens to form the board pattern used for the demonstration of capability. A single CTP represents the smallest size panel for which an approval to a sectional specification can be gained.
Aspect ratio	The ratio of the length or depth of a hole to its preplated diameter. In practice this should be calculated as follows: $\frac{\text{nominal board thickness of base material}}{\text{smallest drill diameter}}$

e.g., $\frac{3.5 \text{ mm}}{0.4 \text{ mm}} = 8.75:1$

This definition is applicable to either component or via holes. Aspect ratio is used as a measure of the ability of a manufacturer to overcome the difficulties present when a small hole is to be plated through. When aspect ratio is to be evaluated for capability approval the manufacturer shall choose the smallest hole diameter which can be plated through the board to achieve the requirements of the standard.

Note: A smaller drill diameter than that used to verify aspect ratio may be claimed providing the maximum aspect ratio is not exceeded.

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E0.2 **Introductory Pages:** These are the pages concerned with the structure of the document as indicated below.

Title Page: "Capability Manual: Printed Boards, EN 123000"

Document identity and issue,
manufacturer's name,
address,
telephone, telex and telefax numbers etc.

Authorization by the Management's Quality Representative.

Distribution list: This lists the holders of copies of the capability manual to whom amendments are to be sent. Copies shall be identified in respect of each recipient, preferably by job title.

Amendment Record: This is the facility for recording the incorporation of amendments authorized by the Management's Quality Representative.

List of Amendments: This provides an indication of the purpose or nature of each amendment. It may be convenient to combine this function with the amendment record mentioned above.

NOTE: All amendments have to be agreed with the ONS. [CECC 00114/III]

Contents list: This shall give the sections in the sequence shown in Table 1. It may be convenient to combine this function with the issue status of each page (or section).

Section	Title
0	Introductory pages (Title page (Distribution list (Amendment Record (List of Amendments (Contents list
1	Scope of capability approval
2	Technology of printed boards
3	Subcontracting
4	Limits of capability
5	Description of capability
6	Manufacturer to customer interface
7	Design rules
8	Materials list
9	Manufacturer
10	Procedure in the event of CQC or product failure
11	Test programme for capability approval
12	Maintenance of capability approval
13	Modifications to the capability approval
14	Test methods and inspection

E1 Scope of capability approval

This section shall include:

- (1) a summary of the printed boards covered by EN 123000 for which capability is claimed. Reference shall be made to the relevant sectional and capability detail specification(s). It is implicit that only those features contained within the referenced Capability Detail Specification(s) may be claimed.
- (2) claims additional to the minima prescribed in the sectional specification.

E2 Technology (Process description)

The manufacturer shall provide a brief description of the processing methods and technologies employed. The statement shall include for example:-

- i Base materials - rigid/flexible, clad/unclad, paper/glass (if glass - woven/non-woven/random mat), phenolic/epoxide/silicone etc.

Bonding materials - prepreg, adhesive.

Combinations of base material/adhesives/coverlayer for flexible circuits or bonded heatsinks.
- ii Basic processing methods, e.g., fully additive, fully subtractive, part additive and subtractive.
- iii Method of pattern or image definition and the type of etch resist used e.g., screen printing, photomechanical, or others, shall be defined.
- iv Methods of producing holes, e.g., punching, template drilling, sight drilling, inverted drilling, CNC drilling, etc.
<https://standards.iteh.ai/catalog/standards/sist/b3715bca-9d79-44cc-94db-322222222222>
- v Method of producing board shape and outline including cut-outs, e.g., sawing, punching, engraving, routing, etc.
- vi Method of bonding layers e.g., copper foil or capping layers.
- vii Metallic and organic finishes should be qualified e.g., as electroless, electrolytic, oven cured, IR cured, for edge connector use only, etc.

Examples of different finishes are: Unprotected copper, Tin/Lead, Fused tin/lead (and fusing method), Hot Air Solder Levelling (HASL), Roller coated tin/lead, Gold, Solder resist)
Legend) - state maker, type, and curing method(s), etc.
Flux lacquer)
- viii Types of interconnections, e.g., pth, landless holes, buried via hole, semi-buried via hole, eyelets and tubelets (flexible circuits only - qualified by type e.g., as funnel, soldered, brazed, rolled etc.)
- ix Other processes, e.g., bonding heat sinks, flush conductors.

Note: An example of a process description is given in Appendix F.

E3 Subcontracting

The manufacturer shall declare which processes, if any, may be carried out by a subcontractor. The capability approval programme shall include samples that demonstrate the effectiveness of the subcontracted process(es).

CECC 00114/III clause 2.2 shall apply. There are three options available for consideration in the selection of a subcontractor:-

1. to use an approved printed board manufacturer with an appropriate scope of approval.
2. to use a specialist contractor approved to the relevant Process Assessment Schedule (PAS).
3. to use an unapproved subcontractor.

For options 1 & 2 above, the control of the subcontractor(s) required by EN 29000 shall apply.

For option 3 a scheme of surveillance, acceptable to the ONS, shall be referenced in the capability manual.

The manufacturer shall define which of the cases (1) to (4) given in CECC 00114/III clause 2.4.1 apply.

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E4 Limits of capability

The manufacture shall declare the limits (boundaries) of the capability for which approval is sought as appropriate to his technology and in accordance with the appropriate sectional and capability detail specification(s).

The scope of a capability approval is limited to that of the referenced capability detail specification(s) and the tables given therein.

The sectional specifications list a minimum level of capability for boundaries, such as active board size, conductor width and spacing, pth diameter, aspect ratio, and number of layers.

All finishes, metallic and organic, and additional features must be stated. Finishes should be listed under headings such as "Edge connector", "Surface/Hole", and "Au on Cu", "Au on Sn/Ni on Cu" etc.

Where a figure claimed is not applicable for all types of printed boards this shall be stated, e.g., the maximum size for multilayer boards is often less than that for single or double sided boards.

Where a manufacturer has two or more processes capable of producing the same product (e.g., screen print and photomechanical methods of producing pattern) the boundary limits for each shall be listed.

Solder resists and legends shall be listed by manufacturer and generic type.

In this document buried via holes are considered in two types.

1. Holes through which adjacent layers which do not involve multiple pressing operations.
2. Holes through adjacent and non adjacent layers which do involve multiple pressing operations.

Note: Approval of type 2 will be acceptable as covering type 1. Semi-buried via holes will be covered by approval for type 2 but may be covered by type 1 if no secondary pressing operation is required.

Where test tolerances are not given in the sectional specification or capability detail specification they shall be given in the capability manual, e.g., for conductor spacing less than 0.25 mm. A 'limits of capability table' shall be combined with a 'list of CQCs allocated to demonstrate capability', to form a 'limits of approval table'. Solvents additional to that specified for the solvents resistance test, should be included in this table.

Note: An example of a limits of approval table is given in Appendix G.