
British Standard

Sectional specification for capability approval of manufacturers of double-sided rigid printed wiring boards of assessed quality with plated through holes

Spécification intermédiaire pour l'agrément de savoir-faire des fabricants de cartes imprimés rigides
à double face de qualité assurée avec trous métallisés

Rahmenspezifikation für die Anerkennung der Fähigkeit für Hersteller von gütebestätigten starren
Leiterplatten mit Leiterbildern auf beiden Seiten und mit metallisierten Löchern

Foreword

This revision of BS 9762, which has been prepared under the direction of the Electronic Components Standards Committee, is one of a series of specifications dealing with printed wiring boards of assessed quality. This standard supersedes BS 9762 : 1977, which is withdrawn.

The generic standard, BS 9760, defines the test methods applicable to all types of printed wiring board and capability approval procedures and rules. The specific tests and requirements applicable to different types of printed wiring boards are contained in a series of sectional specifications comprising BS 9761 to BS 9766. These specifications deal with both requirements for capability approval and with those for quality conformance inspection. This particular sectional specification deals with double-sided rigid printed wiring boards with plated through holes (PTHs) and includes tests for capability approval using composite test patterns (CTPs) for which information is given in appendices A to D.

Warning. Some of the test procedures given in this standard require the use of substances that may be injurious to health unless adequate safety precautions are taken. The standard refers only to technical suitability and in no way absolves either the supplier or the user from statutory obligations in relation to health and safety at any stage of manufacture or use.

For ease of reference, the test item numbering used in BS 9762 : 1977 has been retained, except for the new tests numbered 27 to 38.

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

Amendment No. 1
published and effective from 24 December 1991
to BS 9762 : 1988

Sectional specification for capability approval of
manufacturers of double-sided rigid printed wiring
boards of assessed quality with plated through
holes

Correction

AMD 6958
December 1991

Table 2. Schedule of tests for capability approval for double-sided boards
with PTHs

In the requirements column for item no. 6, in line 4, delete '*Holes plated through*'
and substitute '*Holes not plated through*'.

Amendment No. 2
published and effective from 15 December 1992
to BS 9762 : 1988

**Sectional specification for capability approval
of manufacturers of double-sided rigid printed
wiring boards of assessed quality with plated
through holes**

Corrections

AMD 7354
December 1992

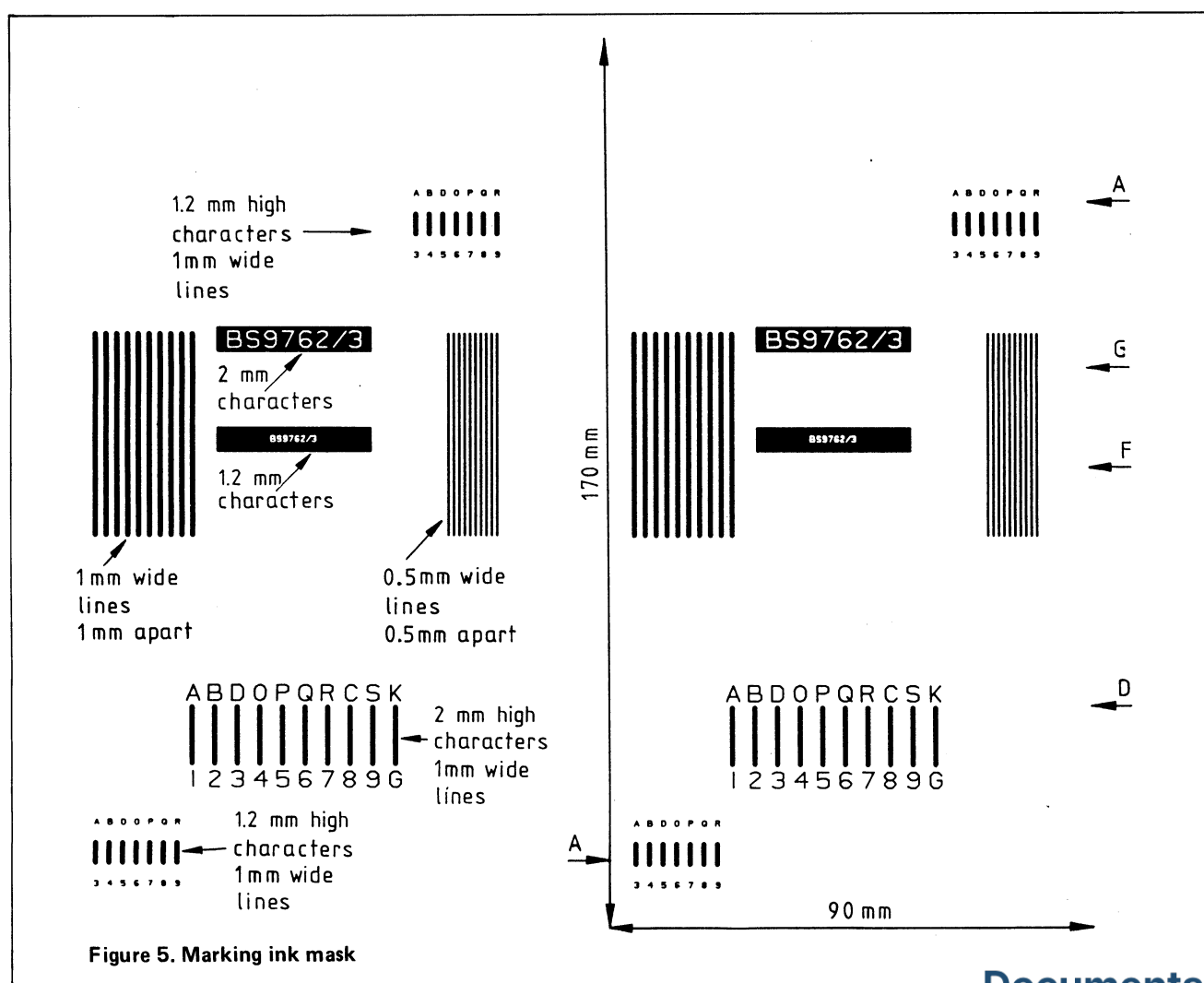
Table 2. Schedule of tests for capability approval for double-sided boards with PTHs

In the inspection characteristics column for item no. 13, in lines 3 to 4, delete 'landed or'.
In line 5, delete '§' and the associated footnote.

AMD 7354
December 1992

Figure 5. Marking ink mask

Delete the existing figure and substitute the attached.



Contents

	Page
Foreword	Inside front cover
Committees responsible	Back cover
Specification	
Section one. General	
1.1 Scope	2
1.2 Related documents	2
1.3 Base materials	2
1.4 Customer detail specification	2
1.5 Inspection	2
Section two. Capability approval	
2.1 Description of capability: limits of approval	3
2.2 Demonstration of capability	3
2.3 Capability CTP allocation	3
2.4 Capability approval acceptance levels	4
2.5 Capability approval report	4
2.6 Abstract of description of capability	4
Section three. Quality conformance inspection	
3.1 General	5
3.2 Certified test records	5
Appendices	
A CTP dimensions and finish for double-sided boards with PTHs	15
B Group pattern layout for double-sided boards with PTHs	16
C Detailed dimensions of specimens shown in appendix B	17
D CTP layout	18
E Example of format for abstract of description of capability for inclusion in PD 9002	19
F Format for customer detail specification for printed wiring boards with PTHs complying with BS 9762	20
G Solder resist and marking ink masks	21
H Test pattern for bonded heat sinks	23
Tables	
1 CTP allocation	4
2 Schedule of tests for capability approval for double-sided boards with PTHs	5
3 Quality conformance inspection: double-sided printed wiring boards with PTHs	12
Figures	
1 Examples of acceptable and non-acceptable soldered holes	14
2 CTP for double-sided boards with PTHs	15
3 CTP layout	18
4 Solder resist mask	21
5 Marking ink mask	22
6 Test pattern for bonded heat sinks	23

Section one. General

1.1 Scope

This British Standard specifies requirements for the capability approval of manufacturers of double-sided printed wiring boards with plated through holes (PTHs). It also includes requirements for quality conformance inspection.

The standard includes tests, selected from those described in BS 9760, for use in capability approval and in conjunction with detail specifications.

The standard also includes guidance on the preparation of customer detail specifications.

NOTE. There are no requirements for eyelets, rivets, turrets, etc. The assessment and release of such features should be by separate local agreement between the manufacturer and the customer.

1.2 Related documents

This British Standard makes reference to the following publications.

- BS 2011 Basic environmental testing procedures
Part 2.1Ca. Test Ca. Damp heat, steady state
- BS 4584 Metal-clad base materials for printed wiring boards
Part 2. Epoxide woven glass fabric copper-clad laminated sheet, general purpose grade:
EP-GC-Cu-2
Part 3. Epoxide woven glass fabric copper-clad laminated sheet, flame retardant grade:
EP-GC-Cu-3
Part 9. Flexible copper-clad polyester (PETP) film: PETP-F-Cu-9
Part 10. Flexible copper-clad polyimide film: PI-F-Cu-10
- BS 6096 Marking inks and solder resist coating materials for printed circuits
- BS 9000 General requirements for a system for electronic components of assessed quality
Part 1. Specification of basic rules and procedures
- BS 9760 Specification for printed circuits of assessed quality: generic data and methods of test: capability approval procedure and rules
- BS 9761 Sectional specification for capability approval of manufacturers of multi-layer rigid printed wiring boards of assessed quality with plated through holes
- BS 9763 Sectional specification for capability approval of manufacturers of single- or double-sided printed wiring boards of assessed quality without plated through holes

- BS 9764 Sectional specification for capability approval of manufacturers of flexible single- or double-sided printed wiring boards of assessed quality without plated through holes and with or without rigidizing component materials
- BS 9765 Sectional specification for capability approval of manufacturers of double-sided flexible printed wiring boards of assessed quality with through hole connections and with or without rigidizing component materials
- BS 9766 Specification for printed circuits of assessed quality: sectional specification for multilayer flexi-rigid printed circuits with through hole connections
- PD 9002 BS 9000, BS CECC and IECQ qualified products list

1.3 Base materials

The base materials used shall either comply with BS 4584 or shall be other suitable materials for which an approved manufacturer or user specification is available (see 2.3.4 of BS 9760 : 1977).

The test requirements given in table 2 are applicable to epoxide glass base materials except where otherwise stated. For base materials other than epoxide glass, the printed wiring board manufacturer shall define the test requirements for table 2 in his capability manual. This test information shall also be available to the customer.

1.4 Customer detail specification

A customer detail specification (see section three of BS 9760 : 1977) is required for the purchase of double-sided printed wiring boards covered by capability approval.

NOTE. A suitable form for a customer detail specification for double-sided rigid printed wiring boards with PTHs is shown in appendix F.

1.5 Inspection

Printed wiring boards shall not be released until the following has been done:

- (a) capability approval has been obtained by complying with table 2 of this standard or where appropriate (see 1.3) the requirements defined by the manufacturer's capability manual, and with section two of BS 9760 : 1977;
- (b) a customer detail specification has been prepared and agreed (see section three of BS 9760 : 1977);
- (c) production quality conformance inspection in accordance with table 3 of this standard has been carried out.

Section two. Capability approval

2.1 Description of capability: limits of approval

2.1.1 The description of the capability shall comply with **2.2** of BS 9760 : 1977.

NOTE. Capability should be chosen so that it encompasses all printed wiring boards that require release in accordance with BS 9760.

2.1.2 The manufacturer shall describe his capability in terms of active board size (excluding borders), minimum conductor width and spacing, minimum diameter of plated through hole (PTH), aspect ratio (board/hole), finishes and additional features.

2.1.3 The minimum level of capability permitted shall be as follows:

active board size	270 mm × 170 mm
conductor width and spacing	0.4 mm
aspect ratio (board/hole)	2:1
minimum diameter of PTH	0.7 mm

2.1.4 The abstract of approval for inclusion in PD 9002, shall be in tabular form.

NOTE. An example is given in appendix E.

2.2 Demonstration of capability

2.2.1 General

The manufacturer shall demonstrate the boundary limits of the claimed capability in accordance with **2.1**.

2.2.2 Size

2.2.2.1 Minimum size for capability approval. The minimum pattern for capability approval shall be one complete composite test pattern (CTP) as shown in appendix A.

2.2.2.2 Maximum size for capability approval. Capability for printed wiring boards larger than the CTP shall be demonstrated by printing the CTPs in groups, as shown in appendix D, or by multiple printing of the group pattern shown in appendix B.

2.2.3 Minimum conductor width and spacing

Two sizes of conductor width and spacing are shown in specimen F in appendix C. The manufacturer shall declare which width is being offered for approval. Where the manufacturer wishes to declare a finer width and spacing than shown in specimen F of this standard, he shall provide a specially designed specimen F to demonstrate his capabilities.

2.2.4 Diameter of PTH

The diameter of the PTH shall be within the limits listed in appendix B.

NOTE. Smaller diameter PTHs may be used to demonstrate an additional capability.

2.2.5 Finishes

2.2.5.1 Different finishes. All different finishes (organic and inorganic) whether for surface and/or edge contacts shall be assessed separately (see **2.3.3.2**).

NOTE. With the agreement of the National Supervising Inspectorate (NSI), test results for a finish which have been obtained during tests establishing approval to one specification in the BS 9760 series of sectional specifications may be transferred for use in establishing approval to another specification in the series, in lieu of further testing.

2.2.5.2 Edge connector finish thickness. The thickness of finishes required for the minimum level of capability shall be as given in table 2.

NOTE. Thinner coatings may be used to demonstrate additional capability.

2.2.6 Additional features

2.2.6.1 Surface bonded heat sinks or other metallic layers. The test specimens used shall be either boards with the test pattern shown in appendix H or suitable production boards, if an equivalent level of assessment is achieved. Each type of heat sink and its surface finish (e.g. nickel plated copper anodized aluminium) shall be assessed separately, in accordance with table 2.

NOTE 1. Aspects such as shape and the method used to manufacture the heat sink are not assessed. The assessment is restricted to the mechanical and electrical integrity of the bonding and to any degradation of the printed wiring boards. Thermal design aspects of the heat sink are not assessed.

NOTE 2. Test results establishing approval for heat sinks on double-sided boards can normally be used to establish approval for multilayer boards.

2.2.6.2 Landless or landed PTHs. These PTHs shall be assessed on specimen H without surface pads as described in **1.2.3.8** of BS 9760 : 1977 using the relevant tests of table 2.

2.2.6.3 Other features. Suitable specimens shall be provided for other features as specified in **2.3.3** of BS 9760 : 1977.

2.3 Capability CTP allocation

2.3.1 Programme of capability assessment

The programme of capability assessment shall comply with **2.3** of BS 9760 : 1977.

2.3.2 Standard patterns

The standard patterns shown in appendices A to D shall be used for demonstrating standard capability. Hole dimensions shall be as specified in appendix B.

The quantities of patterns to be supplied for capability assessment shall be as follows:

- (a) for single size CTP: six boards = six CTPs (three separate production lots);
- (b) for double size CTP: three boards = six CTPs (three separate production lots);