

Harmonized system of quality
assessment for electronic components

Capability detail specification: Single and double-sided printed boards with plated through holes

ICS 31.180

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National foreword

This British Standard is the English language version of CECC 23200-801:1998 published by the European Electronic Components Committee (CECC) of the European Committee for Electrotechnical Standardization (CENELEC). It supersedes BS EN 123200-800:1992 which is withdrawn.

This standard should be read in conjunction with the most recent editions of BS EN 123000 and BS EN 123200.

The UK participation in its preparation was entrusted to Technical Committee EPL/501, Electronic assembly technology, which has the responsibility to:

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the CECC title page, pages 2 to 27 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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English version

Capability detail specification:
Single and double-sided printed boards
with plated-through holes

Spécification particulière d'Agrément:
Cartes imprimées simple ou double face à
trous métallisés

Bauartspezifikation zur Anerkennung der
Befähigung:
Leiterplatten mit Leiterbildern auf einer oder
auf beiden Seiten mit metallisierten Löchern



This CECC Detail Specification was approved on 1997-08-06.

Up-to-date lists and bibliographical references of other detail specifications relating to EN 123000:1991 and EN 123200:1992 may be obtained on application to the Central Secretariat or to any CENELEC member.

This CECC Detail Specification 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.

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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 Capability Detail Specification has been prepared by CENELEC/TC CECC/SC 52, Printed Boards (formerly designated CECC Working Group 23).

It was approved as CECC 23 200-801 on 1997-08-06.

This Capability Detail Specification replaces EN 123200-800:1992.

It should be read in conjunction with EN 123000:1991 and EN 123200:1992 and with the current regulations for the CECC System.

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1 General

1.1 Scope

This Capability Detail Specification (CapDS) is based upon EN 123200. It relates to rigid single and double-sided printed boards with plated-through holes, made with materials and surface finishes as specified in clause 2.

1.2 Object

To specify the Capability Qualifying Component (CQC), its characteristics to be tested, the test methods and conditions to be applied and the requirements to be fulfilled for testing basic and extended capability.

2 Capability Qualifying Component (CQC)

Test boards to be used as CQCs for basic capability shall:

- be made from one of the copper-clad base materials specified in 2.1 of this CapDS, base material thickness of 1,6 mm $\pm$ 0,14 mm and 35 μ m copper foil on both sides.
- bear the composite test pattern (CTP) specified in 8.2 of EN 123200 (or equivalent CTP).
- have one of the surface finishes specified by groups 11, 12, 13, 14, 15, 16, 17 or 18 in 2.2 of this CapDS.

Requirements for test boards to be used as modified CQCs for the demonstration of additional capability are detailed in clause 5 of this CapDS.

2.1 Materials

Material Group designation	Specification	Base Material		Base material thickness range (mm)	Cu thickness (μ m)
		Type	Grade		
A	EN 60249-2-1	Phenolic paper	High Electrical	0,2 6,4	18, 35, 70, 105
	EN 60249-2-2	Phenolic Paper	Economic		
	EN 60249-2-6	Phenolic Paper	Defined flammability (horizontal)		
	EN 60249-2-7	Phenolic Paper	Defined flammability (vertical)		
	EN 60249-2-3	Epoxide Paper	Defined flammability (vertical)		
B	EN 60249-2-4	Epoxide Woven Glass	General purpose	0,2 6,4	18, 35, 70, 105
	EN 60249-2-5	Epoxide Woven Glass	Defined flammability (vertical)		

2.2 Surface finishes

2.2.1 Metallic finishes

Finish group Designation	Surface finish	Abbreviation for QPL	Remarks
11	Bare copper	Cu	
12	Copper with solderable organic surface protection	Cu(osp)	
13	Copper with oxide	Cu(CuO)	
14	Tin, Tin-Lead	Sn, SnPb	
15	Tin-Lead (fused)	SnPb(f)	
16	Tin-Lead (dipped and levelled)	SnPb(dl)	
17	Tin-Lead (roller coated)	SnPb(rt)	
18	Immersion Gold over Electroless Nickel	AuNi(smt)	
19			not assigned
20			not assigned
21	Specimen K 5 µm, gold plated on copper, remainder using finish group 11-17 (see below)	5 AuCu	
22	Specimen K 0,7 µm, gold plated on nickel, remainder using finish group 11-17 (see below)	0,7 AuNi	
23	Specimen K 2,5 µm, gold plated on copper, remainder using finish group 11-17 (see below)	2,5 AuCu	
24	Specimen K 2,5 µm, gold plated on nickel, remainder using finish group 11-17 (see below)	2,5 AuNi	

The demonstration of metallic group finishes 21, 22, 23 or 24 shall be combined with a finish from groups 11, 12, 13, 14, 15, 16, 17 or 18. Each claimed combination of metallic finishes shall be tested separately. Selective and non-selective finishes of the same material, where claimed, must be demonstrated separately.

2.2.1.1 Accelerated ageing

The ability of finish groups 11, 12, 13, 14, 15, 16, 17 or 18 to solder after extended or adverse storage conditions is demonstrated using accelerated ageing. This test shall be carried out on those finishes where accelerated ageing is claimed. Each finish that has complied with the requirements of the ageing test is highlighted by the inclusion of an asterisk (*) adjacent to that finish in the manufacturers abstract of capability as published in the QPL.

2.2.2 Organic finishes (where claimed)

Finish group designation	Organic finish	Abbreviation for QPL
a	Dry film solder mask	DSM
b	Wet resist solder mask	WSM
c	Liquid photopolymer solder mask	LSM
d	Marking ink	MI
e	Conductive ink	CI

The demonstration of organic finish groups a, b, c or d shall be over a finish from groups 11, 12, 13, 14, 15, 16, 17 or 18. All claimed types of solder resist shall be tested separately.

2.3 Variant designation

The combination of any material group designated in 2.1 and any of the surface finishes designated in 2.2 constitutes a variant. The variant is designated by the combination of both material and finish group designations. e.g. A12(b) or A12/21(c).

3 Capability approval

3.1 Range of capability approval

Capability approval granted on the testing of one variant is valid within the limits specified in 3.7 of EN 123000 for metal clad base material within one group designation, all base material thicknesses and all foil thicknesses of the material in accordance with 2.1 of this CapDS; and all metallic surface finishes within one surface finish group as given in 2.2.1 of this CapDS, that is:

finish group 11	Covers finish group 11 only
finish group 12	Covers finish group 11 and 12
finish group 13	covers finish group 11 and 13
finish group 14	covers finish group 11 and 14
finish group 15	covers finish group 11 and 15
finish group 16	covers finish group 11 and 16
finish group 17	covers finish group 17 only
finish group 18	covers finish group 18 only
finish group 21	covers finish group 21 only
finish group 22	covers finish group 22 and 24
finish group 23	covers finish group 21 and 23
finish group 24	covers finish group 24 only

3.2 QPL information

Information for the QPL (published as CECC 00 200) shall be given in accordance with clause 3.4 of EN 123 000, and shall contain the following details relative to the CapDS:

- | | |
|--|-------------------------------|
| • reference to the CECC Generic Specification | EN 123000 |
| • reference to the CECC Sectional Specification | EN 123200 |
| • reference to the CECC CapDS | CECC 23 200-801 |
| • base material for which approval is granted | as given in 2.1 of this CapDS |
| • the surface finishes for which approval is granted | as given in 2.2 of this CapDS |
| • any additional capability | 3.5.3 of EN 123000 refers |

4 Capability test programme

NOTE In all cases the number of failures permitted is zero.

4.1 Capability demonstration

Capability shall be demonstrated using 9 CTPs of one variant from each material group claimed. Testing shall be in accordance with Table I.

4.1.1 Other metallic surface finishes

If claimed, other metallic surface finishes, as designated in 2.2.1 shall be demonstrated by the manufacture and testing of 3 CTPs plus sufficient extra A and H specimens to meet the requirements of Table II. The maximum active board size for the finish shall be demonstrated. See also clause 5.

4.1.2 Organic surface finishes

Each claimed organic surface finish, as designated in 2.2.2, shall be demonstrated by the manufacture and testing of 3 CTPs using the pattern specified in Annex A (marking inks) or Annex B (solder masks). Testing shall be in accordance with Table III.

4.1.3 External bonded heatsinks

Where claimed, each bonded heatsink and adhesive system shall be demonstrated by the manufacture of three CTPs using the pattern specified in Annex C. Testing shall be in accordance with Table IV of this CapDS.

4.1.4 Demonstration of impedance control

Special CQCs shall be constructed in accordance with Figure G.5, configured as either a “stripline” or “microstrip”. Demonstrations shall be made for the following variants, as required and defined by the approved manufacturer:

- each base material type (e.g. woven glass epoxide);
- each impedance extreme, and a 50 Ω mandatory demonstration;
- conductor width and lateral separation minima;
- each metallic surface finish.

Tolerances at 50 Ω and each impedance extreme shall be claimed prior to demonstration, and achieved. For each solder resist type and thickness claimed, impedance value derating factors shall be declared. Impedance control shall be shown on the Capability Approval certificate as a separate annex.

5 Additional capability

Maximum active board size see 8.3 of EN 123000

Plated through hole diameters	Specimen C (microsection coupon) of CTP employed • minimum drilled hole diameter; use 2,0 mm pads • minimum clearance diameter; use 2,5 mm pads
Maximum aspect ratio	<u>nominal base material thickness for maximum number of layers</u> minimum drilled hole diameter
Minimum conductor width and spacing	Specimen F of the CTP to be modified to provide additionally 5 conductors and 4 spacings, each of the claimed minimum. Initial foil thickness of less than 35 µm may be used for this demonstration, but the thickness used shall be declared.
Metallic conductor finishes	Manufacturers are permitted to demonstrate conductor finishes other than those detailed in 2.2.1. The finish shall be demonstrated in accordance with Table IIa and detailed in the manufacturer’s Capability Manual.

6 Traceability

Traceability of all specimens to the original product shall be maintained. The method used to identify individual test specimens shall not prejudice the test result.