

SLOVENSKI STANDARD

SIST CECC 23 700-801:2002

01-maj-2002

Capability Detail Specification: Flex-rigid double-sided printed boards with through connections

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Bauartspezifikation zur Anerkennung der Befähigung: Starr-flexible doppelseitige Leiterplatten mit Durchverbindungen

Spécification particulière d'agrément: Cartes imprimées double face flexorigides avec connexions transversales

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Ta slovenski standard je istoveten z: **CECC 23 700-801:1998**

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DETAIL SPECIFICATION
SPÉCIFICATION PARTICULIÈRE
BAUARTSPEZIFIKATION

CECC 23 700-801

February 1998

English version

**Capability Detail Specification:
Flex-rigid double-sided printed boards with through connections**

Spécification particulière
d'Agrément:
Cartes imprimées double face
flexorigides avec connexions
transversales

Bauartspezifikation zur Anerkennung
der Befähigung:
Starr-flexible doppelseitige Leiterplatten
mit Durchverbindungen

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This Capability 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 123700:1996 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, 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 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 23 700-801 on 1997-08-06.

It should be read in conjunction with EN 123000:1991 and EN 123700:1996 and with the current regulations for the CECC System.

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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 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

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3.2 QPL information

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Information for the QPL (published as CECC 00 200) shall be given in accordance with 3.4 of EN 123000, 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 123700
- reference to the CECC CapDS CECC 23 700-801
- 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) of CECC 23 200-801. Testing shall be in accordance with Table III of this CapDS.

5 Additional capability

Maximum active board size	see 8.3 of EN 123000
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.

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Table I

Capability approval test schedule

(Table I)

Characteristics	Test No. IEC 60326-2	Specimen of Composite Test Pattern	Requirements	Remarks
<u>General examination</u> <u>Visual examination</u> Conformity and identification	1	All CQCs	Pattern, marking, identification, material and finishes shall comply with this CapDS. There shall be no apparent defects. Any identification for traceability purposes shall be verified.	
Appearance and workmanship	1a	All CQCs	The boards shall appear to have been processed in a careful and workmanlike manner, in accordance with good current practice. The base materials, conductors, surface finishes shall be of uniform appearance and free from cracks, burns, pits, nodules and blisters. Metallic surface finishes shall be free from scratches which penetrate to an underlying surface.	
Plated-through holes		All CQCs	Plated-through holes shall be clean and free from inclusions of any sort that could affect component insertion and solderability. Total area of the voids shall not exceed 10% of the total wall area. The largest dimension shall not exceed 25% of the hole circumference in the horizontal plane and 25% of the thickness of the board in the vertical plane. Plated-through holes shall have no plating voids at the interface of the hole wall and the conductive pattern . The interface shall be considered to extend into the hole below the surface of the board a distance of 1,5 times the total copper thickness on the surface.	
	1a		There shall be no circumferential cracks of the copper, or circumferential separation of the copper from the wall of the plated- through hole Holes with plating voids shall not exceed 5% of the total number of plated-through holes	See annex B
Board edges		All CQCs	The edges of the board and internal cut-outs shall be clean cut without tears and nicks	

(Table I)

Characteristics	Test No. IEC 60326-2	Specimen of Composite Test Pattern	Requirements	Remarks
Eyelets		All CQCs	Eyelets shall be firmly secured. Plated eyelets shall not have exposed bare metal. Eyelets shall not have cracked flanges. There shall be no damage to conductors or substrate around the eyelet.	
Bonding Conductor to substrate		All CQCs	There shall be no separation of the conductors from the substrate by apparent blisters or wrinkles other than those permitted in the material specification.	
Bonding Coverlayer to substrate and pattern		All CQCs	The bonding shall appear to be complete and uniform. Minor delaminations are permitted in the following positions: a) At random locations away from the conductors. Such delaminations shall have an area not exceeding 0,5 mm ² . b) Along conductor edges. Such delaminations shall not infringe upon the design spacing between the conductors by more than 20% of the design width by visual estimation. There shall be a minimum continuous bonding width of 0,5 mm between adjacent conductors. There shall be no delamination with conductor spacings less than 0,5 mm.	
Conductor defects	1b	All CQCs	There shall be no breaks in conductors intended to be continuous. The presence of local defects (e.g. nicks and pinholes) shall not reduce the conductor width by more than 25% The length of the defect shall not be greater than the nominal conductor width.	Where necessary, this shall be verified by dimensional examination using test 2a. Indentations in conductors, other than those in edge board contacts, shall not be a reason for rejection.
Particles between conductors	1b or 1c	All CQCs	Residual metallic particles are permissible provided that the leakage path is not reduced by more than 20% or to less than the distance required for circuit voltage.	Where necessary, this shall be verified by dimensional examination using test 2a.
Edge connector defects	2a	All specimens K	The surface of edge board contacts within the contact zone shall be smooth, and free from pitting or scratches penetrating the surface finish. Within the contact zone of each contact, there shall be no more than one indentation or bump. (see annex A)	
<u>Dimensional examination</u> Board dimensions	2	All CQCs	Dimensions and tolerances shall comply with the CQC outline dimensions.	Thickness measurement of the printed board shall exclude the surface finishes

(Table I)

Characteristics	Test No. IEC 60326-2	Specimen of Composite Test Pattern	Requirements	Remarks
Board thickness in the zone of edge board contacts	2	all specimens K	For basic capability, the total thickness, including the rigid part, shall be $1,6 \text{ mm} \pm 0,2 \text{ mm}$.	Other claimed thicknesses may be detailed in the Capability Manual
Holes	2	All CQCs	Hole diameter shall comply with 8.2 of EN 123700, or as claimed, with a tolerance of $\pm 0,1 \text{ mm}$.	
Access holes	2	All CQCs	Registration of an access hole including the influence of adhesive flow in the coverlayer with relation to the relevant land on the base material shall be such that any overlapping will not reduce the effective land dimensions.	
Conductor width	2	All CQCs	Conductor widths greater than or equal to $0,25 \text{ mm}$ shall not deviate from nominal values by more than $+0,08 \text{ mm}$, $-0,05 \text{ mm}$. Nominal conductor widths less than $0,25 \text{ mm}$ shall be within the manufacturer's claimed tolerance	Conductor defects and particles between conductors shall be disregarded when evaluating conductor width and spacing - see 'visual inspection'. Artwork for CTPs may need etch factor allowance adjustments in order to satisfy these requirements
Spacing between conductors	2	All CQCs	Nominal conductor spacings of $0,5 \text{ mm}$ shall not be less than $0,42 \text{ mm}$. Nominal conductor spacings of $0,25 \text{ mm}$ shall not be less than $0,17 \text{ mm}$. Nominal conductor spacings of less than $0,25 \text{ mm}$ shall be within the manufacturer's claimed tolerance.	
Misalignment of hole and land	1a 2a	All CQCs	There shall be no breakout from the land perimeter. There shall be no interruption of the junction between the land and the connecting conductor.	
Bonding flexible parts to rigid parts	1a	All CQCs	The bonding between the flexible parts and the rigid parts shall appear complete and uniform. The following conditions are permitted at the junction between flexible and rigid parts. Resin flow onto the flexible part shall not exceed 2 mm beyond from the junction. A non-bonded zone may also extend onto the rigid part up to 2 mm from the junction.	
<u>Electrical tests</u> Resistance Change in resistance of plated-through holes, thermal cycling	3c	6 off D	Specimens shall be subjected to 5 immersions @ $260 \text{ }^\circ\text{C}$. The increase in resistance between the first and last $25 \text{ }^\circ\text{C}$ immersion shall not be greater than 10%. The increase in resistance between the first and last $260 \text{ }^\circ\text{C}$ immersion shall not be greater than 10%. The increase in resistance during any $260 \text{ }^\circ\text{C}$ immersion shall not be greater than 120%.	Not applicable to polyester materials. Note: Thermal shock may be applied using either method 19a or 19b of IEC 60326-2.

(Table I)

Characteristics	Test No. IEC 60326-2	Specimen of Composite Test Pattern	Requirements	Remarks
<u>Insulation resistance</u>	6			
Preconditioning	18a			
Measurement at 100 Vdc in standard atmospheric conditions	6		Not less than 1000 MΩ	Insulation resistance shall be measured before and after environmental conditioning and at elevated temperature
Conditioning : IEC 60068-2-3 Test Ca damp heat steady state, 40 °C / 95%RH				
Measurement at 500 Vdc in damp heat conditions	6a	3 off E or J	Not less than 1000 MΩ	Not applicable to polyester materials. Measure @ 0, 10 and 21 days.
<u>Process contamination</u>		3 off E		
Preconditioning	18a			
Conditioning			IEC 60068-2-3 Test Ca; damp heat steady state for 21 days with 60 Vdc applied. (1 mA maximum).	
Measurement at 500 Vdc in damp heat conditions	6a		Not less than 100 MΩ	Measure at 0, 10 and 21 days.
<u>Mechanical tests</u>				
Peel strength				
Conductor to rigid base material	10a	3 off G	The minimum peel strength shall be 1,4 kN/m.	All conductors shall be tested.
Conductor to flexible base material	10c	3 off G	The minimum peel strength shall be 0,5 kN/m.	All conductors shall be tested.
Pull-off strength				
Pull-off strength, lands with plain holes	11a	3 off C	Condition in accordance with test 19d of IEC 60326-3 (3 cycles). The land shall not become detached during the soldering operation.	A flexible specimen may need to be supported by a rigid board.
Pull-out strength				
Landless plated-through holes	11b	3 off B	Condition in accordance with test 19d of IEC 60326-3 (5 cycles). The minimum pull-out force shall be 90 N.	A flexible specimen may need to be supported by a rigid board.
Flexural fatigue	21a	3 off L	After 40 cycles there shall be no delamination or electrical discontinuity.	
Flatness	12a	Complete CTP	The radius of curvature shall not be less than 3000 mm.	Rigid areas only
<u>Miscellaneous tests</u>				
Plating finishes				
Adhesion of plating, tape method	13a	3 off K	There shall be no evidence of plating adhering to the tape after removal from the conductor, other than resulting from overhang.	
Thickness of plating, contact areas	13f	3 off K or complete printed board	The thickness shall be - 0, +100% from the value given in 2.2 for the finish group designation claimed.	Test method : ISO 3543 : 1981 or ISO 1463 : 1982 (referee)