

Tools for live working— Insulating hand tools for work on or near conductor rail systems operating at voltages up to 1 000 V a.c. or 1 500 V d.c.

ICS 13.260

Committees responsible for this British Standard

The preparation of this British Standard was entrusted to Technical Committee PEL/78, Tools for live working, upon which the following bodies were represented:

- Association of Manufacturers Allied to the Electrical and Electronic Industry
- BECCAMA — Electronic Cable Connector and Accessories Manufacturers' Association
- British Glove Association
- British Safety Industry Federation
- Chief and Assistant Chief Fire Officers Association
- Department of Trade and Industry — Consumer Safety Unit
- Department of Trade and Industry — Engineering Inspectorate
- Electricity Association
- Federation of British Hand Tool Manufacturers
- GAMBICA
- Health and Safety Executive

This British Standard, having been prepared under the direction of the Electrotechnical Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 16 January 2002

© BSI 16 January 2002

Amendments issued since publication

Amd. No.	Date	Comment

The following BSI references relate to the work on this British Standard
Committee reference PEL/78
Draft for comment 99/203940 DC

Contents

	Page
Committees responsible	inside front cover
Foreword	ii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Requirements	2
5 Type tests	4
6 Routine tests	9
7 Sample tests	9
8 Records	9
Annex A (normative) Tool categories	10
Annex B (informative) Recommendations concerning use and in-service care	11
Annex C (normative) Sampling	12
Figure 1 — Marking symbol	3
Figure 2 — Example test arrangement for handle grip sleeve adhesion test	5
Figure 3 — Example test arrangement for handle pull-apart test	6
Figure 4 — Example test arrangement for handle material bend test	6
Figure 5 — Example test arrangement for handle torsion test	8
Figure 6 — Example test arrangement for flammability test	9
Table 1 — Applied force for handle pull-apart test for category 1 insulating hand tools	5
Table C.1 — Classification of defects	12
Table C.2 — Sample sizes for major defects	12
Table C.3 — Sample sizes for minor defects	12

Foreword

This British Standard has been prepared by Technical Committee PEL/78, Tools for live working.

This standard specifies requirements for insulating hand tools for work on or in close proximity to ground-level fully exposed live conductor rails providing traction supplies for electrified railways. Such traction supply systems are in wide use in certain areas of Great Britain, particularly in London and southern England. They date from the early days of railway electrification and their design and construction impose special requirements concerning tools used for track work, in order to meet modern safety requirements.

Whilst BS EN 60900 provides a specification for hand tools for live working, these are tools primarily used by electricians and other electrical personnel. That standard does not provide an appropriate specification for the larger, purpose-designed, specialist tools employed in track work. However, full account has been taken of the requirements of BS EN 60900 in the drafting of this standard, to ensure uniformity of approach and common requirements where practicable.

Assessed capability. Users of this British Standard are advised to consider the desirability of quality system assessment and registration against the appropriate standard in the BS EN ISO 9000 series by an accredited third-party certification body, with particular reference to material and chemical bonding used in the manufacture of insulating hand tools.

Annex A and Annex C are normative. Annex B is informative.

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 12, an inside back cover 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 requirements for insulating hand tools required for work on or in close proximity to conductor rails providing traction supplies, in accordance with BS EN 50163, for electrified railways and mass transit systems operating at voltages up to 1 000 V a.c. or 1 500 V d.c.

It is not applicable to hand-held tools conventionally used by electricians and others for work on live electrical apparatus, which are specified in BS EN 60900.

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 876:1995, *Specification for hand hammers*.

BS 1421:1995, *Specification for picks, beater picks and mattocks*.

BS 2589:1995, *Specification for railway track spanners*.

BS 2945:1995, *Specification for axes and hatchets*.

BS 3388, *Specification for forks, shovels and spades*.

BS EN 50163:1996, *Railway applications — Supply voltages of traction systems*.

BS EN 60900:1998, *Hand tools for live working up to 1 000 V a.c. and 1 500 V d.c.*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1

insulating hand tool

hand tool designed to protect the user from electric shock and to minimize the risk of causing short circuits by bridging between two conductive parts at different potentials; made predominantly of insulating material except for metal parts or inserts:

- at the tool working head(s); or
- used for reinforcement, but separated from the working head

NOTE Annex A categorizes tools according to their design, construction and intended use.

3.2

tool working head

part of an insulating hand tool intended to perform the function of the tool, which may be in contact with or in close proximity to conductor rails

3.3

insulating insert

insulating material inserted between two conductive parts, e.g. in the case of a double-ended tool

3.4

type test

test of one or more insulating hand tools manufactured to a certain design to show that the design meets certain specifications

3.5

routine test

test to which each individual insulating hand tool is subjected during or after manufacture to ascertain whether it conforms to certain criteria

3.6

sample test

test on a selected number of items taken at random from a batch

3.7**material batch**

purchase lot or production run of each finished length, profile and size of profile of insulating material to be used in the manufacture of insulating hand tools

3.8**tool batch**

production run of tools within a particular tool category

NOTE Definitions of tool categories are given in Annex A.

4 Requirements**4.1 General requirements**

4.1.1 An insulating hand tool shall be manufactured from the assembly of one or more insulating parts in conjunction with the conductive tool working head.

NOTE 1 Insulating parts may be applied over other insulating parts (multi-layer construction). The design and construction of the tool may necessitate some overlap of insulating and conductive parts where joined at the tool working head.

NOTE 2 When the design, dimensions and construction of an insulating hand tool are checked visually, the tool should be deemed to be safe with respect to:

- general operation of the tool by a user (i.e. the tool should be deemed not to constitute a danger to the user when used in accordance with the manufacturer's instructions);
- accidental contact by a user with the working head (i.e. it should be deemed that such contact has been minimized);
- the traction supply system (i.e. the tool should be deemed not to constitute a danger to the traction supply system when used in accordance with the manufacturer's instructions).

4.1.2 Where the handle end incorporates a grip sleeve, the adhesion of the sleeve shall be tested in accordance with and shall conform to the requirements specified in **5.3.2**.

4.1.3 All metallic parts shall be securely fixed to the insulating handle or other insulating insert, as appropriate. Conformity shall be verified by means of the test specified in **5.3.3**.

4.1.4 The mechanical properties of an insulating hand tool shall conform to the relevant requirements of the appropriate British Standard for an uninsulated tool having the same function:

- BS 876 for hand hammers;
- BS 1421 for picks, beater picks and mattocks;
- BS 2589 for railway track spanners;
- BS 2945 for axes and hatchets;
- BS 3388 for forks, shovels and spades.

4.1.5 The insulating material shall be compatible with any other materials used in the construction of the insulating hand tool. Its electrical properties shall be tested in accordance with and shall conform to the requirements specified in **5.4.1**. Its flame retardancy shall be tested in accordance with and shall conform to the requirements specified in **5.5**.

4.1.6 When fibreglass insulating material is required, fibreglass shall be used that contains a mass fraction of not less than 60 % fibre, and the fibres of which are tensioned, continuous and parallel. The fibreglass specification shall be obtained from the fibreglass manufacturer and shall be made available to the tester and/or the purchaser if requested.

4.1.7 The colour of insulating parts shall be predominantly orange. Where the insulation is formed of several layers each layer shall be of a contrasting colour.

4.1.8 When tested in accordance with BS EN 60900, the component parts of insulating hand tools shall not become detached.