



Guidance Note **PM38** (revised October 1992)

This guidance is issued by the Health and Safety Executive. Following the guidance is not compulsory and you are free to take other action. But if you do follow the guidance you will normally be doing enough to comply with the law. Health and safety inspectors seek to secure compliance with the law and may refer to this guidance as illustrating good practice.

Introduction

1 Electric handlamps (sometimes known as inspection lead lamps) have been involved in a significant number of serious and fatal electrical accidents. These accidents have been caused by electric shock, fires and explosions in explosive atmospheres. This Guidance Note gives advice on the selection and use of suitable safe handlamps in order to prevent these accidents.

Electric shock

2 There will be a risk of electric shock if there are any bare metal parts of the handlamp that may become 'live' for any reason. Some commonly available handlamps have metal cages to protect the bulb against breakage and some handlamps have other metal parts, such as the handle.

3 The risk of electrocution, ie of death from electric shock, is particularly acute if these metal parts become live at mains voltages, such as 230 volts ac. There is an increased risk of serious electric shock, even at reduced voltages such as 110 volts, where the victim is working in conducting surroundings or cramped conditions.

4 The risk of an electric shock can be reduced by the appropriate selection and use of electric handlamps which comply with the following recommendations.

Selection and use of electric handlamps

Guidance Notes are published under five subject headings:

Medical
Environmental Hygiene
Chemical Safety
Plant and Machinery
General

Selection of handlamps to prevent electric shock

- 5 The risk of electric shock can be reduced by the following:
- The use of 'all insulated' or 'double insulated' construction (known as Class II), which is designed for 230 volts operation, and for which no earthing connection is necessary. The bulb should be adequately protected by a robust cage of insulating material or a transparent insulating enclosure. It should be noted that some fluorescent tube type leadlamps in this category use a resistive flexible cable as part of the ballast gear, and this should not be shortened without reference to the supplier.
 - In some cases, a 110 volts centre tapped to earth supply may be available. This is safer than a 230 volt system, because there are only 55 volts between each of the two live conductors and earth. However, the use of even lower voltages is recommended under some conditions.
- 6 The use of voltages not exceeding 50 volts ac or 120 volts dc (ripple free), supplied from a transformer of the double wound type, will give electrical separation from the mains input power supply, and reduce the risk of serious shock. The transformers should comply with British Standard BS EN 61558-1,¹ or equivalent. (This is known as an extra low voltage

system, and also as an SELV system. Further details can be found in the current edition of the *Regulations for Electrical Installations*.² Where the environmental conditions are confined and conducting, for example inside boilers, tunnels and other cramped locations where people are likely to come into good electrical contact with earthed surroundings, it is recommended that handlamps should be supplied at voltages not exceeding 25 volts.

7 An added advantage of extra low voltage bulbs for handlamp use is that their filaments are heavier and more robust than most mains voltage types, and thus give better service under rough usage.

8 With developments in modern materials it is now feasible for handlamps to be of non-metallic construction. In the past certain handlamps with unearthed metal guards and handles were accepted as approximating to what is now known as Class II construction; not requiring the guard to be earthed. It is now recommended that such handlamps should only be used on extra low voltage systems (see paragraph 6).

9 British Standard BS EN 60598-2-8:1997³ sets out criteria for all-insulated and low voltage types of handlamp, and the use of handlamps conforming to this specification is recommended.

10 Sometimes it is preferable to use battery-powered torches and handlanterns. In these cases, it is important that they are sufficiently robust and proof against the entry of dust or moisture, as necessary. Where working conditions are difficult, the provision of some form of security restraint or cord is advisable.

Fire and explosion

11 Unless a handlamp is of special construction (see paragraph 12) it is not suitable for use in potentially explosive atmospheres. Handlamps have caused many serious and fatal burn accidents when explosive atmospheres have been ignited following the breakage of a handlamp bulb. This has occurred particularly in motor vehicle inspection and repair pits where petrol vapour, which is heavier than air, has collected in the pit and been ignited by the white hot filament of the bulb. The use of extra low voltage handlamps or torches in these circumstances gives no protection against the ignition of potentially explosive atmospheres. Protection must be provided by the construction of the equipment.

Selection of handlamps for use in potentially explosive atmospheres

12 Handlamps are available which are constructed so that they are suitable for use in a potentially explosive atmosphere. Several methods of protection are employed and those applicable to handlamps include:

- flameproof (type 'd');
- increased safety (type 'e');
- air purged or pressured (type 'p');
- special protection (type 's').

13 The selection of explosion protection electrical equipment should be based on the advice given in British Standard BS EN 60079-14 *Electrical apparatus for explosive gas atmospheres. Electrical installations in hazardous areas (other than mines)*.⁴

14 The supplier of a handlamp for use in a potentially explosive atmosphere should be advised of the nature of the atmosphere to which the handlamp may be exposed. Handlamps for use in mines need special consideration and advice is contained in the HSE Approved Code of Practice *The use of electricity in mines. Electricity at Work Regulations 1989*,⁵ or is available from HM Inspectorate of Mines.

15 The use of low voltage, eg 12 volts, does **not** give protection against the risk of fires and explosions in potentially explosive atmospheres, unless the handlamp is constructed in accordance with a method of explosion protection.

Note: For general advice on electrical equipment in garages etc see HSE booklet HSG67 *Health and safety in motor vehicle repair*.⁶

Use

Bulb replacement

16 A common cause of electric shock accidents has been a failure to isolate the handlamp from the supply before changing a faulty or broken bulb. A handlamp should always be disconnected from the supply before the bulb is changed.

17 Only the correct size and rating of bulb should be used. The use of an unsuitable, or higher wattage bulb may give rise to dangerous overheating and deterioration of the lamp assembly. Information should be sought from the manufacturer if there is any doubt as to the correct size of bulb for a particular handlamp.

Leads, plugs and connectors

18 The condition of the leads, plugs and connectors associated with handlamps is vital. For safety, leads should be of an appropriate grade of tough and flexible cable, suited to the environments in which they may be used. (PVC may not be suitable for use near very hot surfaces and certain grades of PVC and rubber are not suitable in oily or greasy conditions). Cable manufacturers and suppliers should be able to advise on, or recommend, suitable cables for each environment.

19 Particular care should be taken in the connection of the flexible cable to plugs, connectors and lamp holders. The cable restraint or grip should effectively clamp the sheath of the cable to prevent the cable's cores pulling free from their terminal posts. If earthing connections are necessary, earth wires should be made long enough within the termination enclosure that they do not come under tension during use.

20 Care should be taken (by suitable selection of plugs and sockets) that extra low and reduced voltage handlamps cannot be plugged into higher voltage sockets, giving rise to danger.

Inspection and maintenance of handlamps

21 In common with all electrical equipment which may prove dangerous if permitted to deteriorate, handlamps should be subjected to regular routine inspection and maintenance. The hard use and occasional abuse which portable equipment receives, coupled with the fact that this equipment, being hand-held, is more likely to inflict serious or fatal injury if it becomes faulty, demands that such inspection and maintenance should be carried out frequently and stringently. It is recommended that a record of each inspection and test is kept on file. For further advice see booklet HSG107 *Maintaining portable and transportable electrical equipment*.⁷

Legal requirements

22 This guidance is intended to assist employers and employees in complying with the Electricity at Work Regulations 1989.⁸ Further guidance on the safe use of electricity can be found in the *Memorandum of guidance on the Electricity at Work Regulations 1989*.⁹

References

1 BS EN 61558-1:2005 *Safety of power transformers, power supplies, reactors and similar products. General requirements and tests* British Standards Institution

BS EN 61558-2-9:2003 *Safety of power transformers, power supply units and similar products. Particular requirements for transformers for class III handlamps for tungsten filament lamps* British Standards Institution

2 BS7671:2001 *Requirements for Electrical Installations (IEE Wiring Regulations Sixteenth Edition)* British Standards Institution

3 BS EN 60598-1:2004 *Luminaires. General requirements and tests* British Standards Institution

BS EN 60598-2-8:1997 *Luminaires. Particular requirements Handlamps* British Standards Institution

4 BS EN 60079-14:2003 *Electrical apparatus for explosive gas atmospheres. Electrical installations in hazardous areas (other than mines)* British Standards Institution

5 *The use of electricity in mines. Electricity at Work Regulations 1989. Approved Code of Practice L128* HSE Books 2001 ISBN 0 7176 2074 3

6 *Health and safety in motor vehicle repair* HSG67 HSE Books 1991 ISBN 0 7176 0483 7

7 *Maintaining portable and transportable electrical equipment (Second edition)* HSG107 HSE Books 2004 ISBN 0 7176 2805 1

8 *The Electricity at Work Regulations 1989* SI1989/635 The Stationery Office 1989 ISBN 0 11 096635 X

9 *Memorandum of guidance on the Electricity at Work Regulations 1989. Guidance on Regulations* HSR25 (Second edition) HSE Books 2007 ISBN 978 0 7176 6228 9

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