

Risk control briefing note 2: The use of electrical extension leads and adaptors



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1 Introduction

Employers have a duty under the Electricity at Work Regulations 1989 (ref. 1) to ensure that they are not exposing employees to danger and providing a safe working environment. However, as the number of electrical appliances in the workplace (and at home) continues to rise, the limited number of power points available often results in the introduction of electrical extension leads and adaptors. These require careful management.

Wherever possible the rule should be one socket, one plug, but in some cases the provision of additional socket outlets may not be possible or practicable, and at other times an appliance or appliances may need to be used briefly or only on a temporary basis. There are therefore occasions when an extension lead may have a place to play, provided that the correct device is employed and it is used safely.

Sadly, the misuse of extension leads and adaptors is not uncommon, and in many cases has led to fires or near misses. This briefing note sets out guidance that should be followed when the use of an electrical extension lead is unavoidable.

2 Permanent installations

- 2.1 Electrical installations should be designed with an adequate number of electrical socket outlets, to provide one socket for each plug that is to be used in the immediate vicinity in normal operations.
- 2.2 All permanent electrical installations and alterations to existing installations should comply with BS 7671 (ref. 2). For your information: the 18th edition of the IET wiring regulations – BS 7671: 2018 will be published 1st July 2018 with a six month transition period. The 18th edition introduces arc fault detection devices (AFDDs), their purpose being to mitigate the risk of fire in final circuits of a fixed installation due to the effect of arc fault currents not picked up by RCDs.
- 2.3 All work should be undertaken by a competent contractor or in-house electrician:
 - Contractors should be recognised by an organisation such as the National Inspection Council for Electrical Installation Contracting (NICEIC); the Electrical Contractors' Association (ECA), the Safety Assessment Federation (SAFeD); the National Association of Professional Inspectors and Testers (NAPIT); or, in Scotland, the Scottish Electrical Contractors' Association (SECA).
 - In-house electricians should meet the definition of a 'Skilled Person' in accordance with BS 7671 (ref. 1) i.e. 'A person who possesses, as appropriate to the nature of the electrical work to be undertaken, adequate education, training and practical skills, and who is able to perceive risks and avoid hazards which electricity can create'.
- 2.4 The number of electrical sockets to be provided should be considered at the time of each new build or refurbishment project. This should be consistent with the current and projected number of electrical appliances likely to be used in the immediate vicinity.

3 Extension leads



- Minimise the use of extension leads in the workplace and the home.

- 3.1 Where extension leads are necessary, a lead of the correct rating for the intended purpose should be used. Some extension leads have lightweight cables only suitable for lighting appliances: the plug on these extension leads should only be fitted with a 5amp fuse. The plugs on leads of more robust cables suitable for use with devices with a higher current rating may be fitted with a 13amp fuse if appropriate.
- 3.2 Extension leads are available with either a single socket or a block with between two and ten socket outlets. The number of outlets should be in accord with the number of devices that need to be used. A minimum number of sockets should be present to prevent their misuse.



- Never plug one extension lead into another.
- Ensure that extension leads are subject to the same in-service inspection regime ('PAT testing') as other portable electrical appliances.

- 3.3 Extension leads are available in a number of lengths: the lead selected should not be of excessive length for the intended purpose to prevent loose cables becoming a trip hazard.
- 3.4 Extension leads should not be so short that excessive strain is placed on the cable grips and connections.
- 3.5 To avoid damage to the insulation, extension leads should not run around sharp corners or across doorways. Where it is necessary for an extension lead to run across a floor, it should be suitably protected (see Figure 1).
- 3.6 The total current drawn by devices to be used with an extension lead should be calculated, to ensure that the current rating of the fuse in the plug fitted to the lead is not exceeded.
- 3.7 Because of the danger of overloading a circuit, extension leads should not be 'daisy chained' (i.e. plugged one into another).
- 3.8 Extension leads should be used for the minimum period of time necessary.
- 3.9 Extension leads should be subject to in-service electrical inspection and maintenance ('PAT testing') in compliance with the Electricity at Work Regulations 1999. Guidance in HSE publications HSG107 (ref. 3) and INDG236 (ref. 4) (for low risk environments) make similar recommendations. INDG236 additionally recommends that all leased equipment is also maintained. The results of the tests should be recorded.
- 3.10 New extension leads should be inspected visually by a competent person prior to their first use. If the inspection raises questions as to their safety, they should be labelled as being potentially unsafe, and not be used until they have been inspected and tested by a trained and competent PAT tester.
- 3.11 The blocks of extension leads should be located where they may be subject to periodic visual inspection.
- 3.12 Both closed and open reeled extension leads must be fully unwound before use to prevent the production of heat within the reeled cable (see Figure 2).
- 3.13 The cable of extension leads should be laid flat: care should be taken to avoid knots.
- 3.14 Extension blocks should not be covered (for example by bags of rubbish or clothing).
- 3.15 When not laying on a flat surface, the block of an extension lead should be supported. It must not be allowed to hang unsupported from its cable.
- 3.16 The blocks of extension leads should not be located where they may become subject to damage, spillages of water or other liquids, affected by warm/hot surfaces; or be allowed to accumulate significant deposits of dust or powder.

Figure 1: Proprietary cable cover



credit: ThinkStock/nelsonpeng

Figure 2: Wound extension cable showing overheating



credit: AL

- 3.17 Due to the potential for faults or problems to arise if equipment is not kept under observation, an electrical extension lead should not be used for providing power to equipment that is to be left operating unattended.
- 3.18 Extension leads with damaged blocks or cables should be taken out of service immediately (Figure 3).
- 3.19 Unless otherwise designed and safe for use in the relevant hazard zone classification, electrical extension leads should not be introduced (even on a temporary basis) into an area identified as a Hazard Zone by an assessment carried out in compliance with the Dangerous Substances and Explosive Atmospheres Regulations 2002 (as amended 2015) (DSEAR) (ref. 5).
- 3.20 An extension lead should not be used outdoors unless designed for this purpose and protected by a residual current device (RCD).

4 Electrical adaptors



- Avoid the use of block adaptors with multiple sockets.

- 4.1 The use of block adaptors and multiple socket adaptors should be avoided, as mechanical loads on the cables may result in poor contacts within the socket outlet. (See Figures 4, 5 and 6.)
- 4.2 The use of mains outlet plug adapters in combination with a razor plug (Figure 7) should be avoided: the use of a lead with a fused 13amp plug is much safer.
- 4.3 Block adaptors should not be used in conjunction with extension leads (see Figure 8).
- 4.4 In a similar manner, care should be taken that the weight of heavy transformers with built-in plugs does not also lead to poor contacts of the pins with the socket.

5 References

1. Electricity at Work Regulations 1989, SI 1989 No 635, The Stationery Office.
2. BS 7671: 2008 + A3 2015: Requirements for electrical installations: IET Wiring Regulations. British Standards Institution.
3. HSG107 Maintaining portable electrical equipment. 2013. Health and Safety Executive
4. INDG236 Maintaining portable electric equipment in low-risk environments. 2013. Health and Safety Executive
5. The Dangerous Substances and Explosive Atmospheres Regulations 2002 (as amended), SI 2002 No 2776, The Stationery Office



credit: ThinkStock/Mawaribahar

Figure 3: Damaged extension leads should be taken out of service immediately



credit: AL

Figure 4: Mechanical loads may result in poor contact between an adaptor and a socket



credit: ThinkStock/ Peter Horrox

Figure 5: Multiple socket adaptor



credit: ThinkStock/ThamKC

Figure 6: Switched multiple socket adaptor



Figure 7: Razor adaptor

credit: ThinkStock/CaronB



Figure 8: Never combine extension leads and block adaptors



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