TEST REPORT

No: 43478-1

Client	Electrical Safety Council 1 – 10 Canterbury Court 1 – 3 Brixton Road London SW9 6DE.
Client contact	Mr Steve Curtler
Item/s tested	600mm LED linear retro fit lamps for fluorescent luminaires See the following pages of this report for details
Sample/s tested / Conditions	Four samples / Good condition
Tested to	Investigation looking at the effect of using LED linear lamps as direct replacements for standard fluorescent lamps against reference standards EN60968 : 2000 and EN60598-1 : 2008
Date sample received	8th February 2012
Test period	14th February 2012 to 19th March 2012
Date of Issue	23rd March 2012 (re-issued 5th April 2012)
Tests carried out at	20 ± 5 °C
Testing Officer	*Gary A Read*
Verified by	*Giuseppe Capanna*

Issue II

0225

Form No: QF102-2
Issue No: 2
Issue Date: 21.07.11

Report No:	**43478-1**
Client:	**Electrical Safety Council**

THIS REPORT APPLIES ONLY TO THE PARTICULAR SAMPLE UNIT(S) TESTED AND TO THE SPECIFIC TESTS CARRIED OUT AS DETAILED IN THIS REPORT.

Introduction and Summary of test results

The LED linear T8 retro fit lamps supplied were reviewed and assessed to ascertain whether there were any potential hazards when a modification had to be made to a fluorescent luminaire fitted with either high frequency or wire wound control gear.

Each of the lamps were supplied with user instructions (or user instructions were available on the internet) which required modification of the fluorescent fitting to a lesser or greater extent. When used with high frequency (electronic) control gear all of the retro fit lamps required extensive modification of the fitting i.e. complete removal of the control gear.
When used with wire wound control gear, two of the four retro fit lamps were used with the magnetic ballast in place (see main part of the report for more details). The other two required complete removal of the control gear.

It should be noted that If the LED retro fit lamps are operated with a magnetic ballast in the circuit the optimum efficiency and performance will not be achieved.

Summary of test results (see body of report for more details)

Model	Direct retro-fit	Potential Hazard when used with retro fit lamp	Potential hazard during modification or if used with original lamp after modification
[redacted] With Wire wound fitting	YES	NO	NO
[redacted] With Electronic fitting	NO	NO	YES
[redacted] With Wire wound fitting	YES	NO	NO
[redacted] With Electronic fitting	NO	NO	YES
[redacted] With Wire wound fitting	NO	YES	YES
[redacted] With Electronic fitting	NO	YES	YES
[redacted] With Wire wound fitting	NO	YES	YES
[redacted] With Electronic fitting	NO	YES	YES

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Results of tests and Observations

LED Lamp No : 1
Photograph of identification

Lamp Reference: Lamp details: 12W 6000K G13, 230VAC 50/60Hz

Marking Details: The lamp is marked with the following:

12W 6000K G13, 230VAC 50/60Hz CE Rohs
The is a circuit diagram etched on to the lamp
The lamp caps are marked with a warning stating cut power supply / no pins touching when tube installed.
The lamp packaging states the following :
Made in China
600mm T8 Tube
Input : 220VAC 50/60Hz
CT 6000K
Flux 900lm

Instruction Leaflet supplied with the lamp states the following :

1) Installation only to be carried out by a qualified Electrical Contractor
2) Details are given on how to install the LED lamp
3) The voltage rating is given as 240VAC, however the lamp is marked as 230VAC and the lamp packaging states 220VAC.
4) It is claimed that the LED retro fit lamp is compatible with most standard magnetic ballasts, provided that the starter switch is remove from the circuit.
5) The instructions also state that the LED retro fit lamp is not compatible with electronic or high frequency control gear.
6) There is also a Technical Hotline given if assistance is required
7) Although the lamp is compatible with most standard magnetic when the starter switch is removed the instruction leaflet states that if a LED tube is used with a magnetic ballast with the starter removed wattage will still be drawn from the control gear and the energy savings will not be as great.

Tests and observations

Using the retro fit LED lamp with a wirewound fluorescent fitting

The above LED retro fit lamp was declared as a direct replacement for a fluorescent lamp.
The LED retro fit lamp was placed between a pair of lampholders mounted within a single fluorescent wire wound control gear batten luminaire.
As per the instructions supplied with the LED retro fit lamp the only item removed from the wire wound control gear was the starter switch.
When the supply was connected to the luminaire, the LED retro fit lamp operated instantly.

Refitting a fluorescent tube after modification of the fitting

It was possible to re-use the fitting with a fluorescent tube after modification. There would be no potential hazard relating to a fluorescent lamp being used in place of the LED retro fit lamp in a luminaire with wire wound gear fitted as only the starter switch would need to be replaced for the fitting to work as originally intended.

Test 1 (with modified wirewound fitting)

Direct Retro Fit : YES (with Starter Switch removed from the fluorescent control gear circuit)

Maximum voltage measured during removal of lamp between live pins of the lamp & earth = 1.9V

Maximum Current measured 10mA

This combination of voltage and current is not considered a Hazard
(ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

Test 2 (with modified high frequency/ electronic fitting)

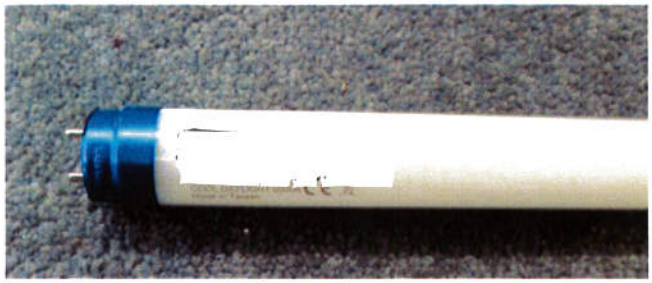
Direct Retro Fit: No (electronic or high frequency ballasts need to be removed or bypassed before fitting the LED lamp).

The LED lamp was declared as not being compatible with electronic or high frequency ballasts. However, the instructions then give details of how to modify a high frequency/ electronic fitting in order for it to be used with this lamp. Stating: " In such fixtures the ballast will need to be removed from the luminaire or bypassed. This is a relatively simple operation and just involves connecting the mains input to the end cap wires as pictured in the first section"
When a high frequency/ electronic fluorescent luminaire is modified in this way it will no longer accept its original lamp therefore there is a potential hazard relating to a fluorescent lamp being used in place of the LED lamp.
When a fluorescent lamp is used without the aspirate control gear the cathodes within the lamp are blown apart as mains voltage is applied directly across the lamp.

Maximum voltage measured during removal of lamp between live pins of the lamp & earth : 2.5V
Current measured 10mA

This combination of voltage and current is not considered a Hazard
(ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

LED Lamp No : 2
Photograph of identification



Lamp Reference:

Lamp details: 11W 6500K G13, 100-240VAC 50/60Hz

Marking Details : The lamp is marked with the following :

Tube 11W 100-240V 50-60Hz /COOL DAYLIGHT 6500K CE
Made in Taiwan /*The is a circuit* diagram on a label attached / 0NC 9292 001 813
The LED lamp was not supplied in its original packaging.

There was no instructions supplied with the LED lamp, the only information that was available via the internet was as follows :

be integrates an LED light source with a frosted cover and aluminium heat sink / Replaces fluorescent tubes.
Only works with Conventional / Electromagnetic Control Gear and will not work with Electronic Control Gear."

Tests and observations

Using the retro fit LED lamp with a wirewound fluorescent fitting

The above LED lamp was declared as a direct replacement for a fluorescent lamp, the LED lamp was placed between a pair of lampholders mounted within a single fluorescent wire wound control gear batten luminaire.

The instructions for the LED retro fit lamp states that only the standard fluorescent starter switch needs to be removed from the wire wound control gear and be replaced with a special starter to enable the lamp to operate. It should be noted that the starter was not supplied with the lamp and after searches on the internet and direct contact with Phillips we failed to find a source for the Further research revealed that the as in fact a fuse and use of the product without the nay lead to potential hazards under fault conditions.

Refitting a fluorescent tube after modification of the fitting

It was possible to re-use the fitting with a fluorescent tube after modification. There would be no potential hazard relating to a fluorescent lamp being used in place of the LED retro fit lamp in a luminaire with wire

wound gear fitted as only the starter switch would need to be replaced for the fitting to work as originally intended.

Test 1 (with modified wirewound fitting)

The following tests were carried out using a short circuit across the starter due to the non - availability of the [redacted] starter".

Direct Retro Fit : YES (with Starter Switch removed from the fluorescent control gear circuit and replaced with [redacted]

Maximum voltage measured during removal of lamp between live pins of the lamp & earth = 0.743V
Maximum Current measured 0.004mA

This combination of voltage and current is not considered a Hazard
(ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

Test 2 (with modified high frequency/ electronic fitting)

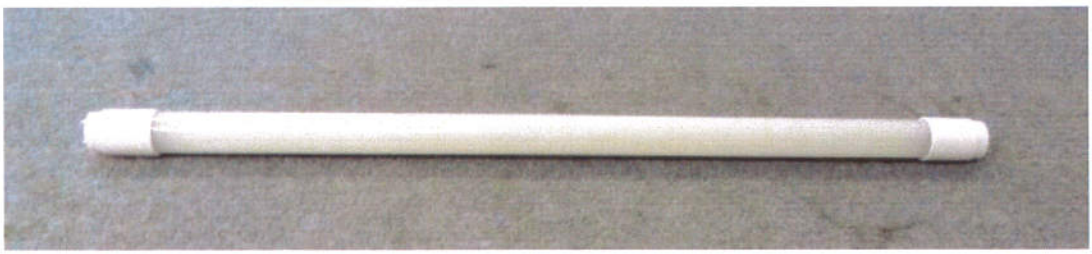
The LED lamp was declared as not being compatible with electronic or high frequency ballasts. However, the instructions give details of how to modify a high frequency/ electronic fitting in order for it to be used with this lamp. In such fixtures the ballast will need to be removed from the luminaire or bypassed.
When a high frequency/ electronic fluorescent luminaire is modified in this way it will no longer accept its original lamp therefore there is a potential hazard relating to a fluorescent lamp being used in place of the LED lamp.
When a fluorescent lamp is used without the aspirate control gear the cathodes within the lamp are blown apart as mains voltage is applied directly across the lamp.

Direct Retro Fit : No (electronic or high frequency ballasts need to be removed or bypassed)

Maximum voltage measured during removal of lamp between live pins of the lamp & earth: 50VAC
Current measured : between the lamp pins and the earth was 11mA

This combination of voltage and current is not considered a Hazard
(ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

Lamp No : 3
Photograph of identification



Lamp Reference :

Lamp Details : 9W T8 G13, 240VAC 50/60Hz (Information obtained from the internet)

Marking Details : There were no markings on the lamp
There were no instructions supplied with the LED lamp, the only information that was available was via the internet was as follows :
"The ; a light source with a frosted cover and aluminium heat sink."
The instruction leaflet (from the internet) depicts the LED lamp as being H or V series this will depend on the orientation the tube will be mounted in
There is no declaration given stating that the T8 .ED tube is a direct replacement for fluorescent tubes.
There was a series of drawings showing how to remove the fluorescent lamps, starter, ballast control gear / electronic control gear and how to connect to the power supply and fit the T8 LED tube.

Tests and observations

Using the retro fit LED lamp with a wirewound or high frequency fluorescent fitting

The LED retro fit lamp was placed between a pair of lampholders mounted within a single fluorescent batten luminaire with the either the electronic or wire wound control gear removed as per the instructions.
When the supply was connected to the luminaire, the LED retro fit lamp operated instantly.

Refitting a fluorescent tube after modification of the fitting

As the luminaire has been modified it will no longer accept its original lamp therefore there is a potential hazard relating to a fluorescent lamp being used in place of the LED retro fit lamp.
When a fluorescent lamp is fitted without the aspirate control gear the lamp cathodes within the tube are blown apart as mains voltage is applied directly across the lamp.

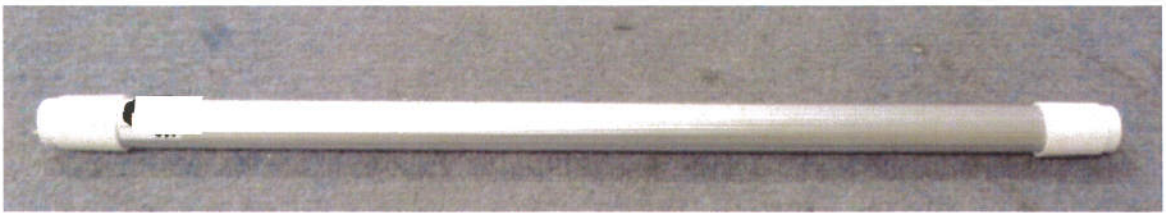
Test 1 & 2 combined (both types of fittings require removal of the control gear)

Direct Retro Fit: NO (this lamp requires the control gear to be removed from the fluorescent luminaire)

Maximum voltage measured during removal of lamp between live pins of the lamp & earth: 90VAC
Current measured : between the lamp pins and the earth was 10.0mA

This combination of voltage and current may be considered a Hazard in certain circumstances (ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

Lamp No 4
Photograph of identification



Lamp Reference :

Lamp Details : 8W T8 220VAC 50/60Hz

Lamp marking

lied
Code 6204 Model T8 – 60cm
Colour White Input AC220V
(8000 – 9000K Power 8W

Montajdan once starter ve balasti
Devre disi birakiniza

The above marking was printed onto a self - adhesive paper label which had shown signs of peeling off the LED tube.

Tests and observations

Using the retro fit LED lamp with a wirewound or high frequency fluorescent fitting

A standard wire-wound or high frequency fluorescent luminaires need to be rewired and have the control gear removed before the luminaire can be used with the LED Tube lamp, therefore cannot be classified as a direct replacement for a fluorescent lamp tube

Refitting a fluorescent tube after modification of the fitting

As the luminaire has been modified it will no longer accept its original lamp therefore there is a potential hazard relating to a fluorescent lamp being used in place of the LED retro fit lamp.
When a fluorescent lamp is fitted without the aspirate control gear the lamp cathodes within the tube are blown apart as mains voltage is applied directly across the lamp.

Test 1 & 2 combined (both types of fittings require removal of the control gear)

Maximum voltage measured during removal of lamp between live pins of the lamp & earth: 130VAC
Current measured : between the lamp pins and the earth was 13.0mA

This combination of voltage and current may be considered a Hazard in certain circumstances (ref:- IEC 61140: 2001 +A1: 2004 clause 5.1.6)

Conclusions & Recommendations

When fitting the LED retro fit lamps into electronic control gear luminaires all four LED retrofit lamps submitted for test required the ballast to be disconnected by a licensed electrician, which adds additional labour costs to a retrofit installation. In practise this modification is likely to be carried out by the person purchasing the retrofit lamp who may or may not have the competence to carry out the modification. This is a potential hazard. Modification of the original fitting would also cause issues of liabilty in the case of a fault.

All of the LED retro fit lamps that required removal of the control gear were potentially hazardous during removal and replacement of these LED retro fit lamps. All of the instructions (where available) stated that the supply should be turned off when replacing the lamp, however in practise if the lamp is faulty (not lit) it may be difficult to tell whether the fitting is energized or not.
The modification itself may also be considered hazardous if not carried out by a competent person. After modification the fittings also present further potential hazards if refitted with the original or replacement flourescent lamps. A label (provided by the retrofit kit manufacturer) affixed to the modified fitting indicating that the luminaire has been modified and can no longer operate as originally intended may help to reduce the risks on this point.

---------- End of Report ----------