

**Rules for the preparation of
Detail specifications for**

**Rectangular electrical
connectors of assessed
quality with moulded
bodies for d.c. and low
frequency
applications —
Full and basic
assessment levels**

Foreword

This revised British Standard prescribes the rules for the preparation of detail specifications for rectangular electrical connectors with moulded bodies, for DC and LF applications. It shall be read and used in conjunction with BS 9520 “*Electrical connectors of assessed quality for DC and LF applications: Generic data and methods of test*”. Example detail specifications in the BS 9524 range are BS 9524 N0001 and BS 9524 N0002.

This revision updates the rules document in the light of changes in test requirements for connectors for electronic equipment.

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 and ii, pages 1 to 23 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.

Amendments issued since publication

Amd. No.	Date of issue	Comments
4748	November 1984	Indicated by a sideline in the margin

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1 Scope

This British Standard prescribes those special rules which, in conjunction with the general rules contained in Section 2 of BS 9520, are required for the preparation of detail specifications for rectangular electrical connectors of assessed quality with moulded bodies for frequencies below 3 MHz at the full and basic assessment levels.

2 General

2.1 Contacts

Connectors designed to intermate, but which differ in having removable or non-removable contacts with solder, crimp, wire-wrap, push-on, insulation displacement etc., terminations, may be included in one detail specification.

The type of contact shall be indicated in the title of the connector specification, and for removable contacts the direction of release and removal from the connector, e.g. front release, rear removable, shall be stated.

Removable contacts shall be defined in connector detail specifications by means of outline drawings and shall be identified either:

- a) by reference to the contact detail specification to which the contacts are qualified in the series BS 9521: Removable contacts of assessed quality for electrical connectors as defined by BS 9520: Generic data, methods of test and rules for the preparation of detail specifications e.g. BS 9521 F0001;
- b) by means of digits indicating contact size, wire accommodation and contact style, preceded by the connector pattern number e.g. 9524 N0001/20-20M; or
- c) where a) or b) cannot be applied, by an accessory number.

2.2 Assessment level

The detail specification shall show the relevant assessment level; basic, full, etc. (see 2.1.4 of BS 9520). Each detail specification shall refer to only one assessment level.

The performance of connectors is normally only assessed with mated pairs from the same manufacturer and in such cases the detail specification shall include a statement to this effect.

In other cases, where two or more manufacturers wish to claim functional compatibility and their connectors have been tested to demonstrate such compatibility, this fact and the tests employed shall be stated on the facing sheet of the detail specification.

In cases where a manufacturer produces only one half of a mated connector, such connectors may be tested with an approved mating part to demonstrate functional compatibility. In such cases, the detail specification shall include a statement to this effect.

In cases where two or more manufacturers wish to include a claim of functional compatibility of differing connector styles, and their connectors are tested to demonstrate such compatibility, the detail specification shall identify the appropriate agreed tests and include a statement to this effect.

(See also 2.1.4 of BS 9520.)

2.3 Title

Connectors to detail specifications in this series have the title: "MultiContact, rectangular, with moulded bodies". Typical supplementary information in the title is as follows: "Unsealed with polarized housing and rear release, rear removable crimp contacts".

See the example detail specifications quoted in the foreword for the method of presentation of information required to be shown on the inside front cover.

(See also BS 9000-2 and PD 9004, Circular letters nos. 15 and 16.)

2.4 Pattern number

The pattern number of a connector or range of connectors shall consist of the relevant detail specification number without the letters BS, e.g. Pattern 9524 NXXX.

2.5 Description of the connector and intended application

The description of the connector shall make reference to the method of coupling, polarization, contact type (crimp, solder, etc., removable, non-removable), material or finish, and range of wire and insulation sizes.

For connectors having removable contacts the manner of insertion, release and removal of the contacts shall be stated. Where compliance with the detail specification is dependent on a full complement of contacts being fitted and/or by the use of dummy contacts or unwired contacts with filler plugs, this shall be stated.

The description of intended application shall make reference to the major performance characteristics of the connector, such as non-sealed or sealed, e.g. barrier or barrier and panel sealed, environment resistant, screened or unscreened, etc., and attention may also be drawn to particular uses, e.g. rack and panel or inter-chassis applications.

2.6 Marking of the connector and package

The detail specification shall state the marking shall be in accordance with 1.1.6 of BS 9520. The individual reference number required by 1.1.6 c) of BS 9520:1974 consists of abbreviations to identify individual connectors. It is not intended that this reference number shall describe every feature of the connector. An explanation of the reference shall be included in each detail specification similar to the following:

2.6.1 Connector reference numbers

M

XXXX

XXX

X

X

XX

X

Style number

Contact arrangement

Contact style

Termination style

Polarization

Variant

Style number	A letter M denoting Moulded, followed by four digits. A typical description of a style is M 1234: Connector, fixed, crimp contacts. (The detail specification shall designate styles and shall relate this number to a control drawing in the CC or FC series, e.g. CC/M 1234.)
Contact arrangement	Three digits denoting a particular contact arrangement. These arrangements will be shown in the outline drawing section of the detail specification. In order to facilitate automatic recognition, it is necessary to standardize the number of digits used within the reference number, e.g. contact arrangement 26 will be expressed as 026.
Contact style	M = Male contact F = Female contact H = Hermaphroditic contact
Termination style	C = crimp L = through-board solder (90°) E = through-board solder (90°, extra long tail) S = solder for wire T = through-board solder W = wire-wrap (3 wraps) Z = wire-wrap (2 wraps)

	I = insulation displacement
	X = hybrid arrangement of terminations to user requirement
Polarization	Two letters or digits denoting a particular arrangement of a polarizing feature. (Omitted where no alternative exist.)
Variant	A letter or digit to denote variation from basic specification, e.g. contact finish, etc. Detail specification designate variants. Where no variant exists 0 shall be used.
Example reference number	M 1234 026 M C 12 0

2.6.2 Accessory and tool reference numbers

A (or T) XXXX XX X

Style number _____
Housing (shell) size
or contact size _____
Variant _____

Style number	A letter A denoting accessory or letter T denoting tool, followed by 4 digits. Typical descriptions are screw lock assembly A 4468 or contact insertion tool T 4579. (The detail specification shall designate styles and shall relate this number to a control drawing in the CC or FC series, e.g. CC/A 4468 or CC/T 4579.)
Housing (shell) size	Two digits (quoted for accessories, where applicable).
Contact size	Two digits (quoted for filler plugs or tools).
Variant	Quoted for accessories. Digit as for connector in 2.6.1.
Example accessory/tool reference numbers	A 2468 05 0 T 3579 20
Example removable contact reference numbers	BS 9521 F 0001 20 20 M [see 2.1 a)] BS 9524 F 0007 20 20 M [see 2.1 b)] A 3466

2.6.3 Connector supplied complete with accessory

When a connector is supplied complete with an accessory, the accessory reference number is added to that of the connector.

2.6.4 Packaging

Packaging shall include upon request the manufacturer's assembly instructions, including wire preparation, crimping and contact insertion details.

2.7 Ordering information

For ordering information see 2.4 of BS 9520.

2.8 Drawings

The detail specification shall contain, in appendices, drawings as required by 2.1.5 and Appendix A of BS 9520.

2.9 Ratings (including limiting conditions of use)

The following ratings shall be stated (in accordance with **1.1.12** of BS 9520) and the applicability requirements of Table 1 and Table 2 of this specification.

2.9.1 Electrical

A recommended maximum working current per individual contact size (in isolation) at a specified ambient temperature.

Maximum current per contact (for each contact size) through all contacts simultaneously at a specified ambient temperature.

Working and proof voltages shall be given for stated air pressure(s).

2.9.2 Environmental

Climatic classification:

Low air pressure severity

Vibration severity

Shock severity

Acceleration severity¹⁾

Bump severity

2.9.3 Endurance

Mechanical operation

Electrical load and temperature — long term (at stated current and temperature)

Electrical load and temperature — short term (no electrical load and at upper temperature severity).

2.10 Characteristics

The following characteristics shall be stated (in accordance with **1.1.12** of BS 9520) and the conditions under which they apply. Initial and final values shall both be stated where differences after conditioning are permitted.

2.10.1 Electrical

Maximum contact resistance

Minimum insulation resistance

2.10.2 Mechanical

Engaging and separating force connector

Contact retention (in insert) (moulding) test load¹⁾

Contact holding force

Sealing (air leakage)¹⁾

Wire/cable accommodation

2.10.3 Resistance to fluids

The detail specification shall state the fluids to which resistance is claimed. (See BS 2011, Part 2, I.R Tables 1 and 2.)

2.11 Certified test records (for full assessment level only)

See Appendix C of BS 9000 for an example layout.

2.12 Additional information

Additional drawings, notes etc., needed for the clarification of the detail specification may be given. This information is not required to be verified by the inspection requirements.

¹⁾ Where applicable.

3 Quality assessment procedure

3.1 Selection of specimens

The specimens for each subgroup should contain representative styles and the smallest, medium, and largest size for which approval is sought. The overall sample shall include the greatest contact density for each voltage and current rating for which approval is sought in these sizes. For group D the detail specification shall include a table which indicates the combinations of connectors and accessories to be used in each set and which set is to be tested in which subgroup(s).

3.1.1 Full assessment level

- a) For subgroup D0, one specimen of each piece part for the connector range submitted for approval. For subgroup D1, three specimens of connector for each reference number. However, this may be modified provided that a sampling plan, agreed with the supervising inspectorate is appended to the detail specification. The layout of this should preferably be similar to that in Appendix C of the example detail specifications. (BS 9524 N0001 and BS 9524 N0002.)
- b) The minimum sample for subgroup D2 to D9²⁾ inclusive is 60 specimen mated pairs complete with appropriate accessories. The minimum number of specimens for each of the subgroups D2, D3, D4, D5 and D6 is fifteen pairs, and subgroup D3 samples may be used for subgroup D4. For subgroups D7 and D9²⁾ it is five mated pairs; for subgroup D8(i) it is three mated pairs, and these may be taken from the D2 test samples. For subgroup D8(ii) it is two mated pairs and these shall be selected from the larger sizes of D2 test samples. Alternatively separate samples may be used for subgroup D8(ii) tests.

3.1.2 Basic assessment level

- a) For subgroup D0, one specimen of each piece part required for the connector range submitted for approval. For subgroup D1 three specimens of connector for each reference number. However, this may be modified provided that a sampling plan, agreed with the National Supervising Inspectorate is appended to the detail specification. The layout of this should preferably be similar to that in Appendix C of the example detail specification. (BS 9524 N0001 and BS 9524 N0002.)
- b) The minimum sample for subgroup D2 to D6 inclusive is 30 specimen mated pairs complete with appropriate accessories. The minimum number of specimens for each of subgroups D2, D5 and D6 is 15 mated pairs. Subgroup D2 samples may be used for subgroup D6.

3.2 Information to be given in the detail specification

The following information shall be included in the detail specification in a clause entitled "Quality assessment procedure", or elsewhere at the discretion of the specification writer.

3.2.1 Acceptance criteria for group D

- | | |
|-------------------------------------|--|
| Subgroups D0, D1, D4(ii), D8 and D9 | — No failure allowed |
| Remaining subgroups | — One failure allowed in each subgroup |

3.2.2 Qualification approval

Group C tests need not be carried out if similar tests at the same or increased severity are carried out in group D.

3.2.3 Quality conformance inspection

When group D tests are due, similar tests in group C need not be performed.

3.2.4 Alternative method of maintaining qualification approval

- a) Full assessment level. Subject to the approval of the NSI the group C-D sequential test procedure given in Appendix A may be used.
NOTE Detail specifications invoking the procedures of Appendix A shall not make reference to group C tests.
- b) Basic assessment level. Subject to the approval of the NSI a group D sequential test procedure which has been approved by that authority may be used.

²⁾ For D9, one sample pair is required for each fluid specified and if more than five fluids are specified, the extra specimens may be taken from those used for subgroup D5.