News for the industry from Electrical Safety First

£5.00

Switched On Issue 32 Spring 2014



» A new look & feel for the ESC

Also, The ugly side of beauty products

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Letters

I'm sure that there are many within the electrical industry who will have strong feelings about some of the issues raised in Switched On. So feel free to shout about them.

Please email your letters to the Editor of *Switched On* at: mcswitchedon@gmail.com

Published by:



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From the DG's desk

A new look and feel for the Electrical Safety Council



It can't have escaped your notice that this issue of Switched On has a very different look and feel to it. Well, I'm pleased to announce that some exciting changes have been happening at the Electrical Safety Council!

Over the past 18 months, we carried out extensive research and consultation into our brand to find out what the public, industry, Government and our other stakeholders thought or knew about the ESC. This highlighted a number of issues for us and, as a result, we decided to change our name to '**Electrical Safety First**'.

During the review, it became clear that many people were

confused about what we do – and where we fit in the industry.

Some thought we were a trade association, whilst others thought we were part of Government. And most didn't realise that we are a consumer charity, here to protect people, provide advice and information, and to campaign for improvements in electrical safety.

In fact, at some of our consumer focus groups, we were told that the word "Council" in our name would actually stop them from listening to us if they saw or heard us on TV or radio.

We were obviously concerned about that so, after careful consideration, we decided there was a need to change our name and to adopt a fresh image.

Our new brand has a slightly retro feel which tested really well across all of our stakeholder and consumer groups. And it has a whole new range of colours to help freshen-up our image. But, importantly, it will help to clearly position us as a campaigning charity.

This will help us not only to engage more effectively with consumers on key safety messages and when raising awareness of the need to use a registered electrician, but also when we're pressing Government to change legislation to improve electrical safety.

We've carefully considered every element of our new brand, which has undergone rigorous testing across all of our audiences.

If you have a spare five minutes, please take a look at our new website

www.electricalsafetyfirst.org.uk to see what you think.

As always, we would welcome feedback on the content of *Switched On*. Please email feedback@electricalsafetyfirst. org.uk

Phil Buckle Director General



MP calls for tenants to be better protected

Electrical Safety First was delighted to assist Eastleigh MP Mike Thornton with his recent Westminster Hall debate on electrical safety in the private rented sector, secured after one of his constituents raised concerns about the safety of his home.

During the debate, Mr Thornton urged the government to do more to protect tenants living in private rented accommodation – a sector in which 3.8 million households currently reside and which is seen as a major and growing part of England's housing market.

In particular, Mr Thornton called for compulsory electrical safety certificates, similar to those required for gas, to be made a legal requirement for landlords.

Under current regulations, landlords do not have to certify the safety of the electrics in privately rented properties, or prove when the electrics were last tested, unless they are registered Houses in Multiple Occupation.

This means it is possible for many properties to be rented with dangerous or faulty electrics, where neither the landlord nor tenant is aware of a safety problem until it is too late.

In contrast, landlords are required to have gas installations and products in their rental properties certified as safe annually.



Firm fined after electrician suffers burns

In November last year, a Tayside electrical company was prosecuted at Dundee Sheriff Court for breaches of the *Health and Safety at Work etc. Act 1974* after a man, who was undertaking live electrical testing in an electricity substation, suffered serious burns caused by arcing.

Gordon Roberts, aged 38 at the time of the incident in December 2010, was carrying out live electrical testing at the premises of a manufacturing company in Dundee.

He had climbed a stepladder to remove bolted covers to gain access to the live conductors he was there to test. However, whilst placing one of the covers back into position after the testing, an electrical arc flashover occurred, probably as a result of a corner of the cover coming into contact with live parts.

A colleague noticed a bang and a flash just before all the lights went out and the room filled with smoke. Mr Roberts, who was not wearing the correct protective equipment supplied to him, was thrown off the stepladder but was able to walk out of the substation unaided.

The manufacturing firm's safety manager used snow that happened to be surrounding the substation at the time in an attempt to cool Mr Robert's burns before an ambulance arrived.

As a result of his injuries, Mr Roberts spent nine days in hospital where he underwent treatment for burns to his face, hands and arms. He made a full recovery and returned to work two months later. Mr Roberts' employer, McGill Electrical Ltd of Harrison Road, Dundee, was fined £2,000 after pleading guilty to breaching Section 2 of the *Health and Safety at Work etc. Act 1974*.

The HSE concluded in their investigation of the incident that McGill Electrical Ltd had failed to carry out a suitable and sufficient risk assessment for the task of removing and replacing the bolted covers while the distribution boards were live, and had also failed to have in place a safe system of work by failing to ensure that the electrical supply to the distribution boards was de-energised during removal and replacement of the covers. Following the case, HSE Inspector Mac Young, said: "This incident was wholly preventable. It was foreseeable that a metal plate being manipulated in close proximity to live conductors could inadvertently touch live parts and cause a flashover. The system of work, which involved removal and replacement of bolted covers while the system was live, and without knowing what was behind the covers, exposed Mr Roberts to unnecessary risk."

Guidance on isolation and working on or near live conductors is given in the *Memorandum of guidance on the Electricity at Work Regulations 1989 (HSR25)* published by the HSE.

HSR25 can be viewed or downloaded free of charge from www.hse.gov.uk/pubns/ priced/hsr25.pdf

Section 2(1) of the Health and Safety at Work etc. Act 1974 states that 'It shall be the duty of every employer to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all his employees'.

Welcome conviction for Hackney rogue trader

Electrical Safety First has welcomed the conviction of a rogue trader who conducted substandard electrical work in Hackney.

David Taylor, of DT Property Maintenance and Electrical Contractors, was handed an eight-month suspended sentence in January for offences relating to consumer protection and misuse of the Trustmark, NICEIC and Part P logos. The prosecution was brought by Hackney Trading Standards under the *Consumer Protection from Unfair Trading Regulations* 2008. His poor workmanship required subsequent rectification by other contactors, costing victims more than £10,000.

General Director Phil Buckle said: "Electrical Safety First welcomes this conviction. Mr Taylor's substandard work not only cost his customers thousands of pounds but also put lives in danger. Properties were left unfit for human habitation and were at greater risk of fire and flooding".

...offences relating to consumer protection and misuse of the Trustmark, NICEIC and Part P logos.

Update on electrical intake fires



Continuing to work closely with London Fire Brigade (LFB) to develop a collaborative approach to reducing fires originating at the electrical supply intake position in homes, the ESC hosted an industry meeting at the end of last year at the LFB Training Centre in Southwark.

The meeting, chaired by the head of ESC's Technical Unit, Martyn Allen, was well attended, bringing together representatives from distribution network operators, energy suppliers, meter operators, manufacturers and installers to discuss the issues and to seek to develop industry solutions for minimising the risk of fires being caused by electrical equipment at domestic supply intake positions.

Presentations by the ESC and LFB highlighted the need for combined action, which paved the way for a lively, constructive and open exchange of views and ideas.

Electrical Safety First would like to thank the organisations that attended, and particularly the LFB for hosting the event.

We are following up the many suggestions made at the meeting and will be reporting in future issues of Switched On on how the outcomes are helping to reduce intake fires.

Electrical Safety First holds Product Safety Conference follow-up

In early March, Electrical Safety First held a round table follow-up to last year's highly successful Product Safety Conference. The meeting, at Church House, Westminster, brought together senior industry figures to further discuss the key issues that emerged at the conference last May.

"Our Product Safety Conference was very well received, and gained significant coverage in both trade and consumer media", explains Martyn Allen, Head of the Technical Unit. "The conference attracted delegates from throughout the supply chain as it took a holistic, 360 degree approach to product safety".

"However, the primary focus for both the conference and the follow-up round table was on the ineffectiveness of product recall and traceability processes. In recent years, high profile product recalls have seriously impacted on both corporate reputations and consumer safety. Recall campaigns are currently only about 10-20% effective, leaving millions of people at risk from fire or electrocution from products known to have existing or potential faults."

In addition to calling for greater clarity in the regulations governing recalls, we have been campaigning for a new, centralised, product registration system.

Since the conference, Electrical Safety First has been liaising with industry, the UK and EU governments, and various nongovernmental organisations and trade bodies, about establishing a database where consumers could register their purchases – which would help to ensure products are more easily traceable, enabling recalls to be targeted more effectively.

"However, the primary focus for both the conference and the follow-up round table was on the ineffectiveness of product recall and traceability processes" "Our research has shown that people would be more likely to register products with an independent body such as Electrical Safety First because there could then be an assurance that their details would be used for product recall purposes only," adds Martyn.

"At the moment, only 5-10% of consumers complete registration cards for new items because they fear their information will be used for marketing purposes. But the creation of an effective centralised database we need industry backing, which was an important part of the round table discussion."



DCLG review of property conditions in the private rented sector

Electrical Safety First has for some time been working with politicians, consumer organisations and landlord and tenant groups, to press for improvements in electrical safety in the Private Rented Sector (PRS).

The release of the Department for Communities and Local Government's (DCLG) review of conditions in the PRS, in early February, was therefore of great interest to us.

The review covers a number of important points and invites responses from all concerned parties on the problems found within the sector, and with the legislation governing it.

Of particular relevance to our work is the possible introduction of a requirement for the periodic inspection of electrical installations in privately-rented homes, which would greatly benefit the tenants. Given that many landlords already consider these safety checks to be best practice, any such new requirement should not be a significant burden on the sector.

The DCLG review also covers other areas of interest to us. These include the potential for protection against the so-called 'retaliatory eviction' of tenants who complain about safety



issues in their home, selective licensing regimes which include provisions for minimum safety standards, and the need to raise awareness of the rights and responsibilities of both landlords and tenants.

Electrical Safety First welcomes the publication of this important review, and has submitted evidence to help ensure that tenants get a better assurance of electrical safety when they rent a home.

The DCLG review documents are available to view online at:

www.gov.uk/government/ publications/review-ofproperty-conditions-in-theprivate-rented-sector

Workplace guidance updated

The Health and Safety Executive (HSE) has produced a revised and updated version of its publication *Workplace health, safety and welfare. Workplace (Health, Safety and Welfare) Regulations 1992 Approved Code of Practice and guidance* (L24 Edition 2). It applies to most workplaces (except those involving construction work on construction sites, ships and in mines).

The book is intended to help employers and other duty holders understand the regulatory requirements relating to issues such as ventilation, temperature, lighting, cleanliness, room dimensions, workstations and seating, floor conditions, falls or falling objects, transparent and translucent doors, gates and walls, windows, skylights

and ventilators, traffic routes, escalators, sanitary conveniences and washing facilities.

This second edition also takes account of changes to various pieces of legislation since the previous edition was published, including those relating to quarries, work at height, and construction design and management. The book uses the same format used in other HSE Approved Codes of Practice, with the Regulation under discussion being reproduced in full in italic type, followed by any applicable general guidance in normal type.

Text having Approved Code of Practice (ACOP) status, which gives practical advice on how to comply with the law, is presented in bold type. Although failure to comply with any provision of the ACOP is not in itself an offence, the failure may be taken by a Court in criminal proceedings as proof that a person has contravened the regulation to which the provision relates.

Persons are permitted to use alternative methods to those set out in the ACOP in order to comply with the law. However, if they are prosecuted for breach of health and safety law and it is proved that they did not follow the relevant provisions of the Code of Practice, the onus will be on them to show that they have complied with the law in some other way, or the Court will find them at fault.

L24 can be downloaded free of charge from www.hse.gov.uk/ pubns/priced/l24.pdf



Update on the safety of cable reels

Last year, Electrical Safety First published its findings on the overload testing of extension leads and cable reels. The project included a review of the relevant product standards to check that the requirements for safety are adequate and fully recognise foreseeable conditions of use.

The investigation into cable reels found not only non-compliant products on the market, but also different interpretations by some manufacturers and test houses of the safety requirements that are intended to prevent excessive temperature rise

of the cables under overload conditions.

To address the latter issue, Electrical Safety First held discussions with the UK Technical Committee responsible for the maintenance of the product standard for cable reels, and successfully negotiated the inclusion of a clarification in the National foreword for the standard - BS EN 61242: 1997: Electrical accessories. Cable reels for household and similar purposes.

A change to the British Standard was published as a 'Corrigendum' in January 2014 and reads:

News

...To clarify the requirements for protection against excessive temperatures, the UK committee has proposed a modification to the text of the UK special national condition applicable to subclause 12.11.1: The fuse fitted in the plug in the UK system is not intended to provide protection to the cable reel in the reeled state. A thermal cut-out, current cut-out or weak point should be incorporated within the body of the cable reel.

As the Corrigendum states, the UK Technical Committee intends to transfer this clarification into Annex ZB of the European Harmonisation Standard *EN 61242: 1997* to reinforce the existing requirements for protection against excessive temperatures that are applicable Europe-wide.

This Annex states any particular 'Special National Conditions' that are applicable in individual countries at national level.

Switching on to the digital world!

Unless you're reading a printed copy, welcome to the fourth issue of the digital page-turning version of Switched On.

As announced in the three preceding issues, the paper version is now only available by individual subscription.

For an annual subscription costing only £18 including postage, you can continue to have four quarterly issues of *Switched On* delivered straight to your door.

You can take out a subscription for the paper version at any time. However, as

we're unable to supply paper copies of back issues, the sooner you subscribe the better if you don't want to miss too many.

Subscribers will receive the next available issue after taking out their subscription.

Should you wish to subscribe, please send us an email at:

enquiries@electricalsafetyfirst.org.uk



For further information about subscribing, please go to

www.electricalsafetyfirst.org.uk/

switchedon, where the digital version of all the back issues of *Switched On* can also be found.



Product safety in Parliament – the Consumer Rights Bill

The Consumer Rights Bill has been progressing through Parliament and has now entered the Public Bill Committee stage, where a panel of MPs calls upon witnesses to ask them about various aspects of the proposed legislation.

This Bill is of particular interest to Electrical Safety First as it presents an opportunity to address the issue of product recalls. The inclusion of an amendment or new clause on the consumer's right to prompt effective action from the manufacturer when a product is recalled would be an important step in improving the current system's low success rate.

The problem is widespread, with an estimated one million items subject to recall action still being present in UK homes, leaving consumers at unnecessary risk from dangerous or faulty products.

The recall issue has caught the interest of Mark Durkan, MP for Foyle in Northern Ireland. He has previously raised the subject of product recalls during a debate in the House of Commons, where he said:

"I want to raise a further question that is not addressed by the Bill as currently drafted, and surprisingly so. It relates to electrical product recalls, which are clearly a matter of safety for people and properties. The law is currently deficient, and the Electrical Safety Council has made it clear that it wants it improved. It points out that the recall checker on its website often lists products for which there is no procedure in place and no traceable manufacturer. Surely, with regard to consumer rights, that is an area that needs to be addressed."

Later in the debate, he added:

«.... there is a glaring omission in the Bill on product recall. Even if faults become known to the product manufacturer and the supplier, they might remain unknown to the consumer. There are problems with product recall, particularly in

relation to electrical goods. The Electrical Safety Council runs a recall check and says that only 10% to 20% of the products it tracks are subject to successful recall. We should remember that those products are recalled because of a risk to people and property..... we should remember that we are talking about products that go inside consumers' houses and represent a real risk. There is something of a dereliction in the law in terms of what is expected or required in product recall."

Mr Durkan has continued his interest in product recall during the Bill's Public Committee sessions, where he sits on the panel. There he asked representatives of the Office of Fair Trading and Trading Standards:

"The Bill sets out measures in respect of where consumers

come forward with faults in products in respect of repair or replacement, but it does not address the situation in which the consumer is not aware of the fault, but a manufacturer or supplier might be, in terms of instances that would be the subject of product recall. Why should the Bill not do more in the area of recall when the Electrical Safety Council is telling us that only 10% to 20% of recalls at the minute are fully successful?"

"Do you agree with the Electrical Safety Council on the low rate of successful recalls? In some circumstances, the faults in these products can lead to health and safety risks and threats to life and to property through, for example, fire. Is the onus on manufacturers? In many circumstances, the manufacturers are not known, because people are buying the products from chains that have sourced them elsewhere. Who, for the purpose of recall obligations, is the manufacturer in those circumstances?"

Electrical Safety First is very grateful to Mr Durkan for his actions in bringing this matter to the attention of the committee and Parliament, and will be following the progress of the Bill with great interest.



Support for Certsure and NAPIT joint approach proposals

Electrical Safety First has welcomed the announcement that Certsure (which operates the NICEIC and ELECSA brands) and NAPIT will being working together to provide a single point of reference for consumers seeking a registered electrician.

Since Certsure and NAPIT created their own registers for competent electricians a year ago, there has been concern that the attention given to the separate registers has provided a distraction from key issues in the industry, such as safety and quality.

In order to combat this, both parties met last autumn to

discuss ways in which they can work together to promote the use of competent, registered electricians, and to raise public awareness of the dangers of substandard electrical installation and repair work.

The proposed new arrangement would continue to operate within the current Building Regulations framework, and promote both brands jointly with a new quality mark.

The proposal is expected to lead to the removal from the marketplace of both existing registers (ElectricSafe Register and the Electrical Safety Register). The joint approach will also include all Competent Person Scheme Operators in England and Wales that are authorised by the Department for Communities and Local Government (DCLG) to operate electrical installation certification schemes.

All full scope electrical Competent Person Scheme Operators have been included in the discussions, whilst Stephen Williams MP, Parliamentary Under Secretary of State at DCLG, also supports the plans.

Director General Phil Buckle said: "Electrical Safety First strongly supports this move by Certsure and NAPIT. A joint approach will simplify things for consumers, and make it easier for them to find a local registered electrician. It will also help our work by further highlighting to the public the importance of using a registered electrician".

Updates to Electrical Installation Forum Q&A

New and revised content posted

The agreed answers to the following new questions have been added to the 'Industry guidance on the Wiring Regulations' section of the Electrical Safety First website:

- How close to a cooker hob can an accessory, such as a light switch or socket-outlet, be installed?
- How close to a sink or wash basin can an accessory, consumer unit

or distribution board be installed to protect it from splashing?

- I am installing a new circuit in an existing installation where there are exposedconductive-parts and socket-outlets that are not earthed. Would it be acceptable to leave those exposed-conductive-parts and socket-outlets unearthed and just provide earthing in the new circuit?
- Where a cable is to be concealed in a sloping surface that could be considered to be either a wall or a ceiling (such as in a loft conversion), should the requirements of Regulation 522.6.100, relating to a cable installed under a floor or above a ceiling, be applied, or should the requirements of Regulations 522.6.101 to 522.6.103, relating to a cable concealed in a wall or partition, be applied?
- Whilst carrying out the periodic inspection and testing of an electrical installation, a low resistance between neutral and Earth (less than 1 MΩ) is found on one of the final circuits. What classification code should be recorded on the Electrical Installation Condition Report (EICR)?

Minor amendments have also been made to two questions relating to the provision of cooker control switches.

For the industry-agreed answers to these and many other commonly-asked questions relating to the application of *BS 7671: 2008* (as amended), please visit www.electricalsafetyfirst.org. uk/electricalprofessionals/ wiringregulations

The ugly side of beauty products

Electrical Safety First warns of burn risk to children from hair straighteners

Feature 11

Electrical Safety First's latest safety campaign aims to highlight the dangers that hair straighteners can pose to children.

Working alongside the Child Accident Prevention Trust (CAPT), the campaign warns of the tragic consequences that can result when a child's inquisitive nature is mixed with heated beauty products which can reach temperatures of up to 235 °C.

Calling on retailers, manufacturers and parents alike, the campaign comes in the wake of worrying statistics indicating that the number of children suffering hair straightener burns annually has doubled in recent years¹ and now account for nearly one in ten burns in this age group.²

Correct storage has been identified as the most effective way of reducing this growing problem. The use of heat-proof pouches provides a particularly effective way of ensuring that children cannot touch straighteners, which can stay hot for as long as 15 minutes after they are switched off.

Yet an Electrical Safety First 'mystery shop' has revealed that none of the high street retail outlets sampled displayed this effective safety device alongside their hair straighteners, and that only a third of manufacturers offered a heat-proof pouch with their products.³

Electrical Safety First is therefore trying to raise parents' awareness of the importance of the proper storage of these potentially dangerous products. Research indicates that nearly two thirds of parents with young children do not use a heat-proof pouch, and over a third admit to leaving their products to cool down on the floor or hanging from furniture where a child could easily touch or grab them while they're still hot.⁴

Emma Apter, Electrical Safety First's Head of Communications said: "It's really worrying that retailers and manufacturers are selling products that can reach 235 °C without explaining the dangers of not storing them properly. Hair straighteners can cause burns so serious that surgery is required, and children are at even more risk since their skin can be 15 times thinner than that of adults. Retailers and manufacturers must do more to protect their customers."

As part of the campaign, Electrical Safety First has created a hard-hitting video showing the effects of leaving hair straighteners unattended near toddlers. To view the video, visit www. electricalsafetyfirst.org.uk/beautyburns

¹According to data released by the South West Regional Paediatric Burns Service at Frenchay Hospital which shows that children admitted to hospital for hair straightener burns more than doubled between 2007 and 2011. Sariginson JH, et al, '155 burns caused by hair straighteners in children: A single centre's experience over 5 years', Burns, (2013), http://dx.doi.org/10.1016/j.burns.2013.09.025 ²According to a study by the Royal Society for the Prevention of Accidents in 2012: www.rospa.com/news/releases/detail/?id=1147 ³Only 25 out of the 77 hair straighteners sampled for the Electrical Safety First report came with a heat-resistant mat or pouch ⁴60% of parents with children under the age of 5 do not use a heat-proof pouch after use, 27% leave hair straighteners on the floor after use, and 23% leave hair straighteners hanging off an item of furniture when cooling down.



...It's really worrying that retailers and manufacturers are selling products that can reach 235 °C without explaining the dangers of not storing them properly.



USB socket-outlets scrutinised

Electrical Safety First has for some time been working to raise awareness of concerns about the safety of substandard and/or unbranded plug-in chargers for mobile phones and the like.

We published an article in the spring 2010 issue of Switched On which showed serious safety defects in a number of such plug-in chargers that were tested for us by an independent laboratory.

Then, in the winter 2012 issue, we featured the European Union's move towards introducing a common (standard) charger for mobile phones. Amongst other things, the article raised concerns that, because most new phones would then be supplied without a dedicated charger, there was likely to be a significant increase in the number of counterfeit and/or substandard common chargers on the market, as unscrupulous suppliers sought to capitalise on the increased consumer demand.

Our attention has now turned to new types of product that are becoming increasingly popular — 13 A socket-outlets, extension leads and adaptors that incorporate USB power supplies.

Our concern is that such products could pose an electric shock or fire risk if the extra-low voltage parts of the USB power supply are not suitably segregated and electrically separated from the low voltage (230 V) parts of the accessory and/or, in the case of 13 A socket-outlets, of the fixed wiring. As with all our previous safety screening exercises, we purchased a random sample of these types of product from a number of online retailers, for evaluation by an independent test laboratory.

The size of the problem

As shown in Table 1 (right), all nine samples failed to meet one or more safety requirements of the relevant product standard(s).

Product testing

USB socket-outlets are relatively new in concept, so are not yet covered by a single product standard. The test laboratory was therefore tasked with evaluating the product samples against the general safety provisions of the following standards:

- BS 1363-2: 1995 + A4: 2012 13 A plugs, socket-outlets, adaptors and connection units. Specification for 13 A switched and unswitched socket-outlets
- *BS 5733: 2010 + A1: 2014 General requirements for electrical accessories. Specification*
- EN 61558-1: 2005 +A1: 2009 Safety of power transformers, power supplies, reactors and similar products. General requirements and tests

 EN 62684: 2010 Interoperability specifications of common external power supply (EPS) for use with data-enabled mobile telephones

Summary of evaluation results

Markings and instructions (Clause 7 of *BS 1363-2* or Clause 8 of *BS 5733*)

Visual examination of the nine samples revealed that three of them lacked any brand name or trademark and that, where such marking was included, it was generally of a poor standard. Seven samples had no CE marking. The marking on the faceplate of Sample No 4 was so poor that it was easily erased if gently rubbed with a finger.

Four of the samples had no form of USB marking such as a symbol, lettering, and/or the maximum current rating (e.g. 1200 mA), to indicate what type(s) of device the USB sockets were intended to supply. Of those samples that were marked, one 13 A socket-outlet type had the marking on the back of the product, which would not be visible to users after installation.

Only three of the samples were supplied with adequate operational and safety instructions, and only three indicated that they were compatible with brands such as Apple and Blackberry. Whilst seemingly a minor point at first, one online retailer told us they had recently withdrawn one type of USB socket-outlet from sale following a number of complaints from Apple product owners alleging that their devices had been damaged while being charged through 'non-Apple approved USB ports'.

Construction (Clause 13 of *BS 1363-2* or *BS 5733*)

One of the samples of the 13 A socket-outlet type, shown in Fig 1, had a metallic part in close proximity to the printed circuit board (PCB), which was

Table 1. Evaluation Summary

	Sample number and evaluation results								
	1	2	3	4	5	6	7	8	9
Safety Criteria	-			- 424	14	-	ż	The second	13
Markings and warnings	F	F	F	F	F	IR	F	F	F
External construction	IR	Р	IR	Р	IR	Р	F	Р	Р
Accessibility of live parts	Р	Р	Р	Р	Р	Р	F	Р	Р
Terminals and terminations	F	Р	F	Р	IR	Р	F	IR	Р
Internal wiring / separation	Р	Р	Р	Р	F	Р	F	Р	Р
Screws, current-carrying parts and connections	F	IR	F	Р	IR	IR	Р	IR	Р
Creepage & clearance distances through insulation	F	F	IR	F	F	F	F	F	Р
Short circuit, overload and thermal protection	Р	Р	Р	Р	Р	Р	IR	Р	Р
Mechanical strength	Р	Р	Р	Р	Р	Р	F	Р	Р
Insulation resistance / leakage current	Р	Р	Р	Р	Р	Р	Р	Р	Р
Electric strength	Р	Р	Р	Р	Р	F	Р	Р	Р
Provision for Earthing (where faceplate was metallic)	n/a	F	n/a	n/a	n/a	Р	n/a	n/a	n/a
Output voltage and current under load	Р	Р	F	IR	Р	Р	F	Р	Р

Key: F Fail; P Pass; IR Improvement Recommended

simply slotted into the plastic moulding of the accessory. There was no form of protection, such as an insulated physical barrier or cover, to separate the extra-low voltage components from low voltage parts and, potentially, the fixed wiring once installed. Whilst the limited evaluation process did not simulate installation conditions, it is reasonably foreseeable that such an arrangement could be compromised during installation, especially when the accessory is being pushed into the back box.

In the same sample, as also shown in Fig 1, one of the terminal screws for connecting the accessory to the fixed wiring was inaccessible when the PCB was in place.

Fig 1. Typical examples of poor construction





In another sample, the internal conductors used to power the PCB were soldered onto the live (line and neutral) socket contacts into which the live pins of 13 A plugs should fit.

However, as Fig 2 shows, the soldered connections prevented the test plug from being fully inserted, creating a potential source of overheating. Furthermore, should such a solder-only power connection fail, displacement of the wire could result in an earth fault, short-circuit, or mains voltage appearing at the USB charger output, creating a risk of electric shock and/or fire.

Fig 2. Soldered connections in the accessory prevented the test plug being fully inserted





Accessibility of live parts (Clause 9 of BS 1363-2 or clause 8 of BS 5733)

To assess the accessibility of live parts, a standard 1.0 mm diameter test pin was applied with a force of 5 N perpendicular to the accessible external surface(s) of each of the samples. continued...

One sample, No. 7, failed this test due to poorly fitting shutters over the apertures to the live contacts in the socket-outlet, as shown in Fig 3. In fact, as shown in Table 1, this particular sample performed worse of all, failing 8 of the 12 test criteria.

Fig 3. Access to live parts



Output voltage and current under load (Clause 5 of *BS EN 62684*)

Each of the nine samples had an operating open-circuit voltage at the USB terminals within the maximum permitted range of 4.75 V d.c. to 5.25 V d.c. However, whilst all but one of the samples complied with maximum permitted output current requirement of 1500 mA, about half of them either over- or under-delivered on their stated current outputs. The sample that failed to comply with the maximum output current requirement had a stated output current of 2100 mA, but delivered a steady-state current of 2600 mA when tested under load.

During the output testing, the laboratory adjusted the load on each sample to maximise voltage and current output. Temperatures were then recorded at several key points on the samples every two hours for a period of around eight hours.

Two samples failed this testing. Sample No. 3 failed quietly, simply providing no output at the end of the test period. In contrast, Sample No. 7 failed with dramatic results after approximately 1.5 hours which, as Fig 4 shows, damaged the PCB extensively. A surface mounted resistor ruptured and both USB socket wires were blown off. **Fig 4.** Visible damage to one PCB caused by load testing



In terms of short-circuit protection, *BS EN 62684* permits a maximum output of 3 A under single fault conditions, a test which the majority of the samples passed. However, an output current of 4.1 A was recorded on one sample.

Electric strength (Clause 19 of *BS 5733* or clause 18 of *BS EN 61558-1*)

All but one of the samples passed the standard dielectric strength. The one that failed did so at just 800 V d.c. A burn test later revealed that arcing had occurred between the fusible resistor and the tail of a capacitor which, as can be seen in Fig 5, had been in direct contact with one another.

Fig. 5 Point at which Sample No. 6 failed the electric strength test



Creepage and clearance distances through insulation (Clause 26 of *BS EN 61558-1*)

As electronic circuits rely upon insulation and/or physical separation to prevent electric shock, excess heat and/or fire, the laboratory checked that the components, including the transformer and the conductive tracks of the PCB, complied with the safety requirements set out in the product standards. Regrettably, as indicated in Table 1, seven of the nine samples failed this test.

One significant failing was insufficient separation distances between the terminals

of the primary and secondary windings of the transformers, even though most of them were constructed with three layers of insulation.

Another significant failing was seen on the PCB of Sample No. 2, where solder had been added to the tracks (see Fig 6). Presumably it was done to ensure they would withstand the flow of current, but this is not considered good practice and resulted in failure to meet the minimum separation distances.

Fig. 6 Solder added to the tracks of the PCB in Sample No. 2



Our conclusions:

As is clear from the results of our limited investigation, many safety risks and other unwanted effects can arise from use of the substandard accessories incorporating USB power supplies that are available at low cost online and elsewhere.

As with all our previous product safety investigations, we intend to share the findings of our research with the suppliers concerned to make them aware of the nature and extent of the electrical safety failures we have identified. Where appropriate, our findings will also be shared with Trading Standards to assist them with their market surveillance activities and enforcement duties.

We understand that the safety requirements for any socket-outlet that incorporates other components, such as USB power supplies, will in due course be included within the scope of *BS 1363* when the necessary standards development work is completed.

All our laboratory test reports are available to view in full in the 'Electrical professionals' section of our website: www.electricalsafetyfirst.org.uk



A fresh look at the inspection and testing of portable equipment in lowrisk environments

A year ago, in Issue 28 of *Switched On*, we looked at the inspection and testing of portable equipment in low-risk environments in the light of the recommendations of the Löfstedt Report.

The article also looked at the revised guidance issued by the Health and Safety Executive (HSE) for maintaining portable electrical equipment in such lowrisk environments, which include offices, shops, some parts of hotels and residential care homes.

In this article, we look at what is meant by the term 'portable appliance' and ask if it is time to reconsider how equipment in low-risk environments, other than that which is permanently installed, is classified, inspected and tested.

Time for change

As reported in Issue 28, the Government commissioned a report in March 2011 to look into reducing the burden of health and safety legislation on business without detrimentally affecting the progress that had been made in that area. The report *Reclaiming health and safety for all: An independent review of health and safety legislation,* commonly referred to as the *Löfstedt Report,* was published in November 2011.

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The research for the report found that the real issue was not the existing safety regulations, but how they were being interpreted. The report singled out the then existing custom and practice for portable appliance testing as one example of where the requirements of the *Electricity at Work Regulations 1989* were being applied too widely and disproportionately:

> '... many businesses are currently having their portable appliances, such as kettles and microwaves, tested annually, which is both costly and of questionable value. Furthermore, it has been indicated that businesses are going further and applying testing to all electrical equipment, not just to items that are truly portable.'

What do we really mean when we refer to electrical equipment as being 'portable'?

So what is meant by the term 'portable', or more correctly, mobile, equipment?

BS 7671: 2008 (as amended) includes the definition of 'mobile equipment' given in IEC 60050 - *the IEC online International Electrotechnical Vocabulary (Electropedia):* 'electrical equipment which is moved while in operation or which can easily be moved from one place to another while connected to the supply'.

Unfortunately, and as recognised in the *Löfstedt Report*, much of the published guidance on the maintenance of portable equipment has expanded - incorrectly - to cover equipment beyond the scope of that which is truly portable or which can be easily moved while remaining connected to the supply.

It would seem hard to justify the classification of, for example, appliances for building-in, or items attached permanently to the fabric of a building that are not movable in use, as being 'portable'. That is not to say, however, that the continued safety and suitability of such appliances or items for use should not be verified. This must still be done, but not as a part of a portable appliance testing regime.

What should be inspected and tested as part of a typical portable appliance testing regime?

Based on the IEC definition given above, portable equipment includes the following:

- Hand-held equipment items designed to be held while in use and while connected to the supply, such as hair dryers, vacuum cleaners, power tools and certain kitchen appliances
- Movable equipment items that are not hand-held but may be moved – whether frequently or infrequently – or be touched when energised
 - frequently small items such as table lamps, radios and kitchen appliances that are not hand-held
 - infrequently IT equipment and larger items such as dehumidifiers, photocopiers and domestic laundry equipment.
 - Extension leads and removable power cords.

Portable equipment does not include:

- battery operated equipment (although the charging equipment would need to be treated in a manner similar to a power cord)
- extra-low voltage (not exceeding 50 V a.c. or 120 V d.c.) equipment
- fixed equipment such as hand dryers, trouser presses and towel rails
- appliances designed to be built into kitchen units
- storage heaters, central heating boilers and immersion heaters.

Inspection and testing of portable electrical equipment

There are three levels of inspection and testing to be considered for determining whether portable electrical equipment remains suitable safe for use:

- User checks
- Formal visual inspection
- Combined inspection and testing

User checks

All users of electrical equipment have a responsibility to safeguard themselves and others who may be affected by their actions. Users should therefore visually check portable equipment before plugging it in or switching it on.

A basic visual check is expected to be within the ability of most ordinary (electrically unskilled) persons and should be sufficient to identify any damage or deterioration to the plug, flexible cable or equipment enclosure that might render the equipment unsafe for continued use.

Formal visual inspection

A properly conducted visual inspection carried out by a suitably competent person is the most important factor in determining whether or not an item of portable equipment remains safe for continued use. A formal inspection should be more thorough than can be expected of a user check.

For example, if the plug is of a type having a removable cover, an internal inspection of the plug should be carried out and, regardless of the type of plug, a check should be made to confirm that the fuse is of the correct type and current rating for the particular appliance.

The competent person carrying out the inspection should also consider the suitability or otherwise of the equipment in terms of:

- the task at hand
- the environment in which it is to be used.

Testing

As with formal visual inspection, the testing of portable equipment should be performed by a suitably competent person. It is necessary to perform only a few basic tests to confirm the suitability or otherwise of an item of equipment for continued safe use.

What extent of inspection and testing is appropriate for portable equipment?

Users should usually carry out basic checks on an item of equipment while it is disconnected from the supply, and the equipment should not be energised and used unless the user judges it safe to do so.

Checks for microwave leakage from microwave ovens should not form part of the routine testing of portable equipment.

When deciding what form of testing is appropriate or necessary to check the continued safety of an item of equipment, the most important factor to consider is the equipment Class. *BS EN 61140: 2002* (as amended) Protection against electric shock - Common aspects for installation and equipment categorises electrical equipment under four Classes. Of these, Class I and Class II are by far the most common categories for portable equipment.

Class I equipment

For Class I equipment, basic protection is provided by basic insulation applied to live parts. Any exposed-conductive-parts of the equipment, such as a metallic case, are connected to the Main Earthing Terminal of the electrical installation, via a protective conductor, to provide protection against electric shock.

In short, the safety of Class I equipment relies on an effective connection to Earth. The safety earthing terminal of Class I equipment, which is connected to the exposed-conductive-parts of that equipment, is normally designated with the symbol shown in Fig 1.

Fig 1. Symbol for a safety earthing terminal



Because of this reliance on the connection of exposed-conductive-parts to the means of earthing, it is important that the continued integrity of the protective conductor between safety earthing terminal of the equipment and the earth pin in the plug is verified. As with protective conductors forming part of the fixed installation, this can be achieved by testing for continuity.

An insulation resistance test should be carried out between live (line and neutral) conductors connected together and the protective conductor. If there is any likelihood that a test at 500 V d.c. might damage the equipment, the test should be performed at 250 V d.c.

Where items of Class I equipment, extension leads or three-core lead sets do not have plugs moulded onto the flexible cable, correct polarity should be confirmed by testing.

For equipment in a low-risk environment, it should not usually be necessary to carry out any further testing, subject to satisfactory results having been obtained from the visual inspection of the equipment, flexible cable and plug, and from the basic testing outlined above.

It is important that all extension leads and removable three-core lead sets are treated as Class I equipment.

Class II equipment

For Class II equipment, either basic protection is provided by basic insulation and fault protection by supplementary insulation, or both basic protection and fault protection are provided by reinforced insulation. In either case, no reliance is placed on the presence of a protective conductor for protection against electric shock.

Consequently, for equipment in a low risk environment, it will be sufficient to carry out a formal visual inspection of the equipment, the flexible cable and the plug. No testing for safety is necessary.

Class II equipment is identified by the construction symbol shown in Fig 2.

Fig 2. Class II equipment construction mark



Visual inspection is more important than testing

In practice, by far the most safety issues with portable equipment are found by visual inspection rather than testing. For example, testing alone would be unlikely to reveal a live part accessible to touch.

Therefore, the most important factor in determining whether an item remains safe for continued use is a properly conducted visual inspection of the item, its enclosure, flexible cable and plug. If time for safety checks is limited, it would be better spent on thorough visual inspection than unnecessary testing.

Visual inspection should precede any testing. If visual inspection indicates that an item of equipment is unsafe, that should be sufficient to recommend its immediate withdrawal from service. In the case of Class I equipment, it would be unnecessary to carry out any testing to support the recommendation.

Frequency of inspection and testing

Any item of portable equipment deemed to require inspection and, where necessary, testing (as discussed earlier in this article), should be subjected to such processes at appropriate intervals throughout its life.

The frequency should be determined according to the risk that the use of an item of equipment presents in a particular environment – the greater the risk, the shorter should be the interval between inspections.

Table 1 of the Health and Safety Executive publication INDG236 (rev2) *Maintaining portable electrical equipment in low-risk environments* suggests initial intervals for checking portable equipment from first use.

The Table is reproduced below.

The intervals given in the Table may also be used as the basis for determining appropriate intervals between subsequent inspection and testing activities. However, factors such as the results of previous user checks, formal visual inspections and testing need to be taken into consideration. (Note 1 to Table 1 INDG236 refers.)

Some premises will contain only a relatively small number of appliances requiring inspection and perhaps testing. In such cases, it might be appropriate for financial reasons to carry out the inspection and testing of all appliances at the same time, even where this means some items are being inspected more frequently than suggested by Table 1, or by a risk assessment.

However, this approach would be acceptable only where the informed consent of the person ordering the work had been obtained in advance. Where such an approach is adopted, it will be necessary to use the shortest applicable inspection/ testing interval. (Note 2 to Table 1 of INDG236 refers.)

Further information about portable appliance testing can be found on the HSE website:

www.hse.gov.uk/electricity/faq-portableappliance-testing.htm

www.hse.gov.uk/pubns/indg236.pdf

The Löfstedt Report can be downloaded from the Department for Work and Pensions website:

www.dwp.gov.uk/docs/lofstedt-report.pdf

Table 1 Suggested initial intervals for checking portable electrical equipment

Equipment/environment	User checks	Formal visual inspection	Combined inspection and testing
Battery-operated: (less than 40 volts	No	No	No
Extra-low voltage: (less than 50 volts AC): Telephone equipment, low-voltage desk-lights	No	No	No
Desktop computers, VDU screens	No	Yes, 2–4 years	No if double insulated, otherwise up to 5 years
Photocopiers, fax machines: Not hand-held. Rarely moved	No	Yes, 2–4 years	No if double insulated, otherwise up to 5 years
Double insulated 🖸 (Class II) equipment: Not hand-held. Moved occasionally, eg fans, table lamps	No	Yes, 2–4 years	No
Double insulated 🔲 (Class II) equipment: Hand-held, eg some floor cleaners, some kitchen equipment	Yes	Yes, 6 months – 1 year	No
Earthed equipment (Class I): Electric kettles, some floor cleaners, some kitchen equipment and irons	Yes	Yes, 6 months – 1 year	Yes, 1—2 years
Cables (leads and plugs connected to the above) and mains voltage extension leads and battery-charging equipment	Yes	Yes, 6 months – 4 years depending on the type of equipment it is connected to	Yes, 1–5 years depending on the type of equipment it is connected to

Have you ever been asked..?

Are rewireable fuses still permitted?

When existing installations are altered, extended or periodically inspected, the question sometimes arises as to whether or not there is a requirement in the Wiring Regulations (*BS 7671*) for *BS 3036* semi-enclosed ('rewireable') fuses - which are still in service in many older premises - to be replaced with circuit-breakers.

Whilst rewireable fuses are no longer in general production in the UK, *BS 7671: 2008* (as amended) still recognises their suitability for use as a protective device.

Tables 41.2 and 41.4 of that standard give data on maximum values of earth fault loop impedance for *BS 3036* fuses, and its Appendix 3 gives information relating to their time/current characteristics.

Consequently, unless there is good reason to replace them, such rewireable fuses may to be left in service in existing installations. Indeed, at least in theory, they could used in new installations, though this is becoming increasingly impractical because most modern consumer unit enclosures are not designed to accommodate such protective devices.

The popularity of the semi-enclosed fuse as an overcurrent protection device can be attributed, at least in part, to its relatively low cost. The fuse assembly uses a fuseelement (a length of suitable wire) that is relatively easy and inexpensive to replace.

However, this rewireable feature may also be seen as a disadvantage, as there is a real danger that the fuse-element (the wire) might be replaced inadvertently or, in some cases deliberately, with one having a higher fusing current, rendering the circuit inadequately protected against overload and/or fault current. In recognition of this risk, *BS 7671* expresses a preference for fuses to be of the cartridge type (Regulation 533.1.1.3 refers), but a disadvantage is that such fuses can be bridged, with equally dangerous results.

Where rewireable fuses are used, they should be fitted with a fuse-element in accordance with the manufacturer's instructions. In the absence of such information, they should be fitted with a single element of tinned copper wire of the appropriate diameter, as given in Table 53.1 of *BS 7671*. Replacement fuse wire, which is still readily available, should always be left near the consumer unit.

The continued use of rewireable fuses should not be seen as a deficiency in an existing installation, provided the associated circuits are adequately protected and the required disconnection times for fault protection are achieved.

Each fuse-holder should be checked to confirm that the size of fuse wire is correct and that both the fuse-holder and the carrier have not been damaged, for example by the copper from 'blown' fuse wire being deposited on them.

Guidance on how this should be addressed when observed during, say, a periodic inspection, and on the replacement of a consumer unit in domestic premises, is given in Electrical Safety First's *Best Practice Guides No. 4 and No. 6*, respectively.



Before installing or reusing rewireable fuses, the following factors should be considered:

- For reasons of protection against overload, Regulation 433.1.101 requires that the rated current of the fuse must not exceed 0.725 times the currentcarrying capacity of the lowest rated conductor in the circuit protected. The effect, therefore, of choosing such a fuse is that the cross-sectional area of the cable may need to be greater than if another type of protective device had been chosen, such as a cartridge fuse, a circuit-breaker or an RCBO. A possible alternative to increasing the cable size might be to replace the BS 3036 fuse with one having a suitably reduced rated current (I_c), if that rated current is not less than the maximum sustained current expected to be carried by the circuit in normal service (I_{b})
- Regulation 533.1.1.2 requires fuses having fuse links (fuse wire or cartridge) likely to be removed or replaced by persons other than skilled or instructed persons to be of a type that complies



with the safety requirements of *BS 88-3, BS 3036 or BS 1362.* Regulation 533.1.1.2 also states that fuses should preferably be of a type that cannot be replaced inadvertently by one having a higher nominal current. This requirement and preference are met if the fuse carrier will not fit into the base of a fuse having a lower rating. For example, a 30 A rewireable fuse carrier must not fit into either a 15 A or a 5 A fuse base.

• To meet the requirement of Regulation 434.5.1, a rewireable fuse, like any other overcurrent protective device, must be chosen such that its rated short-circuit breaking capacity is not less than the maximum prospective fault current at the point the fuse is installed. The only exception is where back-up protection is provided by another device, meeting specified requirements. Complying with the requirement of Regulation 434.5.1 may appear difficult with BS 3036 fuses, as they have a relatively low short-circuit breaking capacity rating of between 1 kA and 4 kA, depending on the category of duty. However, BS 3036 fuses, or indeed other type of

overcurrent protective device of rated current up to and including 45 A incorporated in a consumer unit, are considered adequate for prospective fault current levels up to 16 kA provided that:

- the consumer unit complies with Part 3 of *BS EN 60439: 1991,* and
- the consumer unit is fed by a single-phase supply, and
- the service cut-out has an HBC fuse to BS 1361 rated at not more than 100 A (Annex ZA of BS EN 60439 refers).

It might be opportune to replace a *BS 3036* fuse with another type of overcurrent protective device, such as an RCBO, when a circuit is being altered, extended or added and additional protection by RCD is required by *BS 7671*, not least to meet the requirement for RCD protection on socket and lighting circuits.

Also, the installation owner might choose to have *BS 3036* fuses replaced by another type of overcurrent device simply on the grounds of convenience of operation. For example, many users would feel able, and comfortable, to switch a circuit-breaker on or off, but not necessarily feel that they could safely and correctly replace the wire in a rewireable fuse carrier.



The Waste Electrical and Electronic Equipment Regulations 2013

On 1 January this year, Directive 2012/19/EU, a revised version of the previous European Directive on Waste Electrical and Electronic Equipment, was brought into effect in the UK as national legislation, in the form of *The Waste Electrical and Electronic Equipment Regulations 2013*.

This revised UK legislation is expected to provide a cheaper and fairer system for dealing with waste electrical and electronic equipment, and increase recycling rates. This article focuses on the scope of the revised Regulations.

The Waste Electrical and Electronic Equipment Regulations 2013 ('the Regulations') apply to all Electrical and Electronic Equipment (EEE) placed on the market in the UK and falling within the scope of the Regulations, subject to the following transitionary arrangements:

• Regulation 5 states that from 1 January 2014, the Regulations will apply to the ten categories of EEE given in Schedule 1 of the Regulations, namely: large household appliances; small household appliances; IT and telecommunications equipment; consumer equipment; solar photovoltaic panels; lighting equipment; electrical and electronic tools other than those of a large-scale stationary industrial nature; toys: leisure and sports equipment; medical devices that are not implanted or deemed infected: monitoring and control instruments; and automatic dispensers.

Schedule 2 gives an extensive list of examples of types of EEE falling within these categories.

 From 1 January 2019, Regulation 6 comes into force, introducing the six categories of EEE given in Schedule 3, namely;

- 1. Temperature exchange equipment
- Screens, monitors and equipment containing screens having a surface area greater than 100 cm²
- 3. Lamps
- Large equipment any external dimension more than 50 cm
- Small equipment having no external dimension more than 50 cm (other than those in category 6 below)
- Small IT and telecommunications equipment having no external dimension more than 50 cm.



Examples of equipment falling within the above categories are given in Schedule 4 of the Regulations.

Regulation 7 states the types of EEE that are exempt from the requirements of the Regulations. This includes filament lamps.

Regulation 8 lists the types of EEE that are excluded from scope, and include large-scale stationary tools; large-scale fixed installations; and equipment specifically designed solely for the purposes of research and development that is made available only on a business-to-business basis.

The Regulations can be downloaded from: www. legislation.gov.uk/ uksi/2013/3113/made

The Government guidance on the WEEE Regulations 2013 can be downloaded from: www.gov.uk/government/ publications/weeeregulations-2013-governmentguidance-notes



All the previous issues of Switched On are available to read or download from our website. **www.electricalsafetyfirst.org.uk/switchedon**