

System of quality assessment —

Capability detail specification —

Flex-rigid double-sided printed boards
with through-connections

ICS 31.180

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee EPL/501, Electronic assembly technology, upon which the following bodies were represented:

- Association of Contract Electronics Manufacturers
- Federation of the Electronics Industry
- GAMBICA
- Ministry of Defence
- National Supervising Inspectorate
- Printed Circuit Interconnection Federation
- Surface Mounting and Related Technologies (Smart Group) Ltd.

This British Standard, having been prepared under the direction of the Electrotechnical Standards Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 17 December 2001

© BSI 17 December 2001

The following BSI references relate to work on this British Standard:
Committee reference EPL/501
Draft for comment 01/204165 DC

ISBN 0 580 38531 0

Amendments issued since publication

Amd. No.	Date	Comment

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Capability qualifying component	2
5 Range of capability approval	4
6 Capability test programme	5
7 Additional capability	5
8 Traceability	5
Annex A (normative) Use of ANSI/IPC A-600F	16
Bibliography	19
Table 1 — Base materials	2
Table 2 — Metallic finishes	3
Table 3 — Organic finishes	4
Table 4 — Capability approval test schedule and performance requirements — General	6
Table 5 — Capability approval test schedule and performance requirements — Additional metallic conductor finishes	11
Table 6 — Capability approval test schedule and performance requirements — Additional contact finishes	13
Table 7 — Capability approval test schedule and performance requirements — Permanent organic finishes	14
Table A.1 — Capability approval test schedule — General and additional metallic conductor finishes	16
Table A.2 — Capability approval test schedule — Printed contacts	17
Table A.3 — Capability approval test schedule — Solder resist	18
Table A.4 — Capability approval test schedule — Flexible/flex-rigid printed boards	18

Foreword

This British Standard has been prepared by Technical Committee EPL/501, Electronic assembly technology.

The BS 123000:2001 series of British Standards is based on draft proposals to revise the EN 123000 series dated 1992 and 1997. These were circulated and voted on in CENELEC, but the CENELEC Technical Board decided not to approve them for publication. Following repeated attempts by the British National Committee to get them published, the Technical Board agreed to grant derogation from standstill to the British National Committee to publish national standards on the basis of the prEN 123000 series (Technical Board decision D106/092).

These standards are published to complement the BS EN 123000 series, which remains current. They will be withdrawn only if they are replaced by revised EN standards. They have been published because they are considered to be an improvement upon the EN series, for the following reasons.

- a) Requirements for modern materials and surface finishes required by the electronics industry have been incorporated.
- b) Reference is made to ANSI/IPC A-600F for many of the inspection criteria. This has been undertaken in response to industry requests.
- c) References to obsolete CECC regulatory documents have been replaced.
- d) Tests and requirements that are no longer considered relevant have been removed.
- e) The UK electronics industry requires standards that are subject to ongoing revision, in order to take account of new European Eco-Directives.

This British Standard is a capability detail specification, based upon the sectional specification, BS 123700. It should be read in conjunction with the generic specification, BS 123000, and the sectional specification, BS 123700.

Users of printed boards procured using this capability detail specification should satisfy themselves that the sample sizes and frequencies are appropriate for the needs of their product. Alternative requirements should be included in the customer detail specification.

ACKNOWLEDGEMENT. Selected requirements from ANSI/IPC A-600F have been incorporated into the requirements of this British Standard. Copies of this and other IPC publications are widely available, but in case of difficulties contact:

IPC
2215 Sanders Road
Northbrook
Illinois
USA

Tel: +847 509 9700
Fax: +847 509 9798
www.ipc.org

Annex A is normative.

It has been assumed in the preparation of this British Standard that the execution of its provisions will be entrusted to appropriately qualified and experienced people, for whose use it has been produced.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, pages 1 to 19 and a back cover.

The BSI copyright notice displayed in this document indicates when the document was last issued.

1 Scope

This British Standard specifies the capability qualifying component, its characteristics to be tested, the test methods and conditions to be applied and the requirements to be fulfilled for testing basic and additional capability, in relation to flex-rigid double-sided printed boards with through-connections. It is applicable for flex-rigid double-sided printed boards with through-connections made with the materials and surface finishes specified in clause 4.

This British Standard is a capability detail specification intended for use with the IECQ system of quality assessment for electronic components.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this British Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. For undated references, the latest edition of the publication referred to applies.

BS 2011-2.1Ca (IEC 60068-2-3), *Environmental testing — Part 2.1: Tests — Test Ca — Damp heat, steady state*.

BS 2011-2.1Ta (IEC 60068-2-54), *Environmental testing — Part 2.1: Tests — Test Ta — Soldering — Solderability testing by the wetting balance method*.

BS 4584-103.1, *Metal-clad base materials for printed wiring boards — Part 103: Special materials used in connection with printed circuits — Section 103.1: Specification for prepreg for use as a bonding sheet material in the fabrication of multilayer printed board*.

BS 4727-1:Group 11 (IEC 60194), *Glossary of electrotechnical, power, telecommunication, electronics, lighting and colour terms — Part 1: Terms common to power, telecommunications and electronics — Group 11: Printed circuits*.

BS 6221-2:1991 (IEC 60326-2:1990), *Printed wiring boards — Part 2: Methods of test*.

BS 123000:2001, *System of quality assessment — Generic specification — Printed boards*.

BS 123200:2001, *System of quality assessment — Sectional specification — Rigid double-sided printed boards with plated-through holes*.

BS 123500-003:2001, *System of quality assessment — Capability detail specification — Flexible printed boards with through-connections*.

BS 123700:2001, *System of quality assessment — Sectional specification — Flex-rigid double-sided printed boards with through-connections*.

BS EN 60249-2-8 (IEC 60249-2-8), *Base material for printed circuits — Specifications — Part 2-8: Specification for flexible copper-clad polyester (PETP) film*.

BS EN 60249-2-11 (IEC 60249-2-11), *Specifications — Part 2-11: Specification for thin epoxide woven glass fabric copper-clad laminated sheet, general purpose grade, for use in the fabrication of multilayer printed boards*.

BS EN 60249-2-12 (IEC 60249-2-12), *Specifications — Part 2-12: Thin epoxide woven glass fabric copper-clad laminated sheet of defined flammability, for use in the fabrication of multilayer printed boards*.

BS EN 60249-2-13 (IEC 60249-2-13), *Base material for printed circuits — Specifications — Part 2-13: Flexible copper-clad polyimide film, general purpose grade*.

BS EN 60249-2-15 (IEC 60249-2-15), *Specifications — Part 2-15: Flexible copper-clad polyimide film, of defined flammability*.

BS EN ISO 1463:1982, *Metallic and oxide coatings — Measurement thickness — Microscopical method*.

BS EN ISO 3543:1981, *Metallic and non-metallic coatings — Measurement thickness — Beta backscatter method*.

ANSI/IPC A-600F, *Acceptability of printed boards*.

3 Terms and definitions

For the purposes of this British Standard the terms and definitions given in BS 4727-1:Group 11, BS 123000 and BS 123700 together with the following apply.

3.1

referee method

test method, where a choice of methods is given, to be used in the case of disputed test data arising from the two methods

4 Capability qualifying component

4.1 General

Test boards to be used as capability qualifying components for basic capability shall:

- a) be made from a combination of the materials specified in 4.2. The construction shall be as given in BS 123700:2001, 9.4;
- b) bear the composite test pattern specified in BS 123700:2001, 9.3 (or equivalent composite test pattern), for basic and other metallic finishes. Composite test patterns as specified in BS 123200:2001, 8.2 (or equivalent composite test pattern) shall be used to demonstrate organic surface finishes and external bonded heat sinks;
- c) have one of the surface finishes specified by groups 11, 12, 13, 14, 15, 16 or 17 in 4.3;
- d) be fabricated using a copper thickness determined by the needs of the process and parameters to be demonstrated (e.g. conductor width and separation). The capability qualifying component copper thickness shall be detailed in the capability manual.

Test boards to be used as modified capability qualifying components for the demonstration of additional capability shall be as specified in clause 7.

4.2 Base materials

For the demonstration of basic capability, the base materials specified in Table 1 shall be used and shall conform to the performance requirements specified in Table 4, Table 5, Table 6 and Table 7.

For the demonstration of additional capability, if base materials other than those specified in Table 1 are used, they shall be detailed in the manufacturer's capability manual. Base materials used for the demonstration of additional capability shall conform to the performance requirements specified in Table 4, Table 5, Table 6 and Table 7 unless they have inherent electrical or physical characteristics that prevent the performance requirements from being met, in which case they shall conform to the criteria detailed in the relevant base material specification.

Table 1 — Base materials

Material group designation	Material specified in	Base material type	Grade	Base material thickness range
A	BS EN 60249-2-11	Epoxide woven glass	General purpose	0.05 mm to 0.8 mm
	BS EN 60249-2-12	Epoxide woven glass	Defined flammability	≥0.05 mm
	BS 4584-103.1	Prepreg	General purpose	≥0.05 mm
	BS 4584-103.1	Prepreg	Defined flammability	
B	BS EN 60249-2-13	Polyimide film	General purpose	12.5 µm to 125 µm
	BS EN 60249-2-15	Polyimide film	Defined flammability	12.5 µm to 125 µm
C	BS EN 60249-2-8	Polyester film	General purpose	12.5 µm to 125 µm