News for the industry from Electrical Safety First

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Also, Safety Bulletin supporting heavy cables

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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

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From the DG's desk



By the time you read this issue of *Switched On*, the wider political landscape in which Electrical Safety First operates might look different.

The European elections offer the chance for UK residents to have their say on who represents them in Brussels and, in the process, potentially to pass wider comment about our position within the European Union itself.

The ultimate question about the UK's membership of the EU, if it ever does arise, is further down the line.

However, these elections provide an excellent opportunity to explain why I believe the EU is a vital mechanism for helping Electrical Safety First achieve its goal of protecting consumers from the dangers that electricity can pose.

Through the UK's membership of the EU, Electrical Safety First is able to access the legislative process that can directly affect the safety of UK consumers.

With our knowledge and expertise, we can engage with Members of the European Parliament to help ensure that EU legislation is properly formed and well implemented. UK membership also means that all official documentation is published in the English language, making it easier for us to understand.

If the UK ever finds itself outside of the EU however, a paradoxical situation would arise whereby legislation would be made that directly impacted upon UK consumers, but the UK organisations that exist to protect these very people would have had no influence over it.

Take product safety for example. In the event of an exit from the EU, products entering the UK from outside Europe would most likely still be manufactured to EU safety standards, but these standards would be developed with reduced input from UK organisations that specialise in product safety.

Continuing UK membership of the EU is therefore vital so that Electrical Safety First can continue to campaign on behalf of consumers in this country.

A further change to the political landscape this year could come in Scotland, but we will have to await the outcome of the referendum before we know what, if any, the change is.

On more immediate matters in Scotland, I was delighted to see the Infrastructure and Capital Investment Committee's report on the Scottish Housing Bill back our recommendations for five-yearly electrical checks by a registered electrician.

This development brought our campaign for safer conditions in the private rented sector a step closer to success and I would like to thank everyone involved in making this happen, particularly our stakeholders who offered great support as things moved forward. More success has been achieved with our new brand. We have received lots of positive feedback and I truly believe that the new brand will help us engage more effectively with consumers and government alike.

This has already been demonstrated by our latest campaign, which saw the reintroduction of the 70s' style public information film *Charley Says.* Voiced by David Walliams, the film is aimed at raising awareness of electrical safety around the home.

By early June, the video already had almost 75,000 views on YouTube and received widespread coverage in the national media. In case you haven't seen it yet, I won't say too much other than I hope the public are now more aware of the dangers of overloading sockets.

I am delighted that Electrical Safety First is creating opportunities to progress the safety agenda on the public stage.

However, I would like to end by saying that this success can sometimes lead to conflicts of interest with partner organisations. It is my hope that rather than capitalising on our successes, they can work with us more closely in future to help ensure that our messages reach the widest possible audience.

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

Phil Buckle Director General

Guidance on charging e-cigarettes

Interim guidance has been issued following a number of reports of e-cigarettes 'exploding' whilst being charged.

Following a number of reports of e-cigarettes 'exploding' whilst being charged, Electrical Safety First, together with the Trading Standards Institute (TSI), has issued the following interim guidance to e-cigarette users whilst they look more closely at the problem, which seems to be associated with the type of rechargeable battery they contain:

- Follow the manufacturer's instructions
- Heed any warnings provided with the product
- Do not leave an e-cigarette charging for longer than necessary, and never overnight or when you are not at home
- Check that the charger has a CE mark, which indicates that it complies with European safety standards.

Phil Buckle, Director General of Electrical Safety First said: "We are becoming increasingly concerned about incidents involving e-cigarettes. Whilst these might be isolated cases, we are receiving more and more reports of e-cigarettes exploding when being charged. By following these simple steps, people can help to protect themselves, their families and their property against any potential harm".

Jane MacGregor, TSI joint lead officer for health, added: "We strongly advise users of e-cigarettes to follow the instructions provided with them, to take heed of any warnings from the manufacturer, and look for the CE mark on the chargers".

Certification of compliance with the Building Regulations

BS 7671: 2008 (as amended) requires that, on completion of the verification of electrical installation work, appropriate certification is issued to confirm that the work complies with all the applicable requirements of that standard and is therefore safe for use.

In addition, where electrical installation work is carried out in domestic premises, the work must also meet all the applicable requirements of the relevant Building Regulations. In England and Wales, a Building Regulations Compliance Certificate may be required for the work in addition to the electrical safety certificate.

Anyone carrying out electrical installation work in domestic premises in England and Wales is required by law to comply not only with the particular electrical safety requirements of Part P of the Building Regulations, but also with the requirements of **all other** Parts of the Building Regulations relevant to the electrical installation work undertaken.

These Parts include for example:

- Part A (Structure) which gives requirements for the maximum depth of chases in walls, and the sizes and positions of holes in joists and parts of structures
- Part B (Fire safety) which gives requirements for the fire performance of walls and ceilings, and for the provision of automatic fire detection and alarm systems
- Part C (Site preparation and resistance to moisture) which gives requirements for preventing the ingress of water where cables pass through external walls.

Some disturbance to the building fabric is usually unavoidable when installing cables and items such as socket-outlets, switches and lighting fittings. For example, it may be necessary to lift floor boards, make chases in walls and drill holes through ceilings, walls and joists.

Such work must not adversely affect the safety of the property by weakening it structurally, or by reducing its ability to resist the spread of fire and smoke.

It is a fundamental requirement of the Building Regulations that, following construction work, a building must be no less satisfactory in respect of compliance with those regulations than before the work was carried out.

Whilst the designer, builder, electrical installer and the building owner each have a responsibility to ensure that building work complies with all the applicable requirements of the Building Regulations, it will be the building owner who is served with an enforcement notice if Local Authority Building Control determines that the building work does not comply with those regulations.

On completion of notifiable¹ electrical installation work, appropriate certification must be issued by the installer to confirm compliance with the Building Regulations.

If the electrical work was carried out by a *registered competent person*, the installer or the body with which the installer is registered has 30 days from the date the work was completed to provide:

- a copy of the *Building Regulations Compliance Certificate* to the owner of the property, and
- the original certificate, or a copy of the information contained in the certificate, to the relevant building control body.

Fig 1. All building work must meet the applicable requirements of the Building Regulations



Alternatively, installers who are not registered competent persons should notify the relevant building control body of the proposed electrical work before it is started. In such cases, it is the building control body's responsibility to decide what degree of inspection and testing by them will be necessary to confirm that the work is safe.

The determination will take into account factors such as the nature and relative complexity of the proposed work, and the apparent competence of the person who is to carry out the work.

Any inspection and testing deemed necessary may be performed by the building control body directly or by a suitably competent person acting on their behalf, and the property owner will be charged for the costs incurred by the building control body relating to that verification work.

A new option for installers who are not registered competent persons, which applies to notifiable work carried out in homes in England only, is to employ a *registered third-party certifier*. Details of this new option are given in the article on page 8.

¹For England, details of whether or not electrical installation work is notifiable are given in sections 2.5 to 2.9 of Approved Document P (2013 edition). For Wales, reference should be made to Table 1 and the associated notes of Approved Document P (2006 edition incorporating 2010 amendments). Both documents may be downloaded free of charge from www.planningportal. gov.uk/buildingregulations/ approveddocuments/ partp/approved

David Walliams voices new Charley Says films

Charley Says, the nation's favourite public information film¹, has been brought back to life by Electrical Safety First with the help of comedian David Walliams.

Through a series of new adventures and near misses, Charley the Cat and his hapless young owner will teach children about electrical safety in the home by highlighting what not to do.

The original *Charley Says* films, created by the government's then Central Office of Information, were broadcast during the 70s and 80s to warn children about everyday safety issues such as not going off with strangers or playing with matches.

Electrical Safety First is using the nostalgia of the original films to draw attention to electrical safety in a fun and memorable way.

The first video is set in the kitchen and sees Charley preventing the young boy from plugging a toaster into an already overloaded socket, burning his paw in the process. In keeping with the tone of the original films, Charley is rewarded with a fish for his savvy behaviour.

The storyline was chosen by Electrical Safety First as many people remain unaware of the dangers of overloading sockets.

Nearly half of adults admit they are not confident about what combinations of appliances can be safely plugged into a single wall socket, and a further one in ten have noticed scorch marks or even sparks around a socket.²

And, just like Charley, thousands of people have received a burn from an overloaded socket.³

The video can be viewed at www.electricalsafetyfirst.org. uk/CharleySays, where there is also a link to our interactive online socket overload calculator which you can use to check which combinations of appliances are safe to connect to a single wall socket.

¹According to a poll by BBC Magazine of 25,000 readers to mark the 60th anniversary of the Central Office of Information: http://news.bbc.co.uk/1/hi/ magazine/4853042.stm

²41% of adults do not know which combinations of appliances are safe to plug into an extension lead or block adaptor. 11% of adults have seen plugs on extension leads spark and 10% have noticed scorch marks around a plug.

³4% of adults have received a burn from an overloaded socket, which equates to approximately 1.8 million adults across the UK.

The consumer research referred to in notes 2 and 3 above was conducted in February 2014 by Populus on behalf of Electrical Safety First with a sample of 2,053 adults. The figures have been weighted and are representative of UK adults.



Revised guidance on electrical safety at places of entertainment

In March, the Health and Safety Executive (HSE) published revised versions of two Guidance Notes concerning electrical safety at places of entertainment.

One is aimed at those managing or maintaining places where entertainment is provided. The other is aimed at those using sound, lighting or other equipment in places of entertainment.

The third edition of HSE Guidance Note GS50 *Electrical safety at places of entertainment* provides advice primarily for managers of places of entertainment and people who provide facilities for use by entertainers. However, it will also be of interest to technicians and those involved in the installation of electrical equipment in such locations. GS50 provides guidance on the following:

- Risks
- The law
- Licensing
- Managing electrical safety
- Preventing electrical danger
- Fixed installations
- Independent supplies (generators)
- 110-125 volt (USA) equipment
- Electrical equipment
- Equipment maintenance.

GS 50 has two appendices. Appendix 1 discusses the legal requirements and gives information about the agencies responsible for enforcing those requirements. Appendix 2 contains an example checklist for use when carrying out routine electrical checks on portable apparatus.

HSE Guidance Note INDG247 (revision 1) *Electrical safety for entertainers* provides guidance aimed specifically at the users of sound, lighting or other similar electrical equipment during performances and rehearsals.



INDG247 discusses all the issues covered by GS50, but in a less technical manner to suit the target audience.

Both Guidance Notes make numerous references to the appropriate use of residual current devices as an effective way of minimising the risk of electrocution from faulty electrical equipment and installations.

GS50 and INDG 247 can be downloaded free of charge from www.hse.gov. uk/pubns/gs50.htm and www.hse.gov.uk/pubns/ indg247.htm respectively.

Switching on to the digital world!

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

As previously announced, 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. Subscriptions for the paper version can be taken out at any time. However, as we're usually unable to supply paper copies of back issues, the sooner you subscribe, the better if you don't want to miss too many.

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 the past three years' issues of Switched On can also be found.

Whilst stocks last, those subscribing in time to receive the autumn issue will also receive a printed copy of the previous three issues free of charge.

Firms fined after child is crushed to death by an electric gate

The dangers that can be created by incorrectly designed, installed and/or maintained electric gates have been covered in several previous issues of *Switched On*.



In June, two firms were prosecuted at Cardiff Crown Court following the death of a child who was fatally injured when she was crushed between the closing edge of an electrically-powered gate and a gate post.

In July 2010, the five-year-old girl was trapped by the gate to a block of flats near her home when they automatically shut after a car passed through. She was found shortly afterwards by a resident but, although she was rushed to hospital, she died of her injuries.

In their investigation into the incident, the Health and Safety Executive (HSE) found that the closing force of the gate, which was in excess of 2000 N, greatly exceeded the level permitted by European and British safety standards.

The HSE also found that the design of the gate installation was inherently unsafe as there was space for persons to become trapped, that insufficient safety devices were installed to prevent the gate closing on a person or other object, and that the devices that were fitted were incorrectly set. The Court was informed that John Glen (Installation Services) Ltd fitted a new electric motor when the previous motor stopped working, but put the gate back into use despite the fact that there were obvious trapping points. The firm also failed to check that the gate would stop if it met an obstruction, or to test the closing force.

The Court was also told that another firm, Tremorfa Ltd, was contracted to maintain the gate installation. Although they had visited the installation twice, the last visit just two weeks prior to the girl's death, they had failed to perform vital safety checks including the measurement of the closing force.

John Glen (Installation Services) Ltd of Phoenix Way, Garngoch Industrial Estate, Swansea, was fined £60,000 and ordered to pay £40,000 in costs after pleading guilty to breaching Section 3(1) of the Health and Safety at Work etc. Act 1974.

Tremolfa Ltd, of Pascal Close, St Mellons, Cardiff also pleaded guilty to the same charge, and was fined £50,000 with costs of £40,000. Speaking after the hearing, HSE Inspector Stuart Charles said: "Both companies walked away from the gate leaving it in an unsafe condition. Both could have prevented this tragedy.

"Automated gates are becoming more common and it's sometimes difficult to appreciate that even small gates can close with significant force. Badly installed and maintained gates are a threat to all pedestrians, but young children are particularly vulnerable because they are often completely unaware of the dangers.

"No one should install or work on automated gates without knowing the relevant safety standards or without having the right equipment to check that the gate is safe after they have worked on it.

"If you own or are responsible for managing properties with automatic gates you should ensure they are properly maintained. You should also ensure that those carrying out the maintenance are competent to do so."

As reported in Issue 31 (Winter 2013) of *Switched On*, the HSE has issued three safety alerts concerning the installation and use of electric gates, details of which can be found at:



www.hse.gov.uk/safetybulletins/ poweredgates.htm

www.hse.gov.uk/safetybulletins/ electricgates.htm

www.hse.gov.uk/safetybulletins electricgates2.htm

Section 3(1) of the Health and Safety at Work etc Act 1974 states: "It shall be the duty of every employer to conduct his undertaking in such a way as to ensure, so far as is reasonably practicable, that persons not in his employment who may be affected thereby are not thereby exposed to risks to their health or safety."

Third-party certification - what is it and why are there concerns?

Up until 6 April this year, only two procedures were available to certify that notifiable electrical installation work in homes in England and Wales complied with the requirements set out in Part P (Electrical safety – Dwellings) of the Building Regulations: 'self-certification by a registered competent person', or 'certification by a building control body'.

On that date, however, a third procedure -'third-party certification by a registered third-party certifier' - became available for notifiable work not carried out by a registered competent person, but only in England.

Third-party certification is not recognised in the version of Part P of the Building Regulations currently in force in Wales, so the remainder of this article relates specifically to electrical installation work carried out in dwellings in England.

The new procedure enables notifiable electrical installation work in dwellings to be carried out by any person provided that, amongst other things, it is subjected to appropriate inspection and testing by a *registered third-party certifier*.

It is intended by government to be a potentially less costly alternative to the 'certification by a building control body' procedure for notifiable work not carried out by a *registered competent person*, with the expectation that it will reduce the significant amount of notifiable electrical work that is not being certified as compliant with the Building Regulations.

In principle, registered thirdparty certifiers can inspect, test and certify electrical installation work as compliant with the requirements of the Building Regulations including compliance with BS 7671, the UK standard for the safety of electrical installations.

Where used, the new procedure requires that, before work begins, an installer who is not a registered competent person must appoint a registered third-party certifier to inspect and test the work as necessary.

Then, within five days of completing the work, the installer must notify the registered third-party certifier who, subject to the results of the inspection and testing being satisfactory, should complete an electrical installation condition report or recognised equivalent, and give it to the person ordering the work.

Finally, the registration body of the third-party certifier must, within 30 days of a satisfactory condition report being issued, give a copy of the Building Regulations compliance certificate to the occupier and the certificate, or a copy of the information on the certificate, to the building control body.

Currently, only two of the electrical competent person

scheme operators have opted to offer a registration scheme for third-party certifiers: NAPIT and STROMA.

The largest scheme operator, Certsure LLP, has abstained, citing concerns over safety including potentially detrimental effects on the quality of certified work, issues with guaranteeing the impartiality of third-party certifiers, and a possibly negative effect on the number of electricians registering with the main Part P selfcertification schemes.

Certsure is also concerned about the ability of third-party certifiers to adequately inspect and test electrical installation work after it has been completed because some parts are then likely to be inaccessible, such as wiring concealed in the building fabric.

There is also concern that those providing third-party certification services may not fully appreciate the responsibility – and therefore the liability – they will



assume for the safety of the work they certify, especially as the competence of the installer will be an unknown factor, and full inspection and testing procedures in accordance with the UK standard (BS 7671) may not be practicable.

"We have grave concerns over the third-party certification option, particularly following last year's reduction in the range of notifiable work covered by Part P, the only legal framework in England protecting householders from unsafe electrical work in the home", comments Phil Buckle, Director General of Electrical Safety First.

"There are also some key issues - such as for how long an installation can be energised before it is certified and who will ultimately be responsible for the safety of the work - that have not been addressed. We fear that this new procedure will simply add to the confusion around Part P – for both consumers and contractors."

Electrical Safety First would like to hear your opinion about the third-party certification option. Please send an email to **feedback@electricalsafetyfirst.org.uk** to let us know what you think of the practice, or to tell us what you think could be done to improve it.

News 9



Electrical Safety First calls for higher standards in Welsh private rented sector

Electrical Safety First has welcomed the Communities, Equalities and Local Government Committee's initial review of the new Welsh Housing Bill, which supports the charity's campaign to improve safety and poor conditions in the private rented sector in Wales.

Recognising the dangers that electricity can pose to tenants, the National Assembly for Wales' Committee's recent report recommends that the proposed new Code of Practice for Landlords includes a requirement for mandatory periodic checks on electrical safety.

This is a vital step in Wales where the private rented sector is expanding rapidly, indeed so rapidly that it is estimated that by 2020 one in five homes will be provided by private landlords.¹ In January, Electrical Safety First sent an open letter to Carl Sargeant AM, Minister for Housing and Regeneration.

Signed by leading businesses, charities, public bodies and other significant Wales-based organisations – including Citizen's Advice Cymru, the Chartered Institute of Environmental Health, NUS Wales and Welsh Tenants - the letter urged a series of improvements to electrical safety standards in the private rented sector. Although the Minister's response rejected our proposal for measures to be introduced as part of the Housing (Wales) Bill, we still believe the legislation provides a key opportunity to drive up standards, improve home safety and rebuild confidence in the private rented sector.

To coincide with this activity, we recently held a joint event with NUS Wales in Cardiff, which focused on the poor conditions faced by many student renters.

Speaking at the event, Deputy President of NUS Wales, Beth Button, said, "A recent NUS poll of Welsh student renters outlines the seriousness of this issue.

"Over half of respondents were forced to live with damp, mould or condensation in their home, while 18% reported renting properties containing potentially serious electrical safety hazards. We therefore fully back Electrical Safety First's call to make electrical safety checks mandatory."

The event also included a keynote address from the Welsh Liberal Democrats housing spokesperson Peter Black AM. He commented: "In order to drive up standards of privately rented homes, the proposed code of practice for landlords needs to clearly set out the minimum physical standards their properties must meet.

"I would also advocate that it should include a requirement on landlords for periodic checks on electrical safety, and the installation and maintenance of carbon monoxide detectors, as well as other issues around safety in those homes. I think that is the best way to drive up standards." ¹CIH Cymru, Welsh Housing Review 2012

News

Will Scotland lead the way on electrical safety in the private rented sector?

Electrical Safety First's campaign for improved safety in Scotland's private rented sector recently came a step closer to success after the Infrastructure and Capital Investment (ICI) Committee's Stage One report on the new Scottish Housing Bill recommended that all private rented sector accommodation be subjected to mandatory, five-yearly electrical checks by a registered electrician.

The Bill puts forward a range of proposals to help reform the sector, including a new Housing Tribunal which, if approved, will provide landlords and tenants with more efficient and accessible access to justice to help resolve disputes.

However, we believe further provisions should be included to improve the safety and condition of private rented homes, including measures for mandatory electrical safety checks.

This could be achieved by an amendment lodged in May this year by Bob Doris MSP, who has long

been a supporter of our campaigns in Scotland.

Prior to the amendment being lodged, he outlined his views at an event at the Scottish Parliament, saying: "Landlords have a responsibility to ensure that their properties are safe for purpose for their tenants.

"Most landlords are good landlords and ensure that their homes are fit for purpose and safe - but good practice needs to be regulated to ensure it is universal across Scotland. The proposal by Electrical Safety First for mandatory electrical safety checks is therefore both sensible and practical.

"I intend to bring forward an amendment to the Housing Bill, and am hopeful that the vital aspect will be underpinned in the legislation."

Following the ICI Committee's recommendation, its Convener Maureen Watt MSP said: "There is much in this Bill that the Committee supports and believes will help those who rent across the different sectors.

"However, we have also put forward recommendations to Parliament to further improve the Bill, should Parliament agree with us that it should continue to progress.

"For example, our recommendations on mandatory five-yearly electrical checks, mains smoke alarms and carbon monoxide alarms would, we believe, greatly improve safety for all tenants in private rented housing."

"We are delighted that the Committee has made these recommendations", said Phil Buckle, Director General of Electrical Safety First. "It is a requirement we have campaigned long and hard for.

"Most accidental fires in Scotland are caused by electricity - almost 70% in 2012-2013¹. We also know that conditions and disrepair in the private rented sector are worse than in any other Scottish housing sector, and research indicates that private tenants are more at risk from electrical fires.

"So we are extremely pleased that the Committee recognises the need for this fundamental safety requirement.

Improving standards in the private rented sector is crucial to ensuring that everyone has a safe, affordable home to live in, so we hope the Scottish Government will take this opportunity to lead the way on electrical safety in the sector."

¹Analysis by the Scottish Government of Fire Datasets: DCLG and Scotland for 2012-13

A missed opportunity in the Consumer Rights Bill

Electrical Safety First is disappointed that the opportunity to address the issue of electrical product recalls in the Consumer Rights Bill, covered in the previous issue of Switched On, has been missed.

Fiona O'Donnell, MP for East Lothian, tabled an amendment intended to place greater responsibility on manufacturers and retailers to inform consumers of product recalls in the fastest possible way.

However, the proposed amendment was defeated by a government vote, meaning that the Bill will progress



Halogen heaters – avoiding fire risks

Halogen heaters, which produce instant radiant heat in a cost-effective way, are proving more and more popular as their price decreases and householders become more aware of their energy bills.

Often thought of as safer than conventional portable heaters, these lightweight devices store very little heat energy and so cool rapidly when turned off.

Many have 'tilt-switches' that instantly turn off the power should the heater fall over.



A common design of Halogen Heater – image courtesy of London Fire Brigade

However, care must be taken when buying and using these heaters, as simple user errors can have devastating consequences. London Fire Brigade figures show that, since January 2009, halogen heaters have been responsible for 48 fires in London that resulted in five deaths and 29 injuries, with three other brigades reporting a further seven fatal fires elsewhere in the UK.

The greatest dangers come from placing these radiant heaters too close to clothing or other combustible materials, and from heaters without trip switches toppling over.

Additionally though, the construction of many of these halogen heaters reflects their low cost, resulting in potentially serious safety issues.

When buying a heater, users should always check to see that it is stable, has a tilt-switch safety device, and is of good quality. Recognised brands are likely to be constructed to higher standards. Second-hand heaters should be avoided, as older appliances may have been constructed to lower standards than today, and suffered wear and tear. And components may have deteriorated with age.

Electrical Safety First has issued the following simple guidelines to increase awareness of the risks from halogen heaters and to help prevent further accidents:

 Buy good quality halogen heaters from recognised manufacturers

- Avoid second-hand heaters
- Put the heaters on a level surface well away from anything that could knock them over
- Make sure they are at least a metre away from any combustible materials, such as paper, furniture or curtains
- Never leave halogen heaters unattended whilst in use
- Do not control them with an automatic timer
- Never leave them on whilst sleeping
- Do not cover any electric heater
- Never power an electric heater from an extension lead

 such leads can be easily overloaded and cause fires
- Inspect heaters regularly for damage and deterioration.
 If they're not in good condition, don't use them!



This image, courtesy of London Fire Brigade, shows the devastation a halogen heater can cause if not used correctly.

without addressing the widespread concerns about the ineffectiveness of the current arrangements for recalling potentially dangerous products.

On this proposed amendment and its subsequent defeat, Emma Apter, Head of Communications at Electrical Safety First said: "Faulty electrical items can pose a real threat of electric shock or fire to consumers and their families. Given this, they have the right to know as soon as possible when a product has been identified as being potentially dangerous.

"Yet currently, most recalls fail to retrieve 80 to 90% of affected items¹ revealing a lack of effective communication between manufacturers, retailers and consumers. This shocking situation is leaving huge numbers of potentially dangerous items of electrical equipment in people's homes.

"We would like to extend our thanks to Fiona O'Donnell MP for her efforts, but believe the failure of the Consumer Rights Bill to cover electrical product recalls is a sadly missed opportunity.

We hope it doesn't take even more serious accidents

caused by recalled items to make change happen. The government should be acting now to address this important public safety issue."

¹Recall Effectiveness: A Hot Topic; K. Ross, 2009. Available at http:// www.bowmanandbrooke.com/ insights/~/media/Documents/ Insights/News/2009/09/Recall%20 Effectiveness%20A%20Hot%20 Topic/Files/DRI%20Recall%20 Fall%2009/FileAttachment/ DRI%20Recall%2069

Safety in the design and construction of LED lamps

LED lamp manufacturing is projected to see significant growth over the next decade, which will bring an increasing number and variety of products onto the UK market. These LED lamps are available to buy not only on the high street, but also from many online sources.



Since the European ban on the sale of most types of conventional incandescent light bulb, ever more innovations and advancements are being made in the field of LED light sources to meet the demand for alternative lighting solutions.

A negative effect of this time of rapid technological advance, however, is that numerous cheap, poor quality and potentially unsafe lamps are finding their way onto the UK market.

For instance, the summer 2012 issue of *Switched On* included a feature on the safety of LED lamps being marketed as replacements for traditional fluorescent tubes. It drew attention to the risk of electric shock when some makes of that type of LED lamp were being installed.

More recently, a consumer contacted us to report that he had suffered an electric

shock when installing a type of LED lamp having a traditional bayonet base.

We have therefore further investigated the safety of the types of LED lamp intended to replace conventional incandescent and fluorescent lamps in and around the home.

We began by buying ten random samples from mainly online retailers for safety screening by an independent test laboratory. The samples included Edison Screw, bayonet, G24, GU10 and R7 (typical floodlight) lamp types.

We were concerned that none of these samples passed the overall safety assessment, and that the investigation further revealed a risk of electric shock from a number of lamps that had an exposed LED array and/or inadequate separation from the mains supply.

Feature 13

Test criteria and summary of main safety issues found

The ten samples were subjected to testing under the general safety provisions of the following standards:

- BS EN 61140:2002 Protection against electric shock – Common aspects for installation and equipment
- BS EN 60598-1:2008 General requirements for the safety of luminaires
- BS EN 62560:2012 Self-ballasted LED lamps

User instructions were supplied with only one of the samples, and those were of a poor standard.

The absence of adequate installation and safety instructions is a concern, particularly where modification of an existing light fitting is required to accommodate an LED lamp - such as with the G24 type where the original control gear needs to be removed.

However, there were a number of other safety concerns with the lamp samples relating to poor design and/or construction, and access to live parts.

Clearly, all lamps put on the market should be designed and constructed to withstand the forces reasonably necessary to insert them in, and to remove them from, an appropriate lampholder, but this was not the case with some of the sample lamps.

Examples (see Fig 1) included:

- the bayonet base of one of the samples becoming detached when it was being inserted into the lampholder, exposing internal live parts
- the plastic base of another sample having a GU10 base being easily unscrewed from the metal heat-sink surround, presenting a similar electric shock hazard.

Fig 1. Poor lamp construction





Another potential electric shock hazard was found in two of the samples that had an exposed LED array. (See Fig 2.)

Fig 2. Accessible contacts on an exposed LED array



The internal wiring was of an adequate standard in only two of the ten samples.

One sample was comprised of a number of LED arrays connected by extensive internal wiring. The wires were easily detached from the arrays, creating a risk of extra-low voltage wiring making contact with mains voltage circuitry. (See Fig 3.)

Fig 3. Poor internal wiring



Despite the confined space within 'hollow' LED lamps, the electronic control circuits still need to have sufficient physical isolation or electrical separation, or both, between the primary and secondary parts of the circuits to provide protection against electric shock.

Five of the samples had no transformer, and four of them also had no electrical separation between the primary and secondary control circuits. The relevant product standards require such lamps to withstand 2960 V a.c. applied for one minute without flashover or breakdown occurring.

However, four of the samples failed this test with, in the majority of cases, breakdown occurring immediately the voltage was applied.

Lamp operating temperatures were recorded at several points on each sample. The test ran for approximately eight hours, the maximum temperature permitted by the standard being 70 °C. Two of the samples failed this test with recorded temperatures at the front of the lamp of 76.5 °C and 76.8 °C.

It was also noted that, for three of the samples, the recorded input power was far greater than the rating stated on the packaging. In one case, it was almost three times the stated rating.

Further testing

With the initial investigation revealing such poor overall construction issues and the risk of electric shock from lamps having exposed LED arrays, we commissioned further testing.

We bought another random selection of 12 different LED lamps for testing having a mixture of Edison Screw, bayonet and GU10 bases, specifically to determine whether there might be a risk of electric shock when installing or removing them from an energised lampholder.

The investigation focused on the safety of the supply circuit to the LED array and on the touch voltages and currents present on accessible LED pins and solder contacts that might to be touched during insertion and removal of the lamps. (See Fig 4.)

Fig 4. Exposed LED arrays and associated contacts



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Fig 4. continued



The lamps were sent to an independent laboratory for limited testing against particular requirements of the following standards (further details of which are given on the proceeding page):

- IEC 62560:2011 Clause 8 for insulation resistance and electric strength
- BS EN 60598-1 Clause 10 for voltage and touch current values.

The applied touch voltage and current limits were derived from the requirements for protection against electric shock given in BS EN 60598-1:

- Touch voltage: 60 V ripple-free d.c.
- Touch current: Where the touch voltage exceeds 60 V ripple-free d.c., the touch current must not exceed 2.0 mA.

The electric shock hazard

Voltages were measured for normal and reverse polarity between Earth and the accessible LED pins and connections at a supply voltage of 240V a.c, 50 Hz. Lamps with Edison Screw-type bases were included in the reverse polarity voltage testing as 'bayonet to Edison Screw adaptors' are readily available.

Leakage current was measured at the points where the highest voltage was recorded. As can be seen from the Table below, hazardous touch currents ranging from 69 mA to 93 mA were recorded on eight of the twelve samples.

Only one of those samples had an LED array that was protected by a glass cover which prevented the electric shock hazard from otherwise accessible live contacts.

However, a touch voltage of 103.5 V d.c. was measured on the heat-sink encasing the LED array, and the lamp also failed the electric strength test.

In addition, a number of the lamps could be easily dismantled without causing permanent damage, exposing hazardous live internal circuitry.

Our conclusions

The test findings highlighted serious safety concerns including unacceptable electric shock risks, supporting the reported electric shock incident that triggered our investigation.

To avoid the risk of electric shock, we recommend that when buying the types of LED lamp that comprise one or more LED arrays, only those where the arrays and contacts are protected by a plastic or glass cover should be chosen. However, our investigations indicate that, even then, the lamps might be poorly constructed and/or have inadequate separation between the primary and secondary sides of the integral control circuits.

It is therefore important always to try to ensure that a lampholder is de-energised before installing or removing an LED lamp (and indeed any other type of lamp).

Further advice on how to identify potentially substandard, unsafe LED lamps can be found on our website.

We will be raising the safety issues arising from our investigations with the suppliers concerned and, where appropriate, will pass our findings to Trading Standards to assist them with their market surveillance and enforcement duties.

As with all our product screening projects, copies of the laboratory test reports and a more detailed report of the findings can be found in the 'Electrical professionals' section of our website www.electricalsafetyfirst.org.uk



Table: Overview of touch voltage and current measurements

Sample designation and recorded values (Red = Failure)												
	Α	В	С	D	E	F	G	н	I.	J	к	L
Conditions		203	<u> 1000</u>				The second second		ĺ		A Charles and	
Normal polarity (V)	70.4	20.8	79.3	53.5	170.1	186.4	7.5	23.4	157.9	88.1	206.0	191. <mark>2</mark>
Reverse polarity (V)	175.2	21.5	157.8	103.5	73.3	64.9	7.4	23.8	83.1	201.0	47.8	58.7
Leakage current (mA)	81.4	0.0058	73.4	0.0202	76.0	85.6	0.005	0.0056	69.4	90.2	93.2	85.4





Revised TrustMark criteria a step towards greater consumer protection

TrustMark, the government-backed quality mark for reputable tradesmen, was relaunched in April by Consumer Minister Jenny Willott, with new improved standards of consumer protection under a renewed master licence from the Department for Business, Innovation and Skills.

Peter Hansford, the government's Chief Construction Adviser, emphasised the government's strong commitment to TrustMark and called upon more firms to get behind the scheme which is central to boosting the reputation of tradesmen and consumer confidence in the domestic repairs, maintenance and improvement market.

The Consumer Minister announced the new core criteria – the governmentendorsed standards at the heart of the TrustMark scheme – and urged the whole industry to meet the new standards which cover customer service, good trading practices and technical competence. The relaunch was accompanied by a new publicity campaign to increase consumer awareness of TrustMark.

Some of the key changes to the TrustMark core criteria, the first to be made since the scheme was launched in 2005, include:

- Firmer standards. The old requirements in the licence and core criteria spoke about scheme operators using "best endeavours" to meet certain standards, and gave "examples" of checks and activities that they might use to demonstrate compliance. Now the core criteria talk about scheme operators' requirements ("scheme operators must...")
- More specific standards.
 Where before, for example,

scheme operators had to have a general commitment to raising standards, they now need to show how they are raising standards to address identified areas of consumer detriment and other trade-specific issues

- More vetting of tradesmen, including specific checks that must be done not only upon a firm's entry to the scheme, but also at renewal stage or on an ongoing basis
- More proactive use of complaints data by scheme operators, more reporting of that data, and more transparency in the complaints process
- Changes to protect the brand and reduce misuse of the TrustMark logo

 A new requirement for scheme operators to develop ways to measure the effectiveness of their code of practice and how it reduces consumer detriment, and to keep it regularly reviewed in the light of changing customer expectations in their sector.

Existing scheme operators will have 12 months to adapt to the new core criteria. All new scheme operators applying since the relaunch will be assessed against the new core criteria from day one. Also, the core criteria will now be reviewed and updated annually to maintain the drive for higher standards.

"Consumers have the right to expect that any work undertaken in their home is done safely and to a high standard", said Phil Buckle, Director General of Electrical Safety First. "TrustMark's revised criteria are a big step towards achieving this goal and it is therefore a step we welcome.

"That Trustmark recognises the need to increase awareness of their scheme and attract more contractors of the highest calibre is positive, but only once this becomes a reality will consumers have total confidence in the quality of the workmanship and be afforded the best possible protection from death, injury and damage to their property".

"As a campaigning charity, consumer protection is our number one priority so, whilst we support TrustMark's revised criteria, we are also aware that more needs to be done. We will therefore continue to work on behalf of consumers to make them aware of the dangers of employing electrical tradesmen who do not possess the necessary skills".

16 Technical



In-car power supplies investigated

As part of its ongoing electrical product safety screening programme, Electrical Safety First commissioned an independent laboratory to assess the safety of a selection of typical in-car power inverters under foreseeable conditions of use.

These inverters are electronic devices that convert a 12 V d.c. supply from a battery to a 230 V a.c. supply.

Depending on their rated output, the inverters are designed either to plug into a car's 12 V supply/cigarette lighter socket, or to be connected directly to the car battery, to power mains voltage devices such as laptops, televisions, travel kettles and the like through a standard 13 A socket. Some plug-in types also include USB power outlets.

Four in-car inverters, rated at 150 W, 200 W, 300 W, and 600 W were selected at random and purchased from online retailers (including UK suppliers).

As there is no specific product standard for in-car power inverters, the range of safety tests carried out were based on professional engineering judgement and the general safety requirements of the product standards referenced at the end of this article.

Test results

Live testing was not carried out on one of the samples because it was deemed to be unsafe on the basis of visual inspection alone. But the three that were tested performed satisfactorily during short-circuit and overcurrent tests.

However, all the inverters failed the following criteria:

- Marking and instructions: The user instructions supplied were inadequate. In particular, there was no warning notice at the socket-outlet or provided with the instructions warning users of the potential danger of connecting the inverter to a 230 V household supply
- Protection against electric shock and energy hazards: All the inverters failed under flash testing due to insulation deficiencies when the test voltage was applied between line and neutral of the 230 V outlet and either the metal outer casing or, if present, the USB port. Insulation failures also occurred between the metal outer casing of the inverters and the transformer core or printed circuit board
- Socket-outlet dimensions: None of the 13 A socket-outlets fitted to the inverters complied with the dimensional requirements of BS 1363. Three of the inverters had 'universal socket-outlets'. It was not possible to fully insert the 13 A plug test gauge into any of these three inverters. (See Fig 1.)



Fig 1. It was not possible to fully insert the plug test gauge

- The other inverter was fitted with a Schuko socket-outlet of the type used across much of continental Europe, and supplied with a separate plug-in Europe-to-UK 13 A travel adaptor.
- Clearance and creepage distances: Insufficient separation distances between parts were found on all of the samples, for example between the primary and secondary side of the printed circuit board, and between the outer metal casing and soldered joints.

Conclusion

Although deficiencies were found with all the inverters sampled, we found no evidence that they presented a shock risk to users. The inverter circuit arrangements provided electrical separation between the 12 V d.c. input and 230 V a.c. output, and no provision was made for connection to the general mass of Earth.

We will be further investigating the safety of inverters, and publishing the findings in future editions of *Switched On*.

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

Footnote:

Relevant requirements in the following Standards were used for assessing the safety of the inverters: EN 60950-1: Information technology equipment - Safety. Part 1: General Requirements EN 60065: Audio, video and similar electronic apparatus. Safety requirements EN 62109-1: Safety of power converters for use in photovoltaic power systems - Part 1: General requirements EN 62109-2: Safety of power converters for use in photovoltaic power systems – Part 2: Particular requirements for inverters EN 60320-1: Appliance couplers for household and similar general purposes - Part 1: General requirements BS 1363: 13 A plugs, socket-outlets, adaptors and connection units

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Have you ever been asked..?

What is the difference between Class I and Class II equipment?

Persons carrying out inspection and testing of portable equipment must be able to identify the construction Class of the equipment to determine what electrical tests are appropriate.

Basic safety requirement

Clause 4 of the basic electrical safety standard BS EN 61140: 2002 (as amended) Protection against electric shock - Common aspects for installation and equipment states that 'hazardous-live-parts shall not be accessible and accessible conductive parts shall not be hazardous live, either under normal conditions (operation in intended use and absence of a fault), or under single-fault conditions'.

Manufacturers of electrical equipment should construct their equipment in such a way that:

- users of the equipment cannot come into contact with internal live parts, and
- any exposed-conductive-parts that could become live under fault conditions are connected to an earthing terminal that permits connection of a protective conductor.

Technical Report PD 2754-2: 1993 *Classification of electrical and electronic equipment with regard to protection against electric shock – Guide to requirements for protection against electric shock* recognises four construction Classes for electrical equipment: Class 0, Class I, Class II and Class III.

Class 0 equipment

The sale of Class 0 equipment, which has no protective earth connection and only a single level of insulation, is not permitted in the UK on safety grounds, and so this Class of equipment is not further discussed here.

Class I equipment

For equipment of Class I construction, protection against electric shock is provided by limiting the duration of a current passing through the human body.

In practice, this is achieved by the construction of the equipment and by connection of the exposed-conductiveparts of the equipment which may become live under fault conditions, such as a metallic outer casing, to the earthing arrangements of the electrical installation via a protective conductor.

In short, in the event of an earth fault, the safety of Class I equipment is reliant upon the protective device and protective conductor arrangements of the electrical installation to which it is connected.

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.



Examples of Class I equipment include photocopiers, domestic white goods and kitchen appliances.

Class II equipment

For equipment of Class II construction, protection against electric shock is provided by preventing current passing through the human body.

This is achieved either by the provision around live parts of both basic and supplementary insulation (see Fig 2), or of reinforced insulation.

Reinforced insulation may be a single layer of insulation offering an equivalent degree of protection to that provided by basic and supplementary insulation, or may comprise several layers that cannot be tested singly as basic insulation or supplementary insulation.

For Class II equipment, protection against electric shock does not rely on the fault protection arrangements of the electrical installation to which it is connected, and so a protective conductor is not required.



Examples of Class II equipment include power supply units and most modern mainspowered tools and garden equipment.

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



Fig 2. Class II equipment construction mark

Some items of Class II equipment have a metallic casing either to provide mechanical protection, or for purely aesthetic reasons (Class IIc equipment). The metallic casing of such equipment does not need to be earthed as the insulation prevents it from becoming live under fault conditions.

When considering what, if any, tests should be performed, any equipment that is not marked with a Class II symbol should be regarded as Class I equipment.

This applies also to extension leads because, under fault conditions, any items of Class I equipment connected to them will be reliant for safety upon the effectiveness of the protective conductor in the lead.

Class III equipment

Protection against electric shock in Class III equipment is provided by limiting the maximum nominal voltage to 50 V a.c. or 120 V ripple-free d.c.

As Class III equipment does not require any electrical testing to determine its continued safety, it is not discussed any further in this article.

It should be noted, however, that the source of supply for such equipment, which may be of Class I or Class II construction, must be tested as appropriate to its equipment Class.

Safety Bulletin – supporting heavy cables

In August 2010, a man operating a pallet truck in a warehouse tragically suffered fatal head and spinal injuries when six armoured cables fell onto him from a height of about 17 metres.

It is probable that, when originally installed, the cables were adequately secured to the underside of cable tray by metal bands, as had been the practice elsewhere in the warehouse.

At some later time, however, the original supports had been removed in order to dispose of redundant cabling, the remaining cables then being bunched and re-secured with plastic cable ties.

After a number of years those ties failed, resulting in the collapse of the cables. Given the weight of the cables and the height from which they fell, the impact force was lethal.

Following an inquest into the incident last October, the Coroner wrote to the Institution of Engineering and Technology (IET) recommending that further guidance be published on the selection of cable fixings and, in particular, those used to support heavy power cables.

The Coroner also suggested that electrical designers and installers should be made aware of the potential consequences of heavy cables falling from height.

The IET advised the Coroner that JPEL/64, the committee responsible for the UK standard for the safety of electrical installations - *BS 7671* - had considered the circumstances leading to the fatality and had concluded that the current requirements of *BS 7671: 2008* (as amended) for the installation and support of cables were sufficient.

However, to help prevent similar accidents, the members of the committee agreed to work together to raise awareness of the importance of supporting heavy cables correctly, and the potential consequences of failing to do so.

This Safety Bulletin, which has also been offered to other parties for publication, is Electrical Safety First's contribution to that initiative.

Relevant requirements of *BS 7671: 2008* (as amended)

When assembling an electrical installation, BS 7671 requires good workmanship by competent persons or by those under their supervision, the use of suitable materials, and installation in accordance

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with the instructions provided by the manufacturer of the equipment (134.1.1).

Where, due to the method of installation, cables are not supported continuously throughout their length, they should be adequately supported at appropriate intervals such that they do not suffer damage resulting from their own weight (522.8.4).

Every cable should be supported to take account of any mechanical strain imposed by the supported weight of the cable itself (522.8.5).





Full weight of cables is supported by the fixings. Cables must be fixed by suitable means at appropriate intervals such as to prevent them suffering damage by their own weight

The circumstances of this incident clearly demonstrate that the original safety of an installation can be adversely affected by work carried out on it at a later date.

It should therefore be borne in mind that the above requirements of BS 7671 apply

equally to alterations and additions made to an existing installation, and to any parts of an existing installation affected by an addition or alteration (110.1.2 (vi)).

Additional guidance on the support of cables

Cable manufacturers publish guidance and data on the minimum requirements for the support of their cables. A number of industry bodies also publish guidance on how to meet the requirements of BS 7671 for the selection and erection of wiring systems and cabling. Such guidance should be taken into account during installation and subsequent maintenance.

Orientation of the support system

The orientation of a support system such as cable tray or ladder racking must be taken into account when selecting the means by which cables are attached to it.

If the support system is installed vertically on a wall or with its 'open face' facing down, the support of the cables is totally reliant on the integrity of the means of attachment to the tray – if the means of attachment fails, the cables will fall.

If the support system is installed with its 'open face' facing up, support is provided inherently and there will be considerably less strain on the means of attaching the cables. In many cases, the fixings supporting a tray or ladder rack will prevent installed cables falling off the side.

For these reasons, horizontal runs of cable support systems should be installed with the 'open face' up wherever practicable.

Selection of fixings

Where cables are attached to a vertical support system or to the

underside of a means of support, the strength and continued integrity of the means of attachment is critical.

Consequently, only fixings having sufficient strength and durability should be used. This precludes the sole use of plastic cable ties as a permanent means of securing cables and, in particular, heavy power cables.

Appropriate types of fixing include:

- cable clips or cleats attached by nuts and bolts, threaded rod or similar
- metallic banding attached by nuts and bolts
- metallic cable ties attached in accordance with the manufacturer's recommendations.

Periodic inspection

In order to prevent danger, every electrical installation needs to be maintained. This can be achieved by an effective management system for preventative maintenance, or by a suitable programme of periodic inspection and testing. In either case, an installation should be subjected to inspection at appropriate intervals.

In the case reported on above, the inadequate means of re-support provided for the cables had been in place for several years without being detected and corrected before its catastrophic failure.

Appendix 6 of *BS 7671* contains a list of typical items that require inspection during a periodic inspection of non-domestic premises. The list includes checking that cables are correctly supported throughout their length, whether forming part of a distribution circuit or final circuit.

20 News

Product Safety First *Time for change*

Electrical Product Safety Conference 2014 12 November 2014 | Church House | Westminster | London

Round table follows-up product safety issues

A recent Electrical Safety First round table event attracted a host of senior figures from the electrical product supply chain to discuss issues relating to the traceability and recall of defective electrical products.

The event – a follow-up to the Product Safety Conference that took place last year - was attended by representatives from AMDEA, BEAMA, Beko, Dixons, Kenwood and RETRA, together with key figures from the Department for Business, Innovation and Skills, ANEC (the European voice on standards), the British Standards Institution and Trading Standards.

Delegates discussed undertaking a review of existing guidance

for product recalls, with the aim of encouraging industry take-up and use of best-practice examples. However, the need for effective consumer education was the key concern for all those attending.

"I am delighted by the response we've had to the round table", explains Phil Buckle, Director General of Electrical Safety First. "The need for improved traceability and product recall processes is not just an industry concern. Our own research has shown that almost two million adults have knowingly ignored the recall of an electrical item.

"Given our campaigning expertise, we're ideally placed to take the lead on activities involving consumer education, and would welcome opportunities to work collaboratively to achieve this."

Other topics discussed at the round table included a review of the data protection barriers to effective traceability – an issue Electrical Safety First has been raising in both the UK and the rest of the European Union.

Among the ideas Electrical Safety First has suggested to improve traceability from point-of-sale through to the end user is the development of a centralised product registration system. Another is the increased promotion and use of product registration cards designed for the sole purpose of alerting consumers to specific safety issues.

Delegates also considered how new technology – such as the use of QR codes – might be used to support improved traceability procedures.

The success of the round table has led to Electrical Safety First planning a further event as a lead-in to its popular conference in November on electrical product safety.

Back issues of Switched On



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