

Test Report



Report No	247/7129368 BSI Digital copy	This Report consists of 23 pages
Client	Electrical Safety Council 18 Buckingham Gate London SW1E 6LB	
Authority & date	BSI Estimate acceptances 0000111780 and 0000112324 dated 31 October 2007 Equipment Record Numbers 10092470 and 10092486 dated 25 October 2007	
Items tested	Six samples of decorative lighting chains as detailed within this Test Report	
Specification	BS EN 60598-2-20: 1998 including Amendments 1 and 2 with BS EN 60598-1: 2004 including Amendment 1 BS EN 61558-2-6: 1998 including Amendment 1 with BS EN 61558-1: 2005 BS1363: Part 1: 1995 including Amendments 1 and 2 Limited tests as detailed on pages 2 and 3 of this Test Report	
Results	As detailed within this Test Report	
Prepared by	P R Overington Project Leader	
Authorized by	M Mayo Project Manager	
Issue Date	19 November 2007	
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of <i>PS082</i> 'General conditions relating to acceptance of testing'. The results contained herein apply only to the particular sample/s tested and to the specific tests carried out, as detailed in this Test Report. The issuing of this Test Report does not indicate any measure of Approval, Certification, Supervision, Control or Surveillance by BSI of any product. No extract, abridgement or abstraction from a Test Report may be published or used to advertise a product without the written consent of the Managing Director, BSI Product Services, who reserves the absolute right to agree or reject all or any of the details of any items or publicity for which consent may be sought.	

Introduction

The samples of decorative lighting chains were submitted on the 25th of October 2007 for a limited safety assessment according to an agreed test schedule.

The samples were allocated the following type references for identification purposes. All items listed below were declared as being suitable for both indoor and outdoor use:

LC-1: 20 light chain with tungsten lamps and plug in transformer

RL-2: Rope light with electronic controller

LC-3: 80 lamp light chain with LED lamps, plug in transformer and an electronic controller

LC-4: 120 lamp light chain pre-mounted on six miniature Christmas trees, with a plug in transformer and electronic controller

LC-5: 40 lamp light chain with tungsten lamps and flasher lamps, supplied with a plug in transformer

LC-6: 120 lamp light chain with tungsten lamps and a plug in transformer

For further details of the samples submitted, please refer to the photographic evidence contained within Section 3 of this Test Report.

Relevant Specifications

The Specifications used during the assessments performed were as follows.

BS EN 60598-2-20: 1998 including Amendments 1 and 2 - Lighting chains applied with reference to

BS EN 60598-1: 2004 including Amendment 1 – Luminaires: General requirements and tests

BS EN 61558-2-6: 1998 including Amendment 1 - Safety of power transformers, power supply units and similar: Particular requirements for safety isolating transformers for general use applied with reference to

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

BS1363: Part 1: 1995 including Amendments 1 and 2 - 13 A plugs, socket-outlets, adaptors and connection units. Specification for rewirable and non-rewirable 13 A fused plugs

Test schedules

The test schedules applied in the assessment of the lighting chains and transformers were as follows.

Lighting chains:

BS EN 60598-2-20: 1998 including Amendments 1 and 2

Clause 20.5 Marking (excluding 20.5/3.4 Marking durability)

Clause 20.6 Construction (limited to Sub-Clauses 20.6.7, 20.6.8 (excluding abnormal temperature test), 20.6.9 (excluding glow wire test), 20.6.11, 20.6.12, 20.6.13 (excluding oven test))

Clause 20.6 (4.10) Construction: Class II luminaires

Clause 20.7 (11) Creepage distances and clearances

Clause 20.10 External and internal wiring (limited to Sub-Clauses 20.10.1, 20.10.2, 20.10.3)

Clause 20.11 Protection against electric shock (excluding Sub-Clause 20.11.3)

Clause 20.12 (12.4) Thermal test: Normal operation

Clause 20.14 (10) Insulation resistance and electric strength

Test schedules: Continued/...

Transformers

BS EN 61558-2-6: 1998 including Amendment 1 with BS EN 61558-1: 2005

Clause 8 Marking

Clause 16.4 a) Tumble barrel

BS1363: Part 1: 1995

Clause 12.2 Pin dimensions

Results

The results of the limited tests and inspections performed on the samples submitted are contained within the following sections of this Test Report.

Section 1: Lighting chains – Pages 4 to 13 refer

Section 2: Transformers – Pages 14 to 16 refer

Section 1

Lighting chains

Results of the assessment of Sample reference LC-1**Table of results**

Clause No:	Requirement:	Result:
20.5	Marking	Fail
20.6	Construction	Pass
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments**Clause 20.5 (3.3.18) Additional information**

The lighting chain submitted for assessment was not fitted with a rubber based cable, as required for outdoor use.

The Specification states that luminaires rated other than ordinary and fitted with PVC cable shall contain the warning 'For indoor use only'.

No such warning was provided on the lighting chain or the packaging in which it was supplied.

Clause 20.10.2 Cord restraint requirements

The lampholders of the lighting chain were not provided with any form of cord restraint that would prevent tension being applied to the cable terminations.

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug
or
be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a plug in transformer with the UK format three pin configuration.

Results of the assessment of Sample reference RL-2

Table of results

Clause No:	Requirement:	Result:
20.5	Marking	Pass
20.6	Construction	Pass
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug
or
be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a standard UK format three pin plug configuration.

Results of the assessment of Sample reference LC-3

Table of results

Clause No:	Requirement:	Result:
20.5	Marking	Fail
20.6	Construction	Pass
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments

Clause 20.5 (3.3.18) Additional information

The lighting chain submitted for assessment was not fitted with a rubber based cable, as required for outdoor use.

The Specification states that luminaires rated other than ordinary and fitted with PVC cable shall contain the warning 'For indoor use only'.

No such warning was provided on the lighting chain or the packaging in which it was supplied.

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug
or
be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a plug in transformer with the UK format three pin configuration.

Results of the assessment of Sample reference LC-4**Table of results**

Clause No:	Requirement:	Result:
20.5	Marking	Fail
20.6	Construction	Pass
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments

Clause 20.5 (3.3.18) Additional information

The lighting chain submitted for assessment was not fitted with a rubber based cable, as required for outdoor use.

The Specification states that luminaires rated other than ordinary and fitted with PVC cable shall contain the warning 'For indoor use only'.

No such warning was provided on the lighting chain or the packaging in which it was supplied.

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug

or

be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a plug in transformer with the UK format three pin configuration.

Results of the assessment of Sample reference LC-5**Table of results**

Clause No:	Requirement:	Result:
20.5	Marking	Fail
20.6	Construction	Fail
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments**Clause 20.5 (3.2) Mandatory luminaire marking details**

The lighting chain submitted was noted to be missing the following marking details on either the sleeve attached to the chain or the packaging:

- Rated voltage
- IP rating
- Model number
- Rated wattage
- F Mark symbol

Clause 20.5 (3.3.17) Additional information

The packaging in which the sample was submitted did not include any instructions as to the action that should be taken, should the cable become damaged.

Clause 20.5 (3.3.18) Additional information

The lighting chain submitted for assessment was not fitted with a rubber based cable, as required for outdoor use.

The Specification states that luminaires rated other than ordinary and fitted with PVC cable shall contain the warning 'For indoor use only'.

No such warning was provided on the lighting chain or the packaging in which it was supplied.

Comments: Continued/...

Clause 20.5.1 Lighting chain marking requirements

The following information was not provided on either the sleeve attached to the chain or the packaging:

- Chain rated voltage
- Do not insert lamps whilst connected to the supply
- To be used with gaskets in place

Clause 20.5.2 Information to be provided on the chain or an attached sleeve

The following details were omitted from the marking attached to the chain by a label:

- IP rating
- Rated voltage (for a Class III product)
- Replacement lamps of the same type to be used

Clause 20.6.12 Torque test on lamps

It is a requirement that the lamps fitted to the lighting chain shall withstand a torque of 0.25Nm for one minute when applied to the glass envelope of a lamp. There shall be no rotation of the glass in relationship to the lamp cap.

Upon immediate application of the torque, the glass envelope rotated in the lamp cap.

Clause 20.6.13 Push and pull force tests

The force required to insert a lamp into a corresponding lampholder shall be measured and compared with the limits of 3N minimum and 10N maximum.

When measured on a random sample selected from the lighting chain a value of 28N was observed. However, this was the force required for full insertion and not to the first point of contact.

Clause 20.10.1 Cable dimensions

The Specification states a minimum of conductor cross-sectional area (CSA) of 0.4mm² for Class III lighting chains, based upon the maximum chain wattage of 50W.

The measured CSA for the lighting chain under test was recorded at 0.14mm², at the calculated total chain wattage of 20W.

The calculated mm²/watt based upon the Specification limits stated above for an operating voltage of 20W is 0.16mm² minimum.

Comments: Continued/...

Clause 20.10.2 Cord restraint requirements

The lampholders of the lighting chain were not provided with any form of cord restraint that would prevent tension being applied to the cable terminations.

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug

or

be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a plug in transformer with the UK format three pin configuration.

Results of the assessment of Sample reference LC-6

Table of results

Clause No:	Requirement:	Result:
20.5	Marking	Fail
20.6	Construction	Fail
20.7	Creepage distances and clearances	Pass
20.10	External and internal wiring	Fail
20.11	Protection against electric shock	Pass
20.12	Endurance and thermal tests	Pass
20.14	Insulation resistance and electric strength	Pass

Note:

The above table provides a summary of results according to the relevant sections of the applied Specification.

For details of the actual tests applied, please refer to the Test Schedule on page 2 of this Test Report.

Comments

Clause 20.5 (3.2) Mandatory luminaire marking details

The lighting chain submitted was noted to be missing the following marking details on either the sleeve attached to the chain or the packaging:

- Class III symbol
- Rated wattage
- F Mark symbol

Clause 20.5 (3.3.17) Additional information

The packaging in which the sample was submitted did not include any instructions as to the action that should be taken, should the cable become damaged.

Clause 20.5 (3.3.18) Additional information

The lighting chain submitted for assessment was not fitted with a rubber based cable, as required for outdoor use.

The Specification states that luminaires rated other than ordinary and fitted with PVC cable shall contain the warning 'For indoor use only'.

No such warning was provided on the lighting chain or the packaging in which it was supplied.

Comments: Continued/...

Clause 20.5.1 Lighting chain marking requirements

The following information was not provided on either the sleeve attached to the chain or the packaging:

- Chain rated voltage

Clause 20.5.2 Information to be provided on the chain or an attached sleeve

The following details were omitted from the marking attached to the chain by a label:

- Class III symbol
- Rated voltage (for a Class III product)
- Replacement lamps of the same type to be used

Clause 20.6.13 Push and pull force tests

The force required to insert a lamp into a corresponding lampholder shall be measured and compared with the limits of 3N minimum and 10N maximum.

When measured on a random sample selected from the lighting chain a value of 12N was observed. However, this was the force required for full insertion and not to the first point of contact. For the first point of contact, this value was noted to be less than 1N.

Clause 20.10.1 Cable dimensions

The Specification states a minimum of conductor cross-sectional area (CSA) of 0.4mm² for Class III lighting chains, based upon the maximum chain wattage of 50W.

The measured CSA for the lighting chain under test was recorded at 0.14mm², at the calculated total chain wattage of 21.6W.

The calculated mm²/watt based upon the Specification limits stated above for an operating voltage of 21.6W is 0.17mm² minimum.

Clause 20.10.3 Lighting chains for outdoor use

The Specification states that lighting chains for outdoor use shall be provided with either:
a splash proof plug

or

be suitable for permanent connection to fixed wiring by means of a junction box

The sample submitted was provided with a plug in transformer with the UK format three pin configuration.

Section 2

Transformers

BS 1363-1: 1995 Incorporating Amendments 1 and 2

Sub-clause 12.2 Pin dimensions

Line pin and neutral pin dimensions

3.90 Min 4.05 Max					
Sample	L ins	L	N ins	N	Result
1	4.09	3.96	4.10	3.96	Fail
2	4.11	3.94	4.15	3.96	Fail
3	4.02	3.97	4.02	3.97	Pass
4	4.05	4.05	4.08	4.05	Fail
5	3.94	3.98	3.97	4.00	Pass

Bold numbers denote non-compliance

BS EN 61558-2-6

Sub-clause 16.4a) Tumble barrel test

Samples are tested in a tumbling barrel as described in IEC 60068-2-32.
The barrel is turned at a rate of five revolutions per minute, 10 falls per minute thus taking place, the number of falls being:

50 if the mass of the specimen does not exceed 250g

25 if the mass of the specimen exceed 250g

After testing the samples shall fit Fig. 5 gauge of BS 1363 – 1: 1995 Incorporating Amendments 1 and 2.

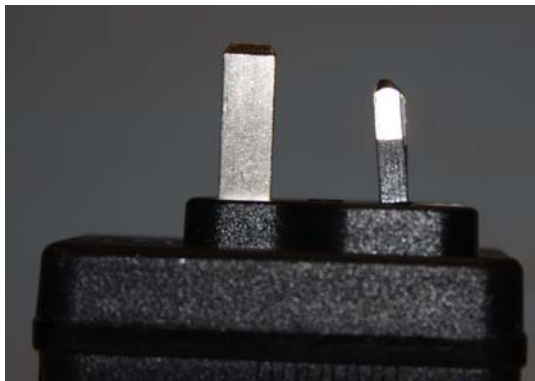
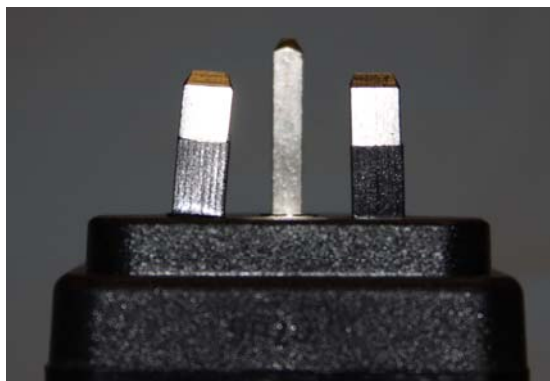
After testing the results were:

Sample 1	LC-3	Did not fit Fig. 5 gauge	Did not comply
Sample 2	LC-1	Did not fit Fig. 5 gauge	Did not comply
Sample 3	LC-6	Fitted Fig. 5 gauge	Complied
Sample 4	LC-4	Fitted Fig. 5 gauge	Complied
Sample 5	LC-5	Did not fit Fig. 5 gauge	Did not comply

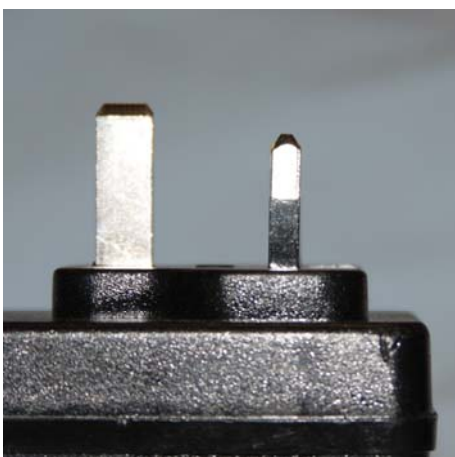
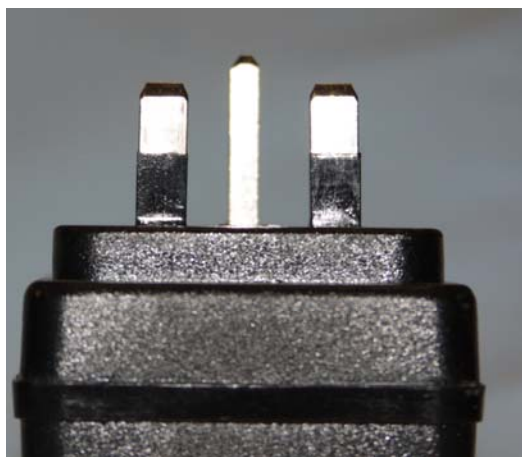
BS EN 61558-2-6

Sub-Clause 16.4a) Tumble barrel test – Photographic evidence

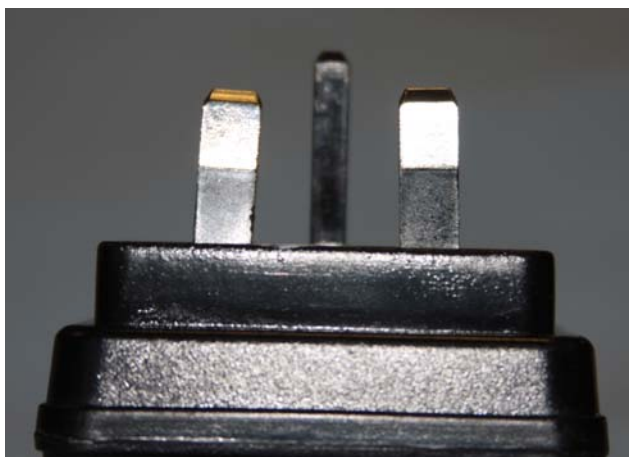
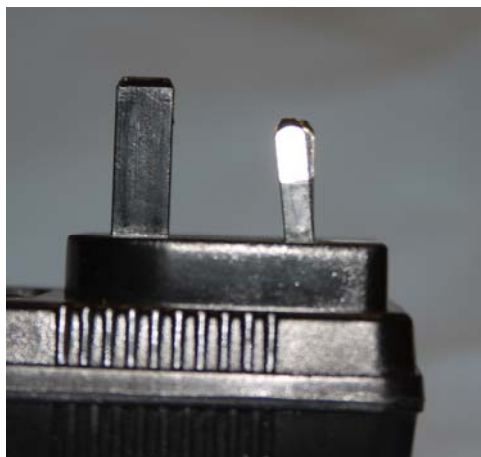
Sample 1 LC-3



Sample 2 LC-1



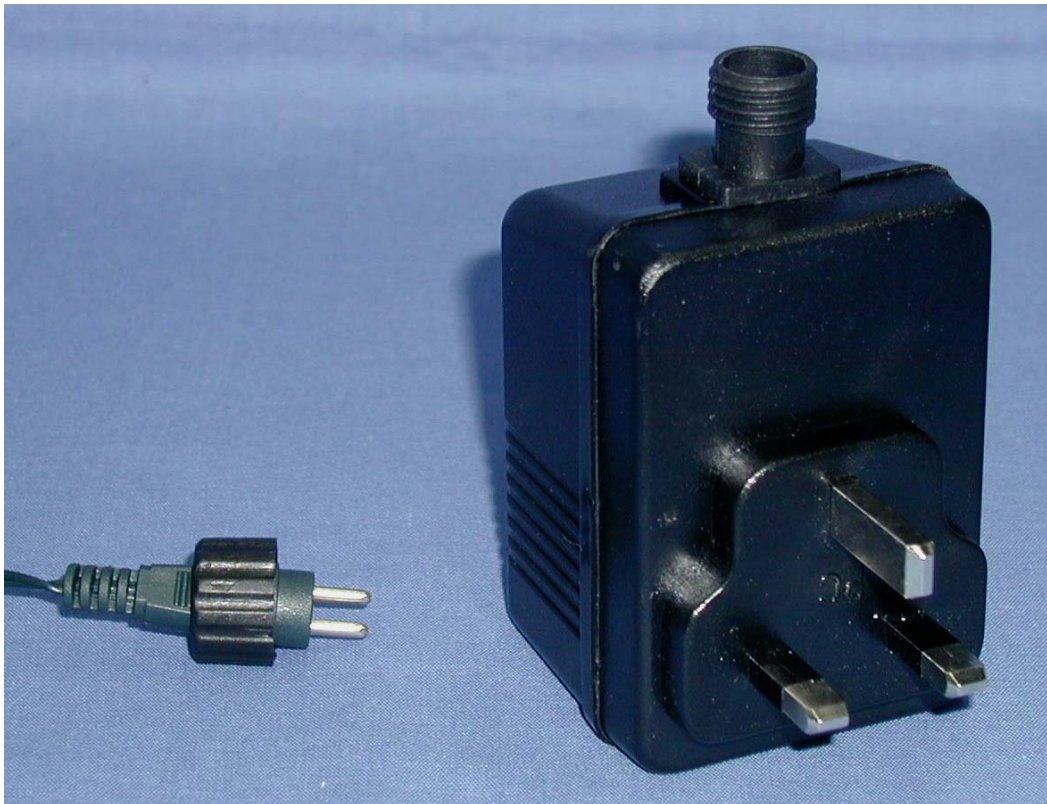
Sample 5 LC-5



Section 3

Photographic evidence of samples submitted

Sample reference LC-1

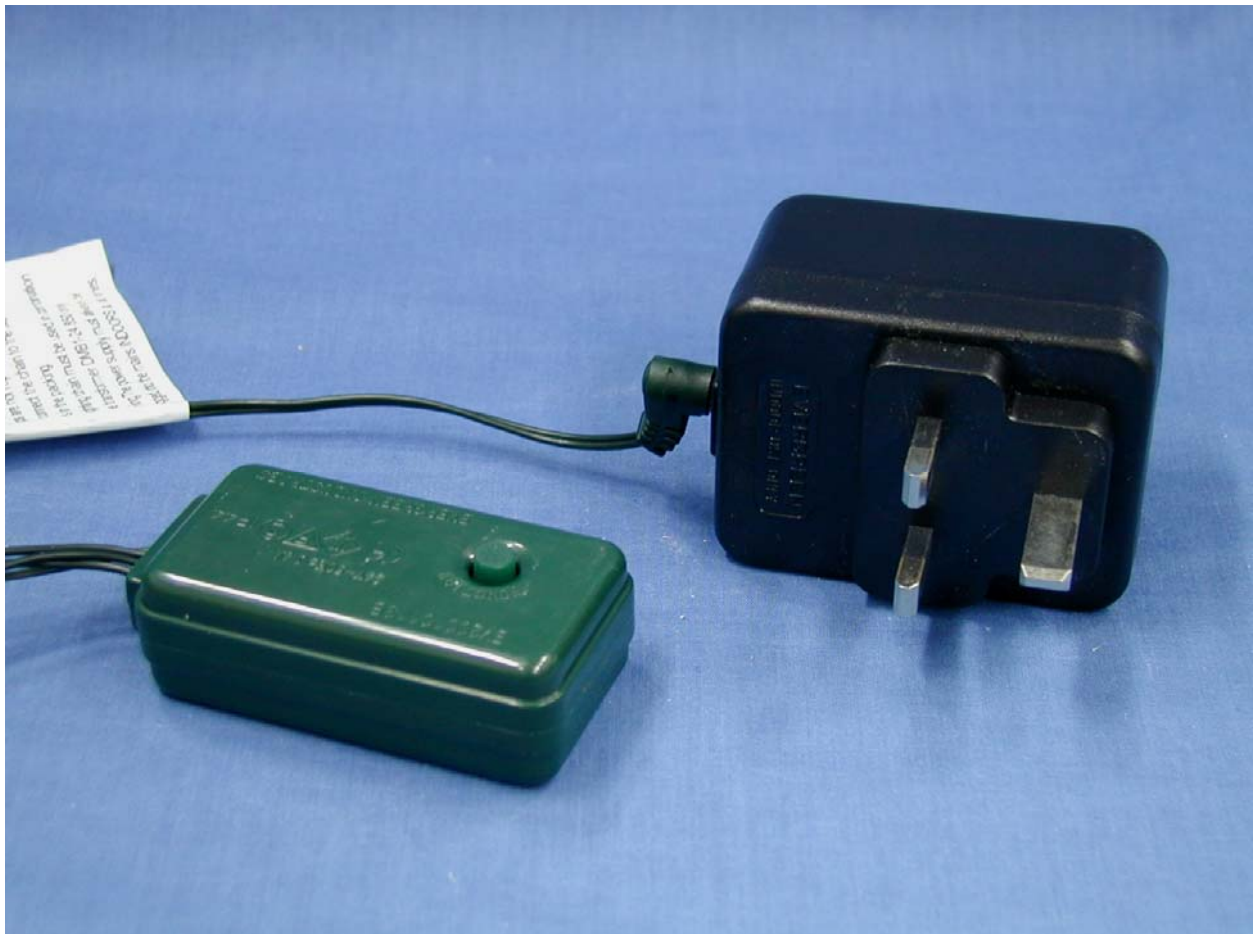


Sample reference RP-2





Sample reference LC-4



Sample reference LC-5



Sample reference LC-6

