Test Report

Report No	247/ 7572628/2 of 2 This Report consists of 46 pages
Client	Electrical Safety Council Canterbury Court 1 - 3 Brixton Road London SW9 6DE
Authority & date	BSI Estimate Acceptance No 0000275614 dated 16 August 2010 Equipment Record No 10118021 dated 24 August 2010
Items tested	6 alternative brands of self ballasted compact fluorescent lamps with bayonet lamp caps of various lamp wattages (4 of each type) being operated in either a bulkhead luminaire or pendant set with glass shade
Specification	BS EN 60598-1: 2008 + A11 Limited tests as detailed on page 2 of this Test Report
Results	As detailed within this Test Report
Prepared by	P R Overington Project Leader
Authorized by	C Higby Team Leader, Lighting Technology
Issue Date	28 September 2010
Conditions of issue	This Test Report is issued subject to the conditions stated in current issue of *CP0322* 'Conditions of Contract for 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 Testing 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 self ballasted compact fluorescent lamps were commercially available products that were purchased for testing by the Electrical Safety Council.

The samples were submitted on 24 August 2010 for a limited safety assessment according to an agreed limited test schedule.

Details of samples submitted

The lamp samples were allocated the following type references for identification purposes:

L1 – 20W Energy saving decor lamp with a spiral tube and bayonet lamp cap, declared as being equivalent to a 100W tungsten filament lamp, marked 8,000 hours and 1200 lumens

L2 – 25W Compact fluorescent lamp with a spiral tube and bayonet lamp cap, declared as being equivalent to a 125W tungsten filament lamp, marked 10,000 hours and 2700K

L3 – 11W Energy saving decor candle lamp with an outer candle glass and a spiral tube and bayonet lamp cap, declared as being equivalent to a 60W tungsten filament lamp, marked 8,000 hour, 2700K and 550 lumens

L4 – 20W Low Energy lamp with multi limbed straight tubes and bayonet lamp cap, declared as being equivalent to a 100W tungsten filament lamp, marked 10,000 hours, 1200 lumens and 60 lumen / watt

L5 – 15W Compact lamp with an outer glass in a standard lamp shape and internal spiral tube with a bayonet lamp cap, declared as being equivalent to a 70W tungsten filament lamp, marked 6,000 hour, 2700K and 810 lumens

L6 – 15W Energy saving stick lamp with multi limbed straight tubes and bayonet lamp cap, declared as being equivalent to a 75W tungsten filament lamp, marked 10,000 hours and 850 lumens

The bulkhead luminaire used for test purposes was a commercially available item that comprised of a black moulded base and a clear prismatic plastic diffuser. The sample was fitted with a ceramic B22 lampholder on a black plastic bracket that was fixed to the base moulding by a single self tapping screw. The assembly was completed by a metal reflector that fitted to the base moulding via a single self tapping screw.
The supply cable (not provided) was required to be fed through one of the entry holes that had to be drilled out, to allow the fitting of the rubber grommet. A suitable hole was then cut in the grommet for the three core cable.
The supply cable was terminated at the lampholder terminals for live and neutral connections and on the earth terminal provided on the metal reflector. A length of sleeving was provided and was instructed to be used over the unsheathed supply cables.

The pendant set and glass shade consisted of a ceiling rose in white plastic, 150mm length of two core cable and a B22 plastic un-switched lampholder. The glass shade was of a frosted type and required the use of a metal shade reducer to prevent the lampholder from passing through the top hole in the glass shade. These items were purchased by the Client from a commercial outlet for test purposes.

For further details of the samples submitted, please refer to the photographic evidence contained within pages 39 to 46 of this Test Report.

Relevant Specification

The tests applied during the assessment of the lamps and luminaires submitted were made with reference to the Clauses contained within the following Specification:

BS EN 60598-1: 2008 + A11

Luminaires: General requirements and tests

Test schedule

The Client requested the following tests as contained within the above stated Specification to be applied to each lamp and luminaire combination submitted:

Clause 12.3 Thermal endurance

Clause 12.4 Thermal test: Normal operation

Results of tests conducted

The results of the tests detailed within the test schedule on the previous page can be found on pages 4 to 38 of this Test Report.

SUMMARY OF RESULTS

Clause 12.3 Thermal endurance

Lamps operated in bulkhead luminaires

Lamp reference L1: Two lamps failed to complete the required test period, with a third lamp noted to comply.

Lamp reference L2: Four lamps were tested and noted to fail to complete the required test period.

Lamp reference L3: Four lamps were tested and noted to fail to complete the required test period.

Lamp reference L4: Three lamps failed to complete the required test period, with a fourth lamp noted to comply.

Lamp reference L5: Two lamps failed to complete the required test period, with a third lamp noted to comply.

Lamp reference L6: The first lamp tested was noted to complete the specified test period.

Lamps operated with the pendant set and glass shade

Lamp reference L1: The first lamp tested failed to complete the required test period, with a second lamp noted to comply.

Lamp references L2 to L6: All initial lamps tested completed the specified test period.

Clause 12.4 Thermal test: Normal operation

All samples tested when operated in the bulkhead luminaires or with the pendant set and glass shade, were noted to comply with the temperature limits applied where known.

RESULTS OF TESTS CONDUCTED

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires

The luminaires were mounted on test boards to simulate a wall mounted attitude, having been pre-painted matt black.

The set up was such that a cap-up lamp situation was created for worst case thermal conditions on the lamp.

The relevant requirements of the Specification were followed to create a test situation where the test chamber was maintained at a nominal temperature of 35ºC and that the samples were operated at a 10% over voltage value.

The aim was to subject the lamp and luminaire combination to the required 240 hour operation, being cycled 21 hour lamp on and 3 hour lamp off.

The results of the tests applied to each combination are shown within Tables 1 to 19.

Table 1	
Lamp reference:	L1
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	63 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L1a and L1b

Table 2	
Lamp reference:	L2
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	63 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L2a and L2b

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires: Continued/…

Table 3	
Lamp reference:	L3
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	63 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – no discoloration to plastic
Lamp photograph references:	L3a and L3b

Table 4	
Lamp reference:	L4
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	84 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L4a and L4b

Table 5	
Lamp reference:	L5
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	84 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – no discoloration to plastic
Lamp photograph references:	L5a and L5b

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires: Continued/…

Table 6	
Lamp reference:	L6
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L6a and L6b

Table 7	
Lamp reference:	L1
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	126 hours
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L1c and L1d

Table 8	
Lamp reference:	L2
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	Less than 2 hours
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational
Lamp photograph references:	Not applicable

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires: Continued/…

Table 9	
Lamp reference:	L3
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	Less than 2 hours
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational
Lamp photograph references:	Not applicable

Table 10	
Lamp reference:	L4
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	21 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L4c and L4d

Table 11	
Lamp reference:	L5
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	0 hours
Condition of sample after test:	
Luminaire:	Not applicable
Lamp:	Lamp non-operational – failure upon switch on
Lamp photograph references:	Not applicable

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires: Continued/…

Table 12	
Lamp reference:	L3
Sample No:	3
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	Less than 1 hour operation
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – no discoloration to plastic
Lamp photograph references:	Not applicable

Table 13	
Lamp reference:	L3
Sample No:	4
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	Less than 1 hour operation
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – no discoloration to plastic
Lamp photograph references:	Not applicable

Table 14	
Lamp reference:	L2
Sample No:	3
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	63 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational - some discoloration to plastic
Lamp photograph references:	L2c and L2d

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test A: Bulkhead luminaires: Continued/…

Table 15	
Lamp reference:	L4
Sample No:	3
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	63 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational – no discoloration to plastic moulding
Lamp photograph references:	L4e and L4f

Table 16	
Lamp reference:	L2
Sample No:	4
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	42 hours maximum
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp non-operational - some discoloration to plastic
Lamp photograph references:	L2e and L2f

Table 17	
Lamp reference:	L1
Sample No:	2
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L1e and L1f

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

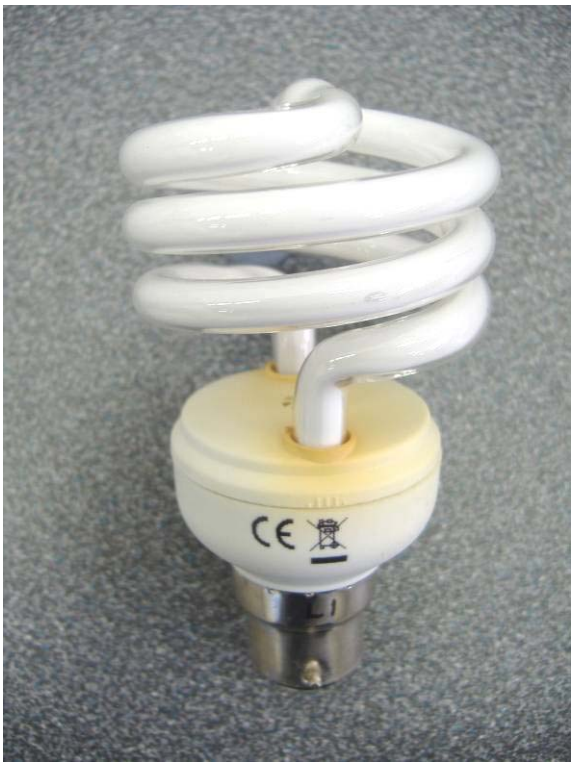
Test A: Bulkhead luminaires: Continued/…

Table 18	
Lamp reference:	L5
Sample No:	3
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp operational – no discoloration to plastic
Lamp photograph references:	L5c and L5d

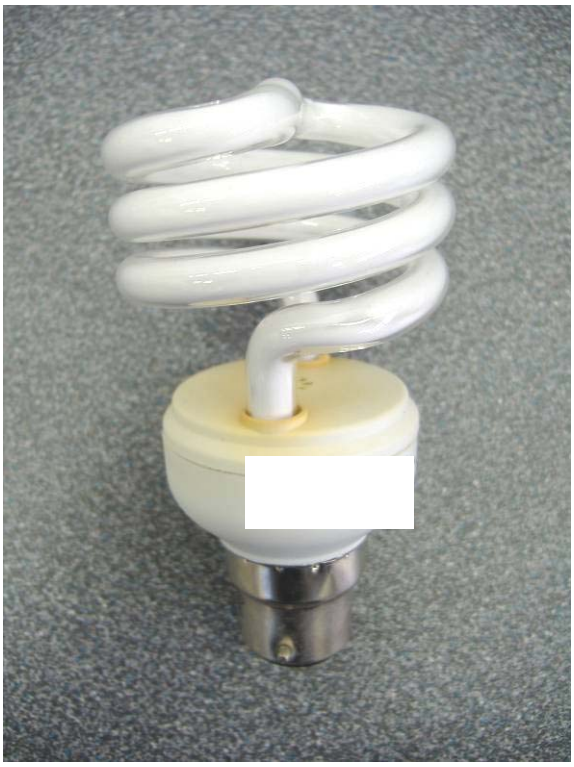
Table 19	
Lamp reference:	L4
Sample No:	4
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Luminaire:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L4g and L4h

PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES

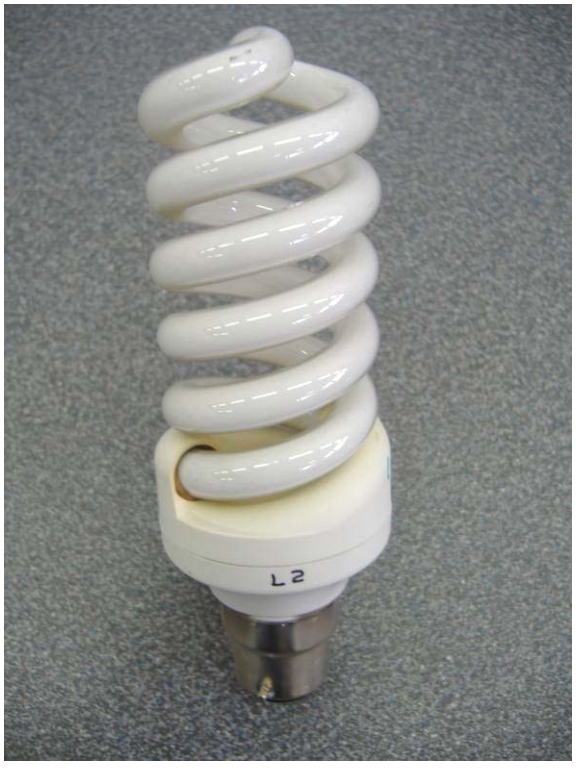
Photograph reference: L1a



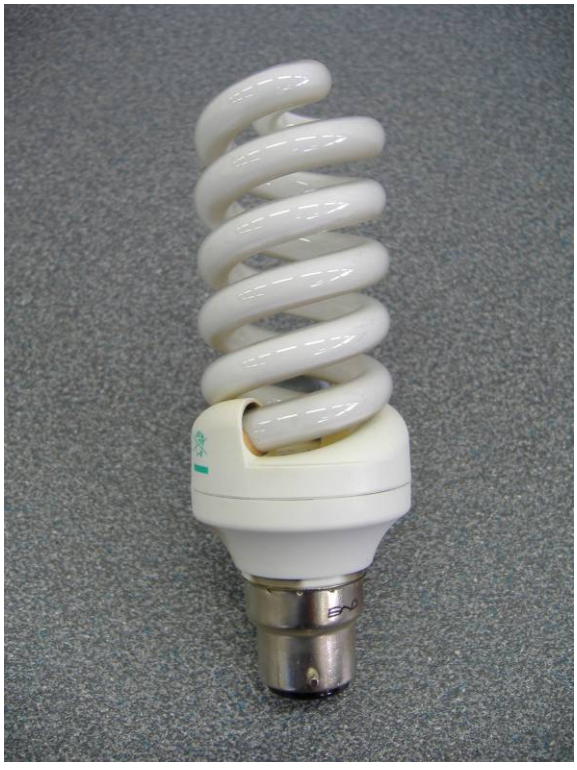
Photograph reference: L1b



Photograph reference: L2a

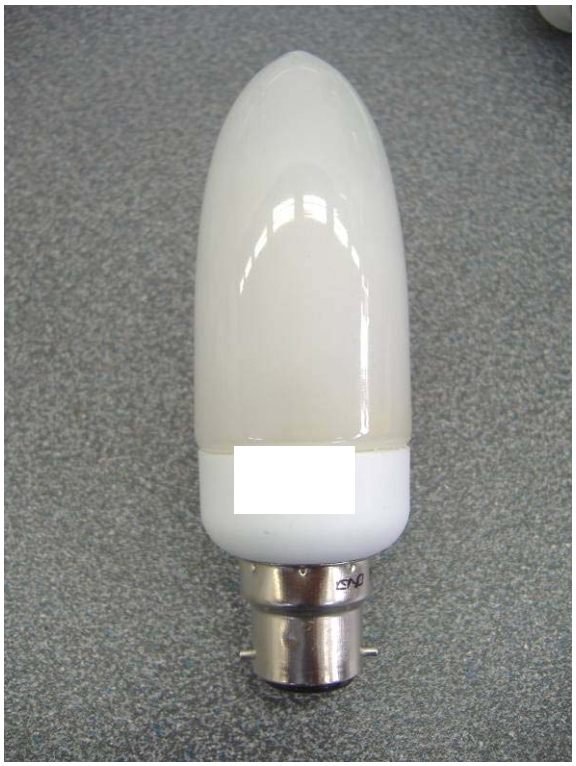


Photograph reference: L2b



PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

Photograph reference: L3a



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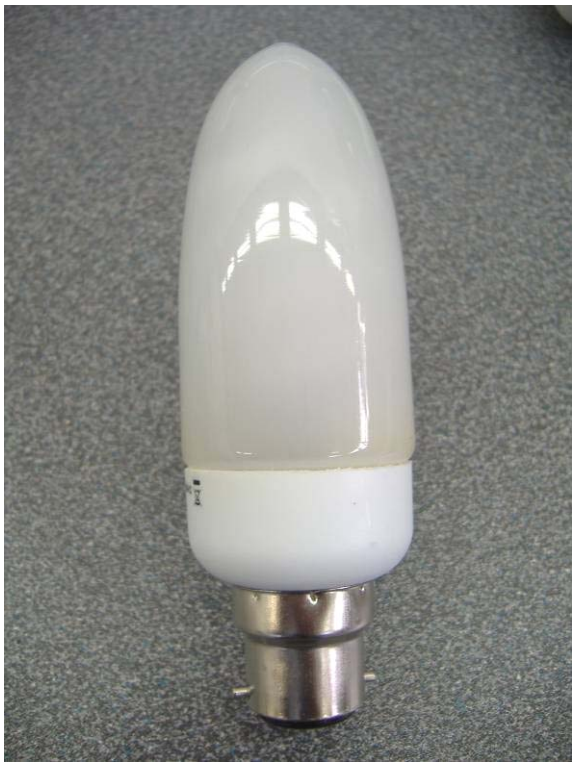

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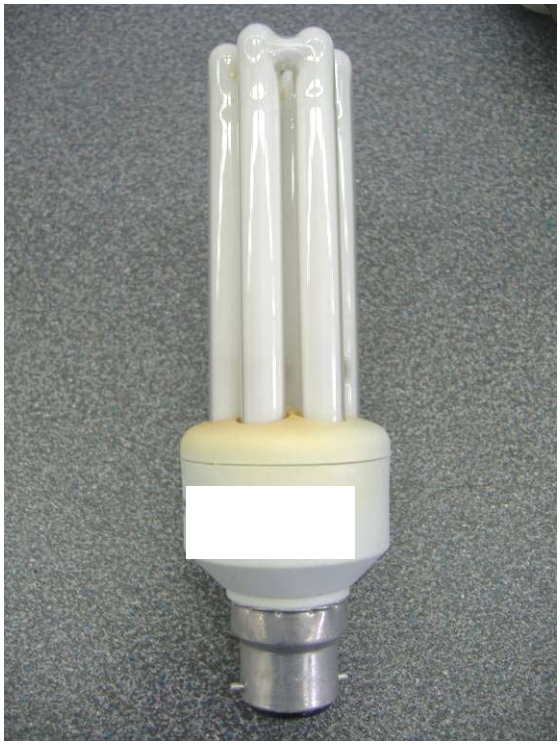

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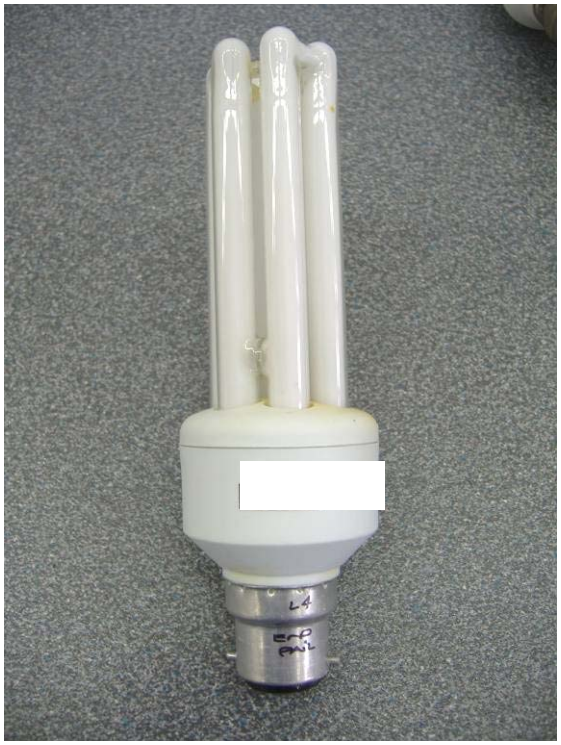
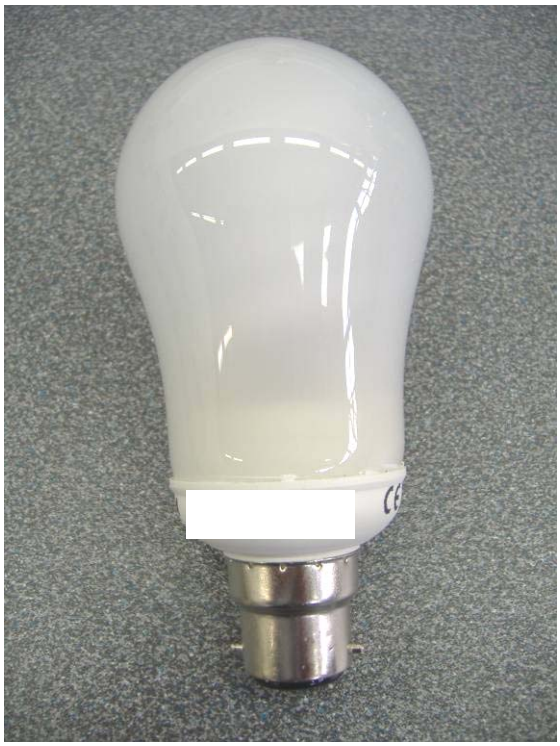


PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

Photograph reference: L5a



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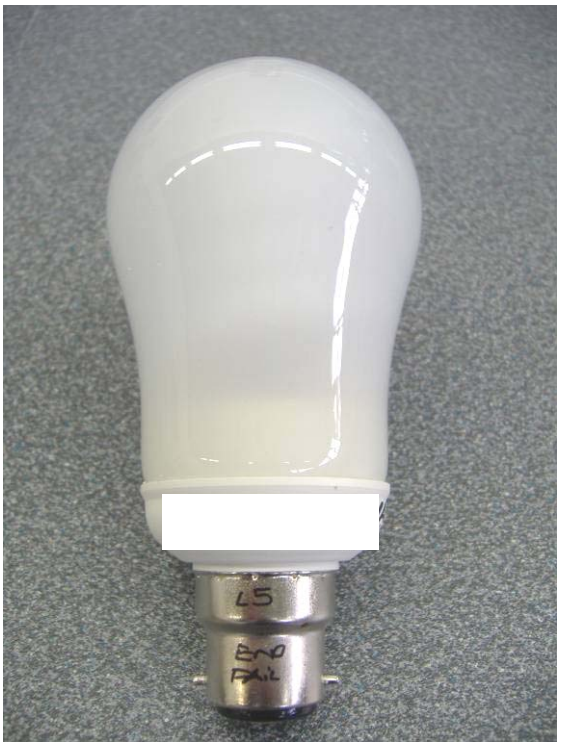

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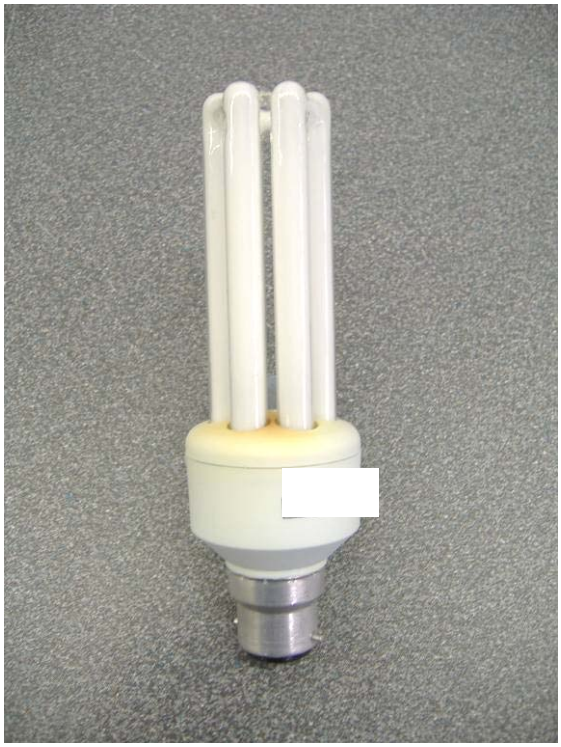

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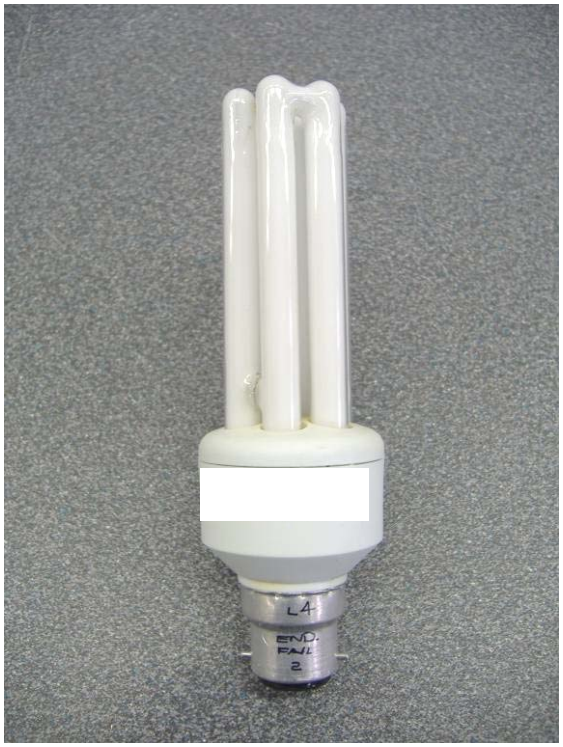

PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

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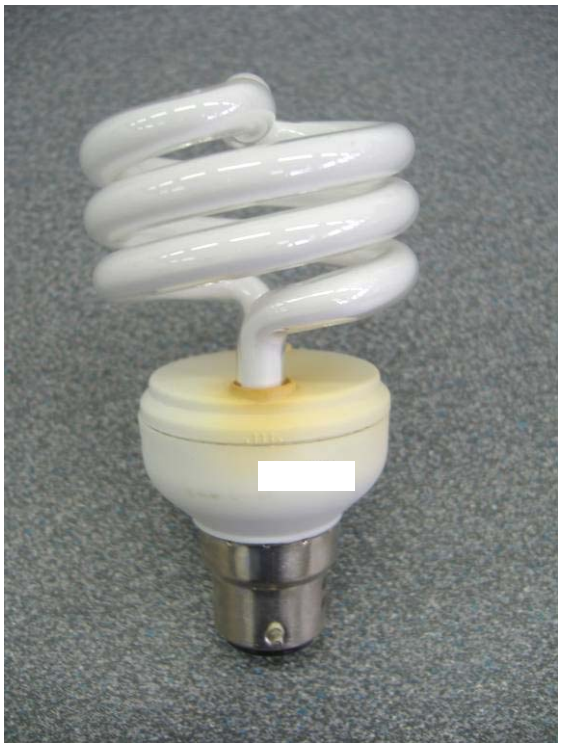

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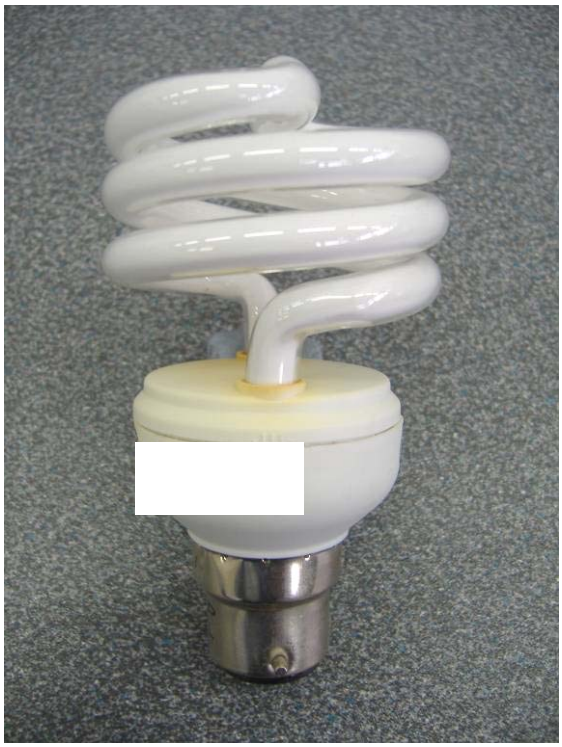

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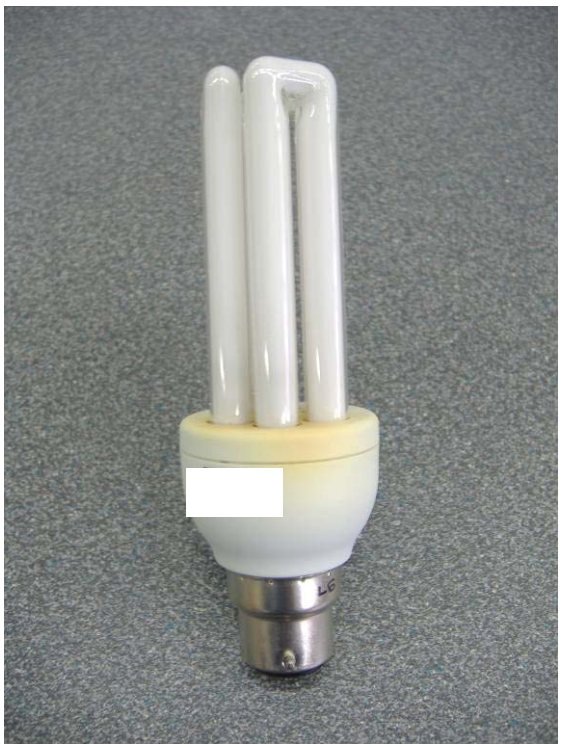

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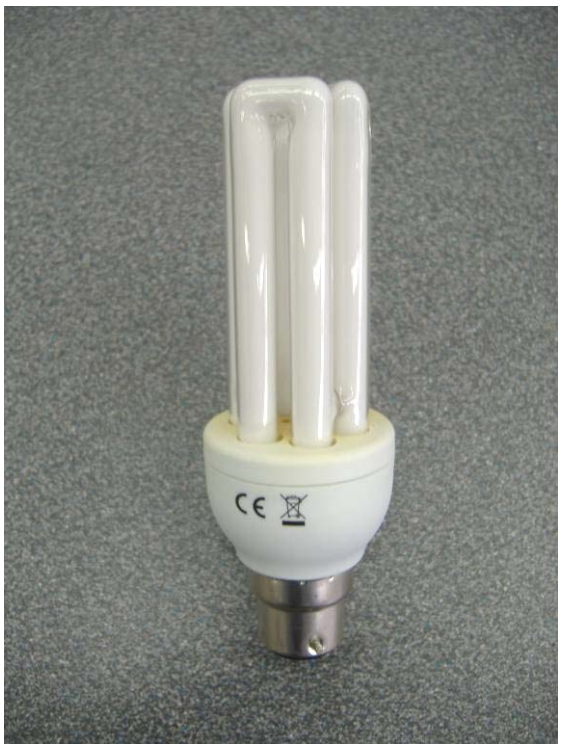

PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

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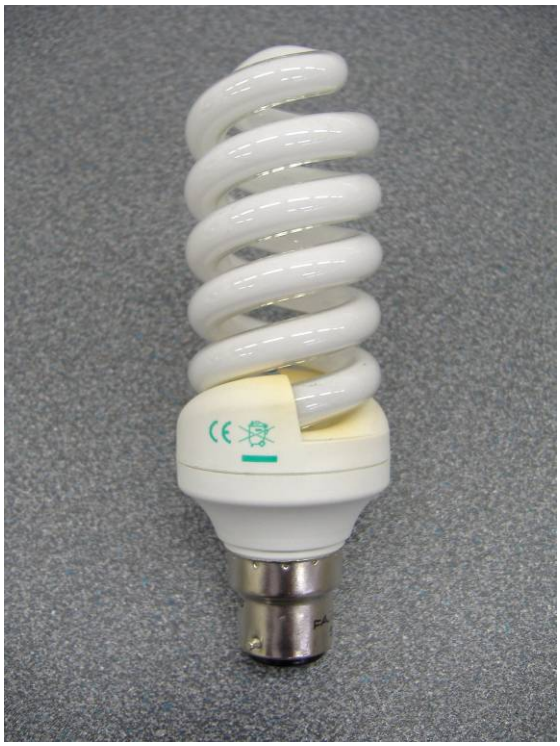

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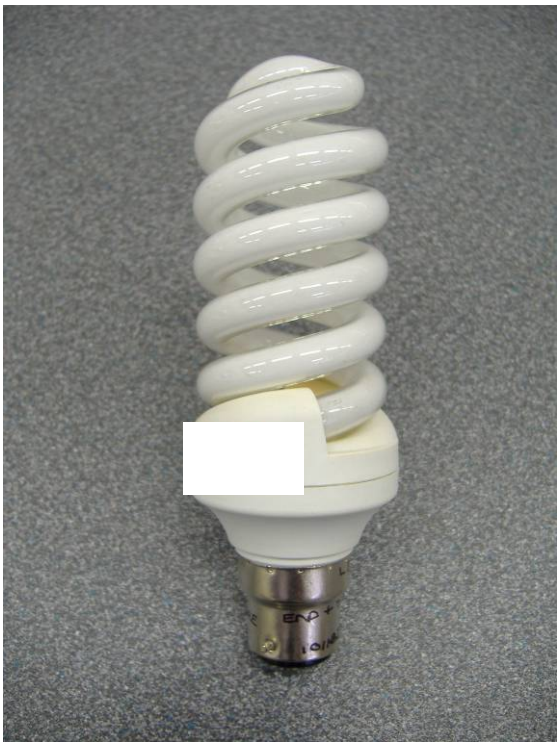
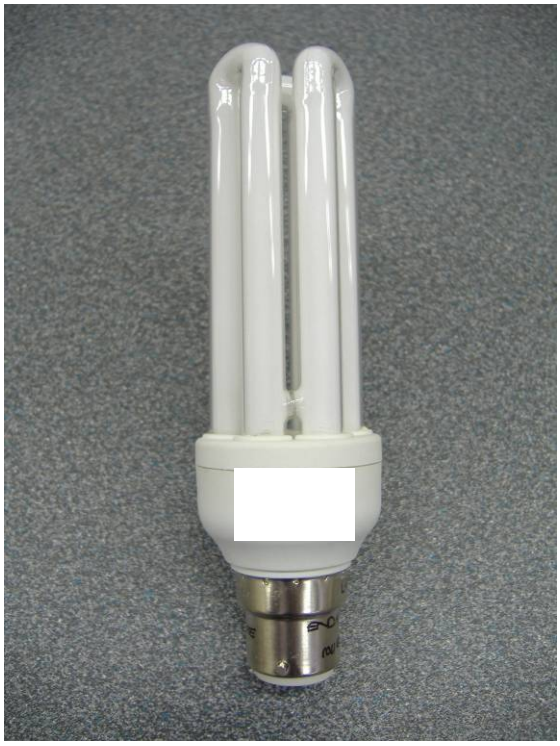


Photograph reference: L4e



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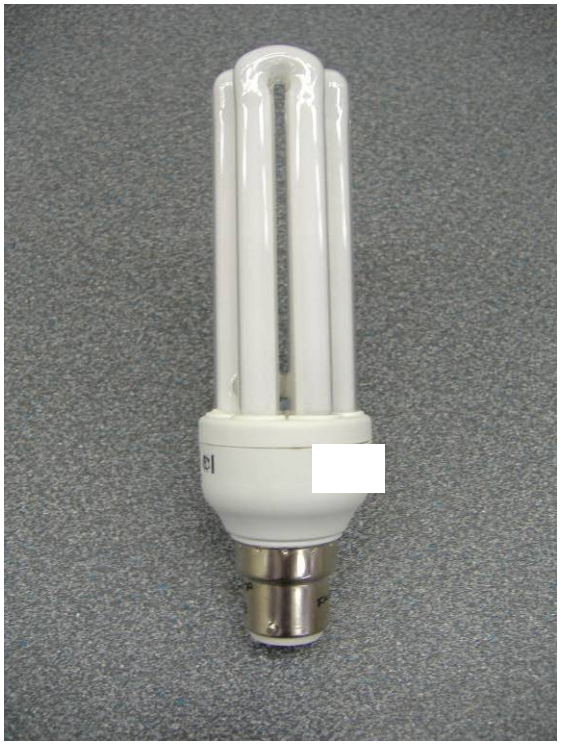

PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

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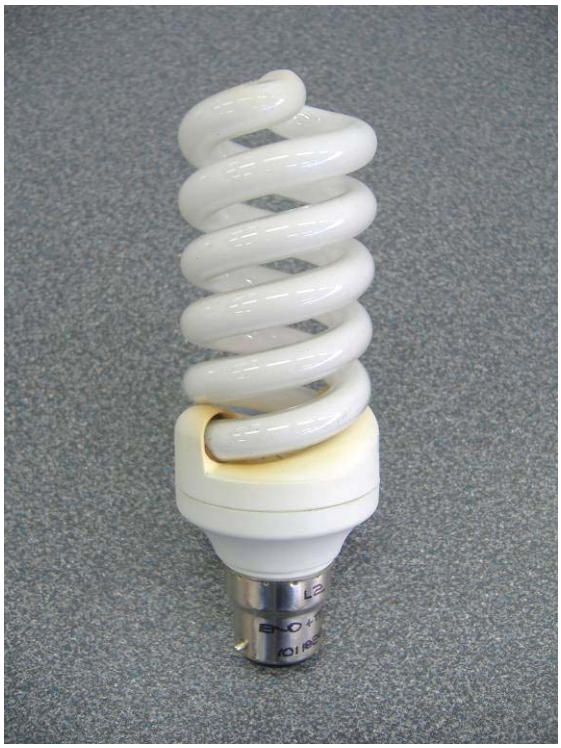

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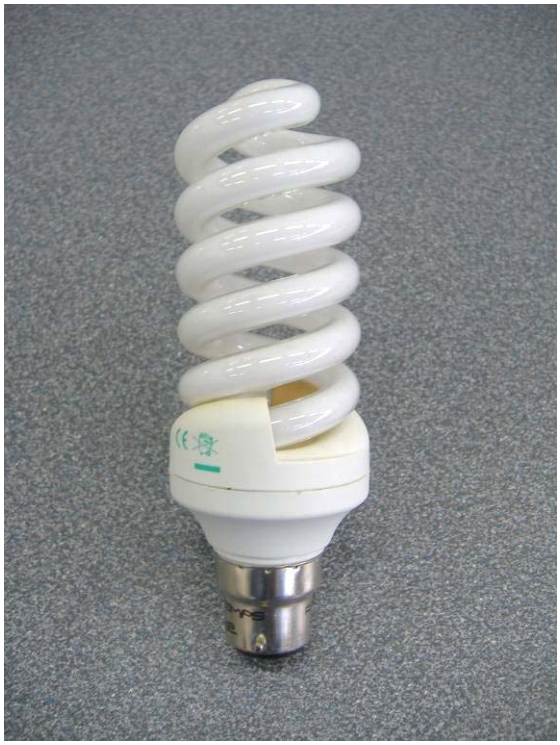

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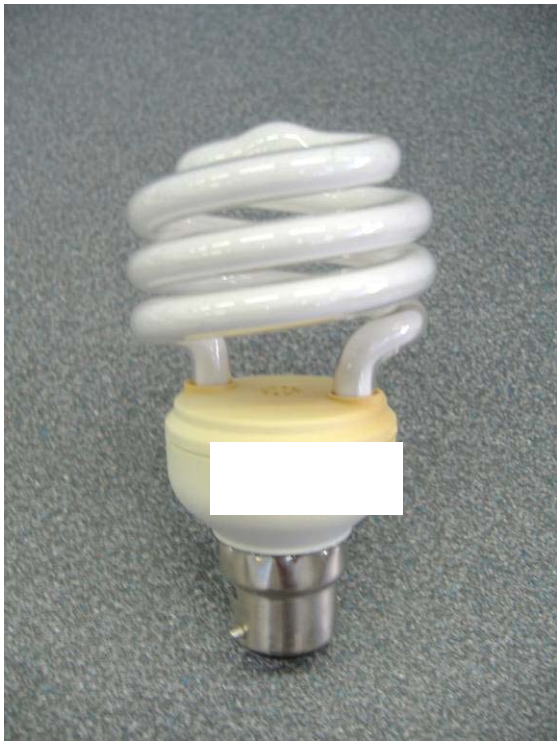

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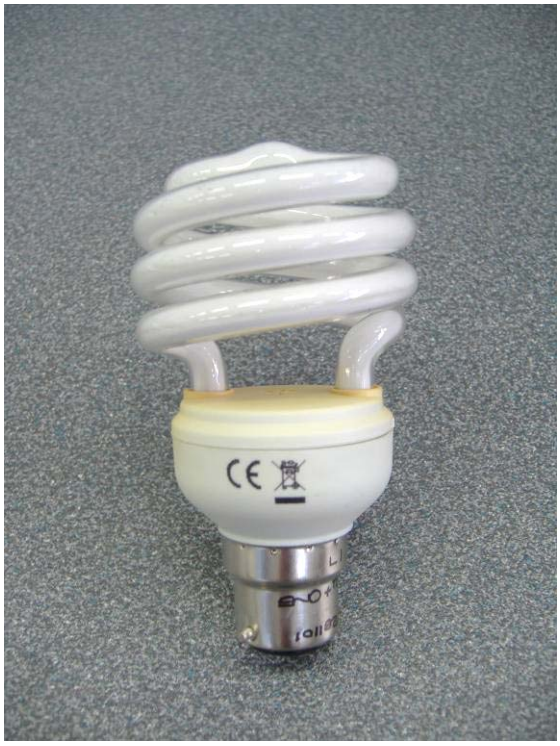
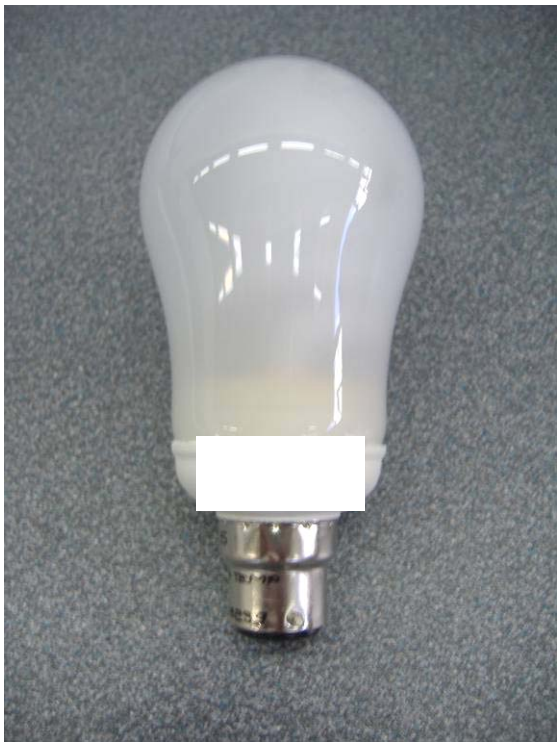
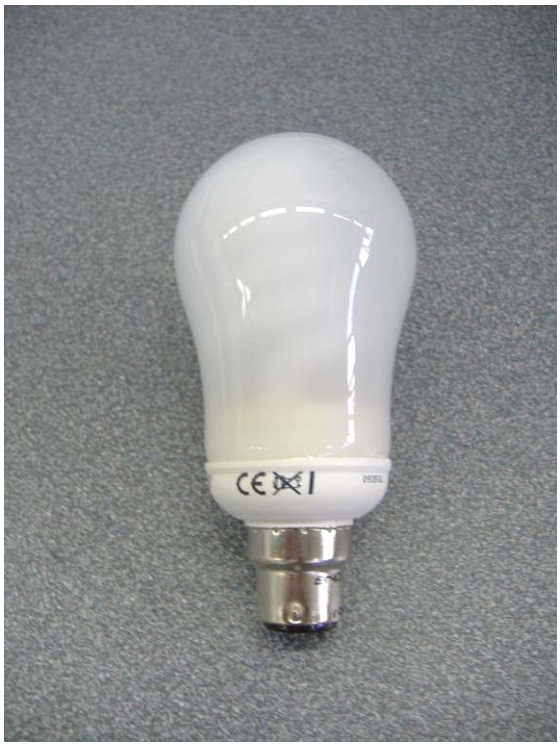


PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN BULKHEAD LUMINAIRES: Continued/…

Photograph reference: L5a



Photograph reference: L5b



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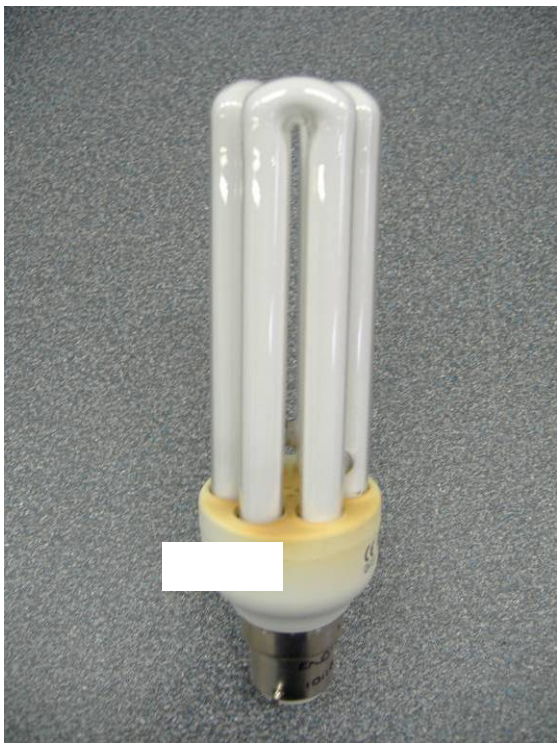
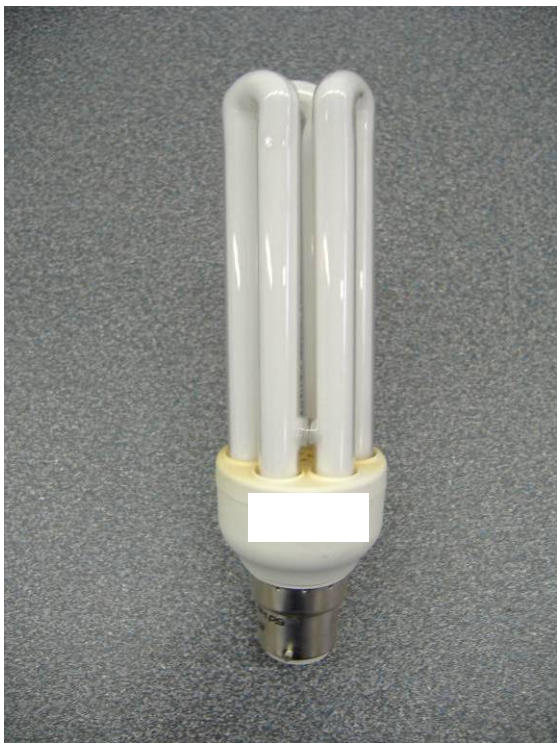


Photograph reference: L4h



RESULTS OF TESTS CONDUCTED

Clause 12.3 Thermal endurance

Test B: Pendant luminaire assemblies

The pendant luminaire assemblies were mounted on test boards to simulate a veiling mounted attitude, having been pre-painted matt black.

The set up was such that a cap-up lamp situation was created for worst case thermal conditions on the lamp.

The relevant requirements of the Specification were followed to create a test situation where the test chamber was maintained at a nominal temperature of 35ºC and that the samples were operated at a 10% over voltage value.

The aim was to subject the lamp and pendant luminaire combination to the required 240 hour operation, being cycled 21 hour lamp on and 3 hour lamp off.

The results of the tests applied to each combination are shown within Tables 20 to 26.

Table 20	
Lamp reference:	L1
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	Less than 210 hours
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp non-operational – some browning to plastic moulding
Lamp photograph references:	L1pa and L1pb

Table 21	
Lamp reference:	L2
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L2pa and L2pb

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

Test B: Pendant luminaire assemblies: Continued/…

Table 22	
Lamp reference:	L3
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – no browning to plastic moulding
Lamp photograph references:	L3pa and L3pb

Table 23	
Lamp reference:	L4
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L4pa and L4pb

Table 24	
Lamp reference:	L5
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – no browning to plastic moulding
Lamp photograph references:	L5pa and L5pb

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.3 Thermal endurance

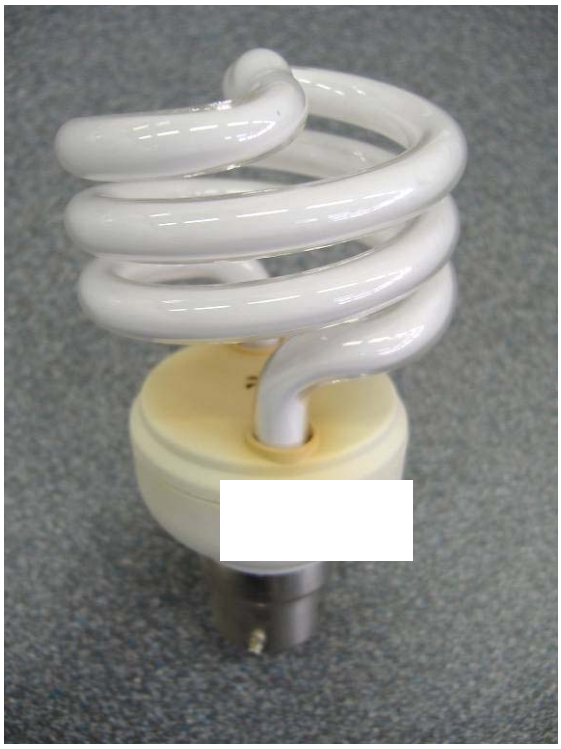
Test B: Pendant luminaire assemblies: Continued/…

Table 25	
Lamp reference:	L6
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L6pa and L6pb

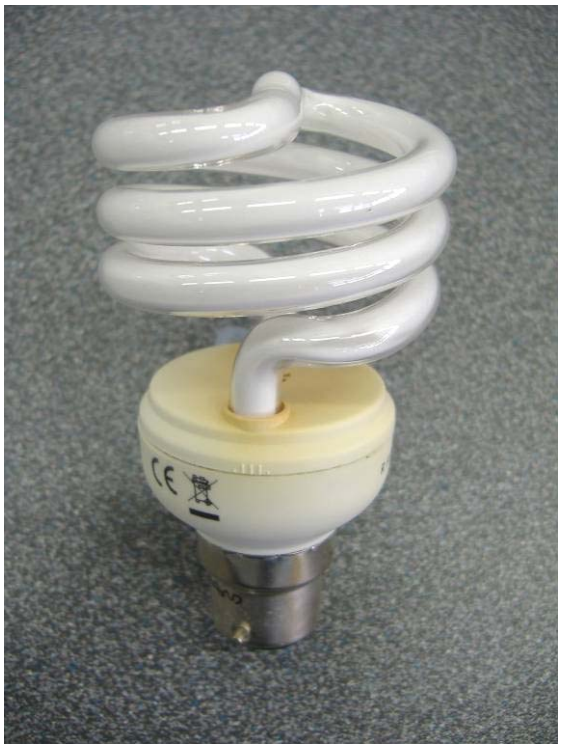
Table 26	
Lamp reference:	L1
Sample No:	1
Maximum lamp voltage:	240V~
Test voltage:	1.1 x 240 = 264V~
240 hour test period achieved:	No
Approximate hours run:	210 hours (10 cycles completed)
Condition of sample after test:	
Pendant set:	No damage or deterioration noted
Lamp:	Lamp operational – some browning to plastic moulding
Lamp photograph references:	L1pc and L1pd

PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN PENDANT LUMINAIRES

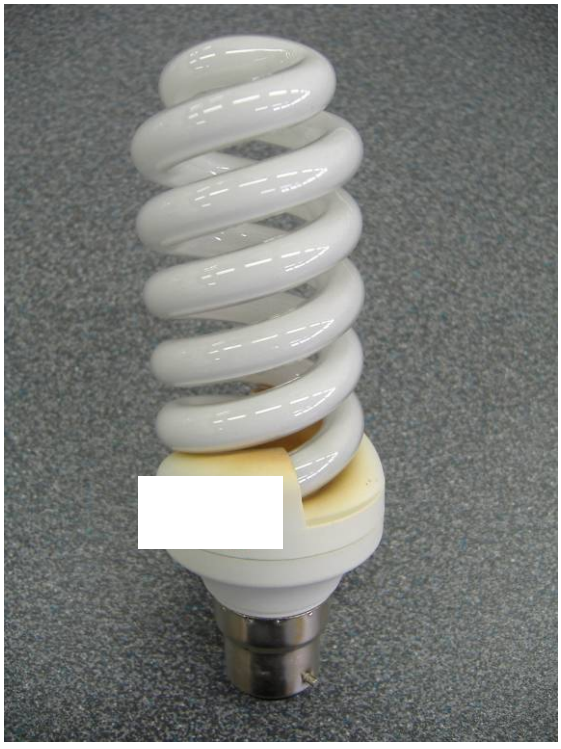
Photograph reference: L1pa



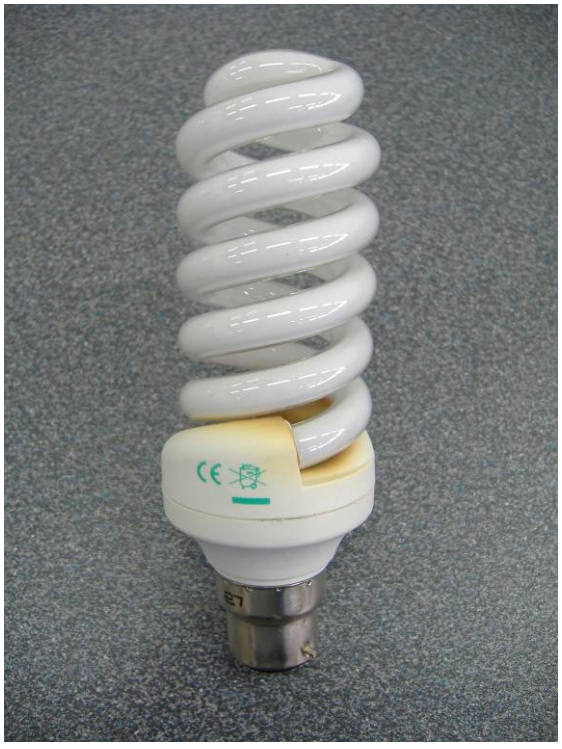
Photograph reference: L1pb



Photograph reference: L2pa

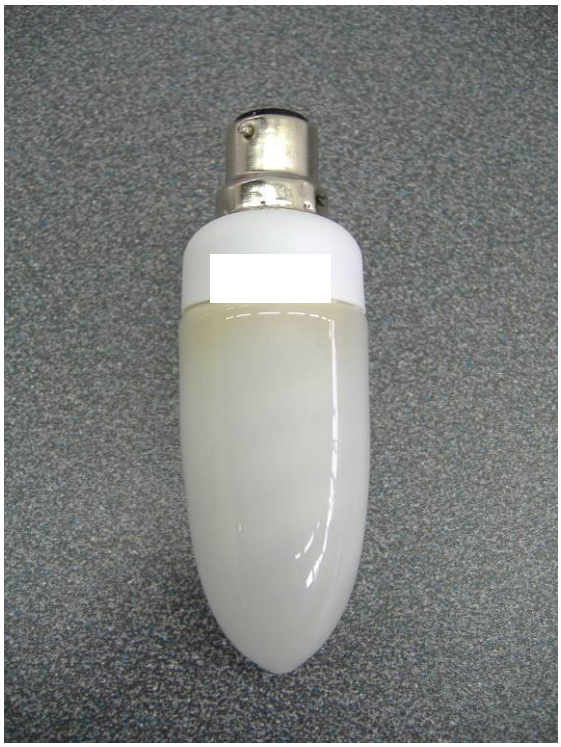


Photograph reference: L2pb

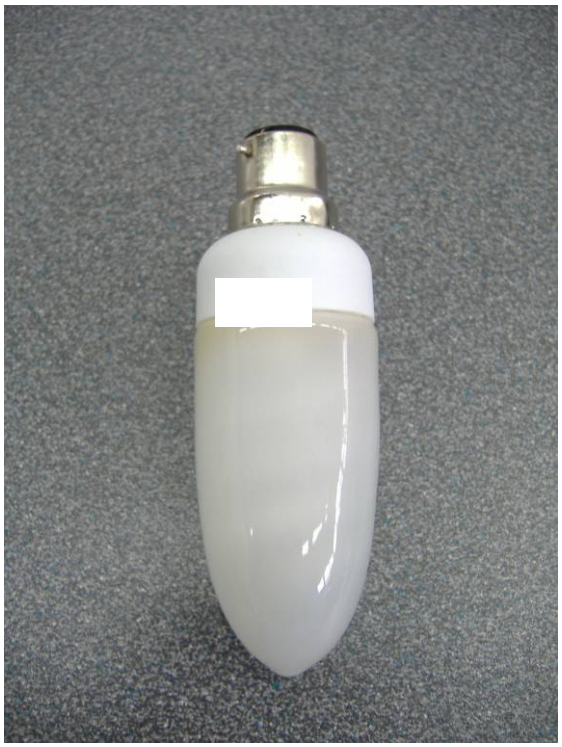


PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN PENDANT LUMINAIRES: Continued/…

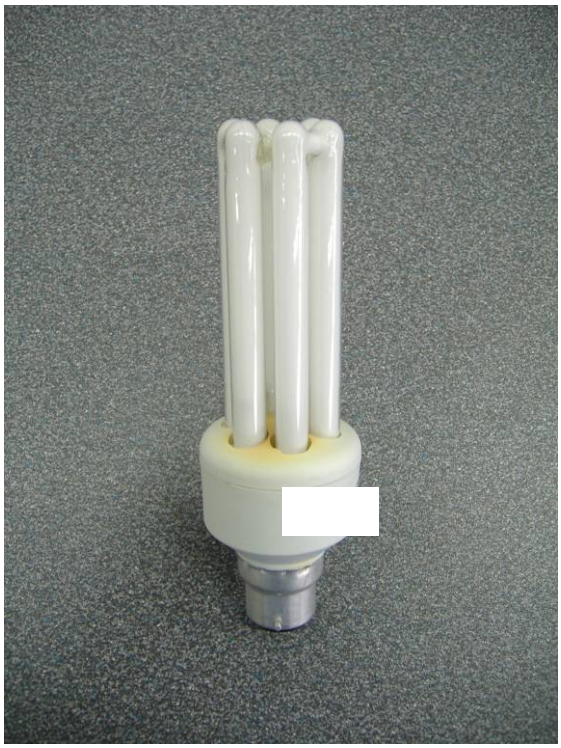
Photograph reference: L3pa



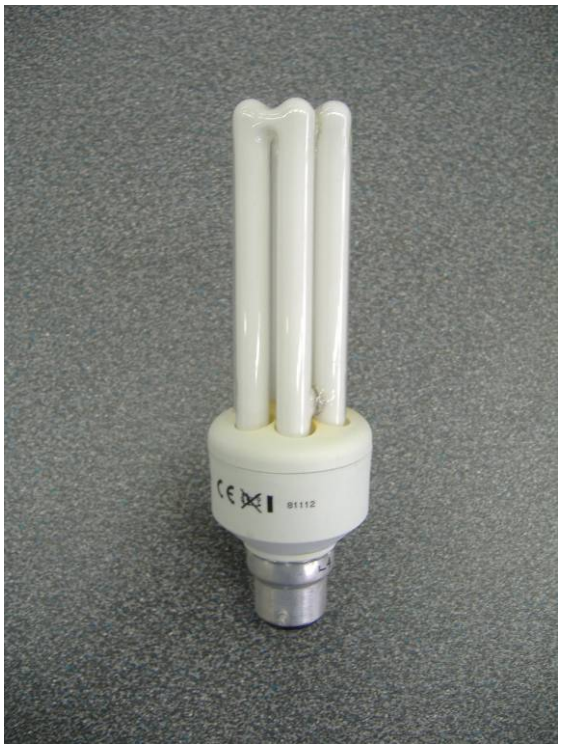
Photograph reference: L3pb



Photograph reference: L4pa

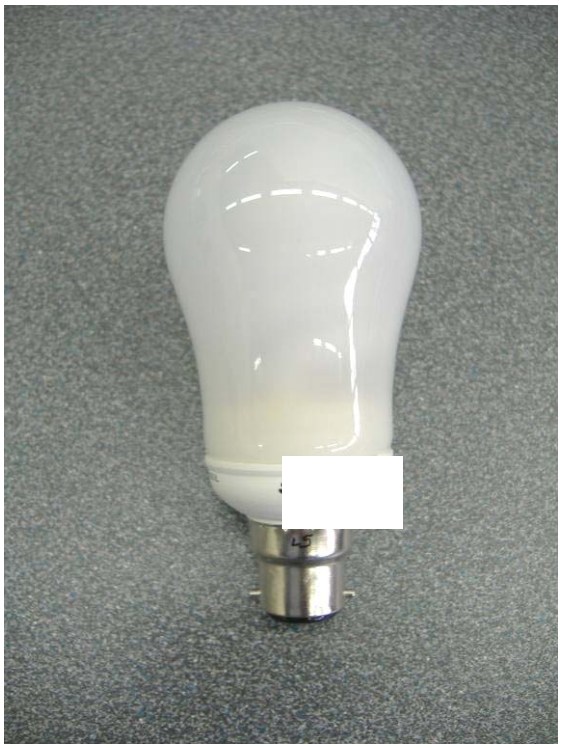


Photograph reference: L4pb

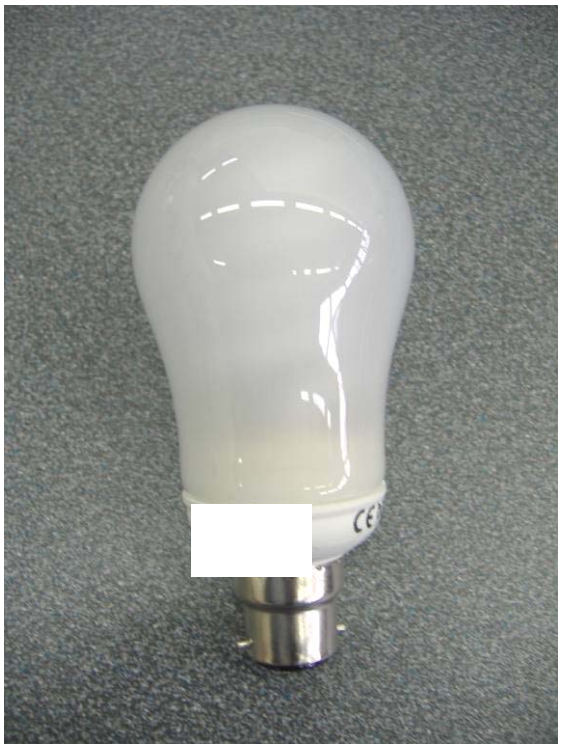


PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN PENDANT LUMINAIRES: Continued/…

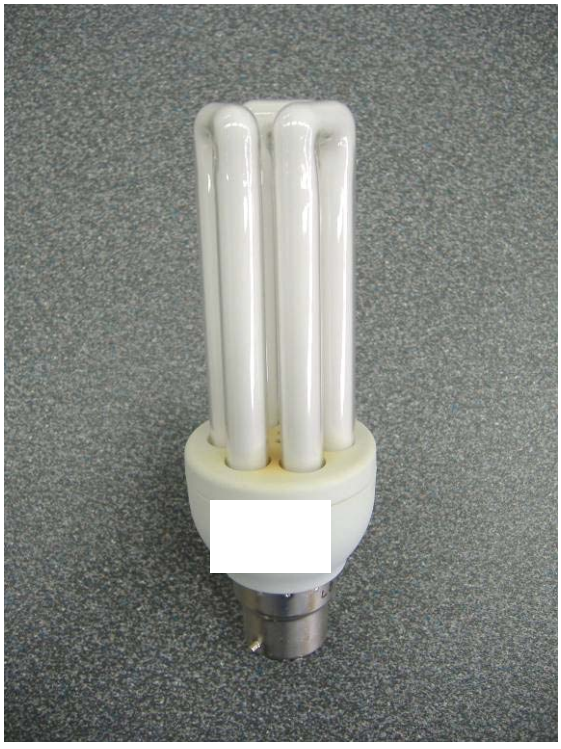
Photograph reference: L5pa



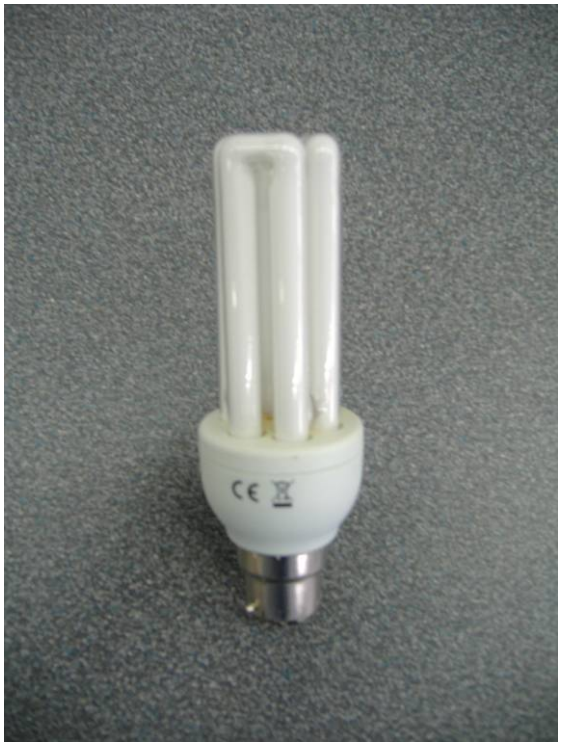
Photograph reference: L5pb



Photograph reference: L6pa

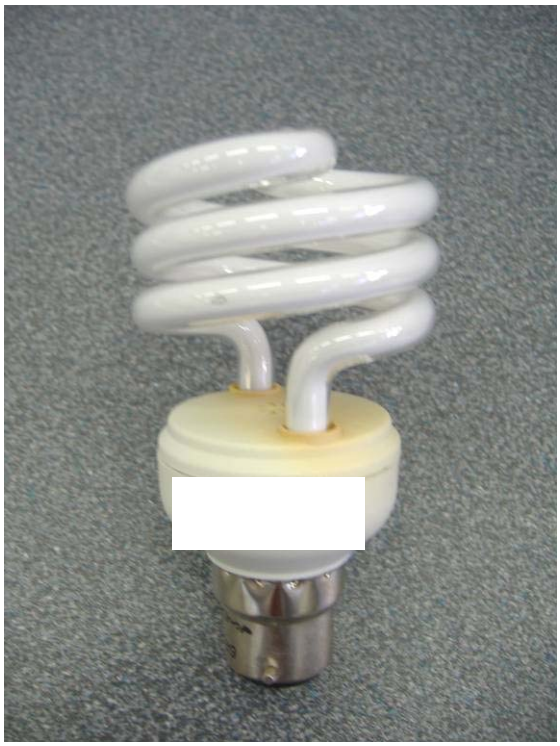


Photograph reference: L6pb

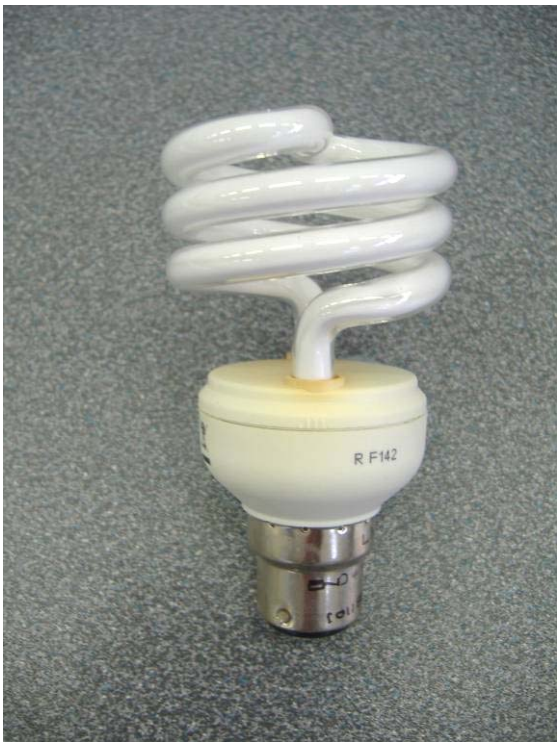


PHOTOGRAPHIC EVIDENCE OF LAMPS SUBJECTED TO THERMAL ENDURANCE TEST CONDITIONS WHEN FITTED IN PENDANT LUMINAIRES: Continued/…

Photograph reference: L1pc



Photograph reference: L1pd



RESULTS OF TESTS CONDUCTED:

Clause 12.4 Thermal test (Normal operation)

Test A: Bulkhead luminaires

The luminaires were mounted on test boards to simulate a wall mounted attitude, having been pre-painted matt black.

The set up was such that a cap-up lamp situation was created for worst case thermal conditions on the lamp.

The relevant requirements of the Specification were followed to create a test situation where the test chamber was maintained at the nominal Laboratory temperature and the lamp / luminaire combination operated within a draught free environment.

Each lamp and luminaire combination was operated at the maximum of the marked voltage range and then repeated at 1.06 times the maximum of the marked voltage range.

As the samples were commercially available items purchased for testing purposes, plastic material types used in the various luminaire and lamp mouldings were of an unknown type. Therefore, the plastic parts measured could not be assigned a temperature limit and a determination of compliance could not be stated.

The above statement also applies to the rubber gasket use on the luminaire and the rubber cable grommet used on the supply cable entry point.

The results of the tests applied to each combination are shown within Tables 27 to 32, with all results corrected for an ambient temperature of 25ºC.

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L1 in bulkhead luminaire

Table 27			
Lamp reference	L1		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	240.1	254.1	
Current	0.139	00.142	
Wattage	17.9	19.3	
VA	33.2	36.0	
Power factor	0.54	0.54	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	36	36	90
Luminaire:			
Gasket material	38	39	Unknown
Rubber cable grommet	32	33	Unknown
Base moulding: Internal	44	45	Unknown
Diffuser moulding: Internal	51	54	Unknown
Lampholder (ceramic)	74	78	-
Metal reflector	72	76	-
Earth supply wire insulation at earth termination (sleeved)	57	59	120
Live supply wire insulation at earth termination (sleeved)	68	70	120
Neutral supply wire insulation at earth termination (sleeved)	66	68	120
Lamp:			
Lamp cap	85	90	150
Moulding adjacent glass	110	114	Unknown
Lamp glass	124	129	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L2 in bulkhead luminaire

Table 28			
Lamp reference	L2		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.6	254.3	
Current	0.162	0.158	
Wattage	20.6	21.8	
VA	38.8	40.4	
Power factor	0.53	0.54	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	39	39	90
Luminaire:			
Gasket material	40	40	Unknown
Rubber cable grommet	35	35	Unknown
Base moulding: Internal	46	47	Unknown
Diffuser moulding: Internal	56	57	Unknown
Lampholder (ceramic)	82	85	-
Metal reflector	82	103	-
Earth supply wire insulation at earth termination (sleeved)	61	62	120
Live supply wire insulation at earth termination (sleeved)	75	76	120
Neutral supply wire insulation at earth termination (sleeved)	72	74	120
Lamp:			
Lamp cap	97	100	150
Moulding adjacent glass	148	154	Unknown
Lamp glass	160	164	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L3 in bulkhead luminaire

Table 29			
Lamp reference	L3		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	NM	NM	
Current	NM	NM	
Wattage	NM	NM	
VA	NM	NM	
Power factor	NM	NM	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	NM	NT	90
Luminaire:			
Gasket material	36	NT	Unknown
Rubber cable grommet	30	NT	Unknown
Base moulding: Internal	37	NT	Unknown
Diffuser moulding: Internal	45	NT	Unknown
Lampholder (ceramic)	69	NT	-
Metal reflector	47	NT	-
Earth supply wire insulation at earth termination (sleeved)	49	NT	120
Live supply wire insulation at earth termination (sleeved)	64	NT	120
Neutral supply wire insulation at earth termination (sleeved)	61	NT	120
Lamp:			
Lamp cap	90	NT	150
Moulding adjacent glass	97	NT	Unknown
Lamp glass (outer candle glass)	72	NT	-

Notes
The results shown for Test 1 are those recorded at the time of lamp failure under the specified test conditions. As no further lamps were available, the testing was suspended at this point.
NM & NT – Test circuit conditions and temperature measurements not tested due to lamp failure.

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L4 in bulkhead luminaire

Table 30			
Lamp reference	L4		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.5	254.3	
Current	0.136	0.138	
Wattage	17.4	18.6	
VA	32.6	35.1	
Power factor	0.53	0.53	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	36	36	90
Luminaire:			
Gasket material	36	37	Unknown
Rubber cable grommet	33	34	Unknown
Base moulding: Internal	43	45	Unknown
Diffuser moulding: Internal	53	55	Unknown
Lampholder (ceramic)	74	75	-
Metal reflector	67	71	-
Earth supply wire insulation at earth termination (sleeved)	56	57	120
Live supply wire insulation at earth termination (sleeved)	68	71	120
Neutral supply wire insulation at earth termination (sleeved)	67	70	120
Lamp:			
Lamp cap	87	91	150
Moulding adjacent glass	103	108	Unknown
Lamp glass	149	155	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L5 in bulkhead luminaire

Table 31			
Lamp reference	L5		
Marked lamp voltage range	230-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	240.1	253.8	
Current	0.096	0.098	
Wattage	12.6	13.4	
VA	23.0	25.1	
Power factor	00.55	0.53	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	34	35	90
Luminaire:			
Gasket material	36	37	Unknown
Rubber cable grommet	32	33	Unknown
Base moulding: Internal	41	42	Unknown
Diffuser moulding: Internal	45	47	Unknown
Lampholder (ceramic)	65	67	-
Metal reflector	54	53	-
Earth supply wire insulation at earth termination (sleeved)	51	53	120
Live supply wire insulation at earth termination (sleeved)	61	63	120
Neutral supply wire insulation at earth termination (sleeved)	62	64	120
Lamp:			
Lamp cap	81	85	150
Moulding adjacent glass	77	79	Unknown
Lamp glass	85	78	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L6 in bulkhead luminaire

Table 32			
Lamp reference	L6		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	240.7	254.3	
Current	0.112	0.107	
Wattage	13.8	15.0	
VA	27.0	27.2	
Power factor	0.51	0.55	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	37	37	90
Luminaire:			
Gasket material	37	38	Unknown
Rubber cable grommet	32	32	Unknown
Base moulding: Internal	39	40	Unknown
Diffuser moulding: Internal	46	48	Unknown
Lampholder (ceramic)	71	75	-
Metal reflector	67	70	-
Live supply wire insulation at earth termination (sleeved)	63	66	120
Neutral supply wire insulation at earth termination (sleeved)	62	65	120
Lamp:			
Lamp cap	84	89	150
Moulding adjacent glass	88	93	Unknown
Lamp glass (limb)	157	163	-

RESULTS OF TESTS CONDUCTED:

Clause 12.4 Thermal test (Normal operation)

Test B: Pendant luminaire assemblies

The luminaires were mounted on test boards to simulate a ceiling mounted attitude, having been pre-painted matt black.

The set up was such that a cap-up lamp situation was created for worst case thermal conditions on the lamp.

The relevant requirements of the Specification were followed to create a test situation where the test chamber was maintained at the nominal Laboratory temperature and the lamp / pendant set combination operated within a draught free environment.

Each lamp and luminaire combination was operated at the maximum of the marked voltage range and then repeated at 1.06 times the maximum of the marked voltage range.

As the samples were commercially available items purchased for testing purposes, plastic material types used in the various luminaire and pendant set mouldings were of an unknown type. Therefore, the plastic parts measured could not be assigned a temperature limit and a determination of compliance could not be stated.

The results of the tests applied to each combination are shown within Tables 33 to 38, with all results corrected for an ambient temperature of 25ºC.

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L1 with pendant set

Table 33			
Lamp reference	L1		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.7	253.7	
Current	0.124	0.124	
Wattage	18.0	19.0	
VA	29.7	31.5	
Power factor	0.61	0.60	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	28	30	90
Pendant set:			
Ceiling rose: Mounting plate	29	31	Unknown
Ceiling rose: Cover plate	29	31	Unknown
Neutral supply wire insulation at ceiling rose terminal	31	32	90
Live wiring insulation at lampholder terminal	50	53	90
Neutral wiring insulation at lampholder terminal	51	53	90
Lampholder (plastic)	73	79	Unknown
Glass shade	48	52	-
Shade reducer (metal)	59	62	-
Lamp:			
Lamp cap	81	87	150
Moulding adjacent glass	98	98	Unknown
Lamp glass	144	150	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L2 with pendant set

Table 34			
Lamp reference	L2		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.9	254.1	
Current	0.176	0.173	
Wattage	22.6	23.6	
VA	42.3	43.6	
Power factor	0.53	0.54	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	29	30	90
Pendant set:			
Ceiling rose: Mounting plate	29	30	Unknown
Ceiling rose: Cover plate	31	33	Unknown
Neutral supply wire insulation at ceiling rose terminal	29	31	90
Live wiring insulation at lampholder terminal	50	53	90
Neutral wiring insulation at lampholder terminal	52	54	90
Lampholder (plastic)	73	77	Unknown
Glass shade	52	53	-
Shade reducer (metal)	60	65	-
Lamp:			
Lamp cap	80	84	150
Moulding adjacent glass	101	104	Unknown
Lamp glass	134	150	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L3 with pendant set

Table 35			
Lamp reference	L3		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	NT	NT	
Current	NT	NT	
Wattage	NT	NT	
VA	NT	NT	
Power factor	NT	NT	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	NT	NT	90
Pendant set:			
Ceiling rose: Mounting plate	NT	NT	Unknown
Ceiling rose: Cover plate	NT	NT	Unknown
Neutral supply wire insulation at ceiling rose terminal	NT	NT	90
Live wiring insulation at lampholder terminal	NT	NT	90
Neutral wiring insulation at lampholder terminal	NT	NT	90
Lampholder (plastic)	NT	NT	Unknown
Glass shade	NT	NT	-
Shade reducer (metal)	NT	NT	-
Lamp:			
Lamp cap	NT	NT	150
Moulding adjacent glass	NT	NT	Unknown
Lamp glass	NT	NT	-

Note

The sample was connected to the measurement system by the application of type K thermocouples to the points mentioned above. However, upon application of the mains voltage, it was noted that the lamp was non-operational.
As no further samples of this lamp were available, testing was suspended at this point.

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L4 with pendant set

Table 36			
Lamp reference	L4		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.8	253.4	
Current	0.148	0.150	
Wattage	20.2	21.6	
VA	35.5	38.0	
Power factor	0.57	0.57	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	29	29	90
Pendant set:			
Ceiling rose: Mounting plate	30	30	Unknown
Ceiling rose: Cover plate	31	32	Unknown
Neutral supply wire insulation at ceiling rose terminal	30	30	90
Live wiring insulation at lampholder terminal	47	49	90
Neutral wiring insulation at lampholder terminal	49	50	90
Lampholder (plastic)	67	69	Unknown
Glass shade	45	47	-
Shade reducer (metal)	57	58	-
Lamp:			
Lamp cap	75	79	150
Moulding adjacent glass	133	137	Unknown
Lamp glass (limb)	133	141	-

RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L5 with pendant set

Table 37			
Lamp reference	L5		
Marked lamp voltage range	230-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.8	253.8	
Current	0.102	0.100	
Wattage	13.3	13.9	
VA	24.6	25.4	
Power factor	0.54	0.55	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	27	27	90
Pendant set:			
Ceiling rose: Mounting plate	28	28	Unknown
Ceiling rose: Cover plate	29	29	Unknown
Neutral supply wire insulation at ceiling rose terminal	29	28	90
Live wiring insulation at lampholder terminal	44	45	90
Neutral wiring insulation at lampholder terminal	45	46	90
Lampholder (plastic)	62	66	Unknown
Glass shade	44	45	-
Shade reducer (metal)	49	51	-
Lamp:			
Lamp cap	74	78	150
Moulding adjacent glass	80	81	Unknown
Lamp glass (outer cover)	92	94	-

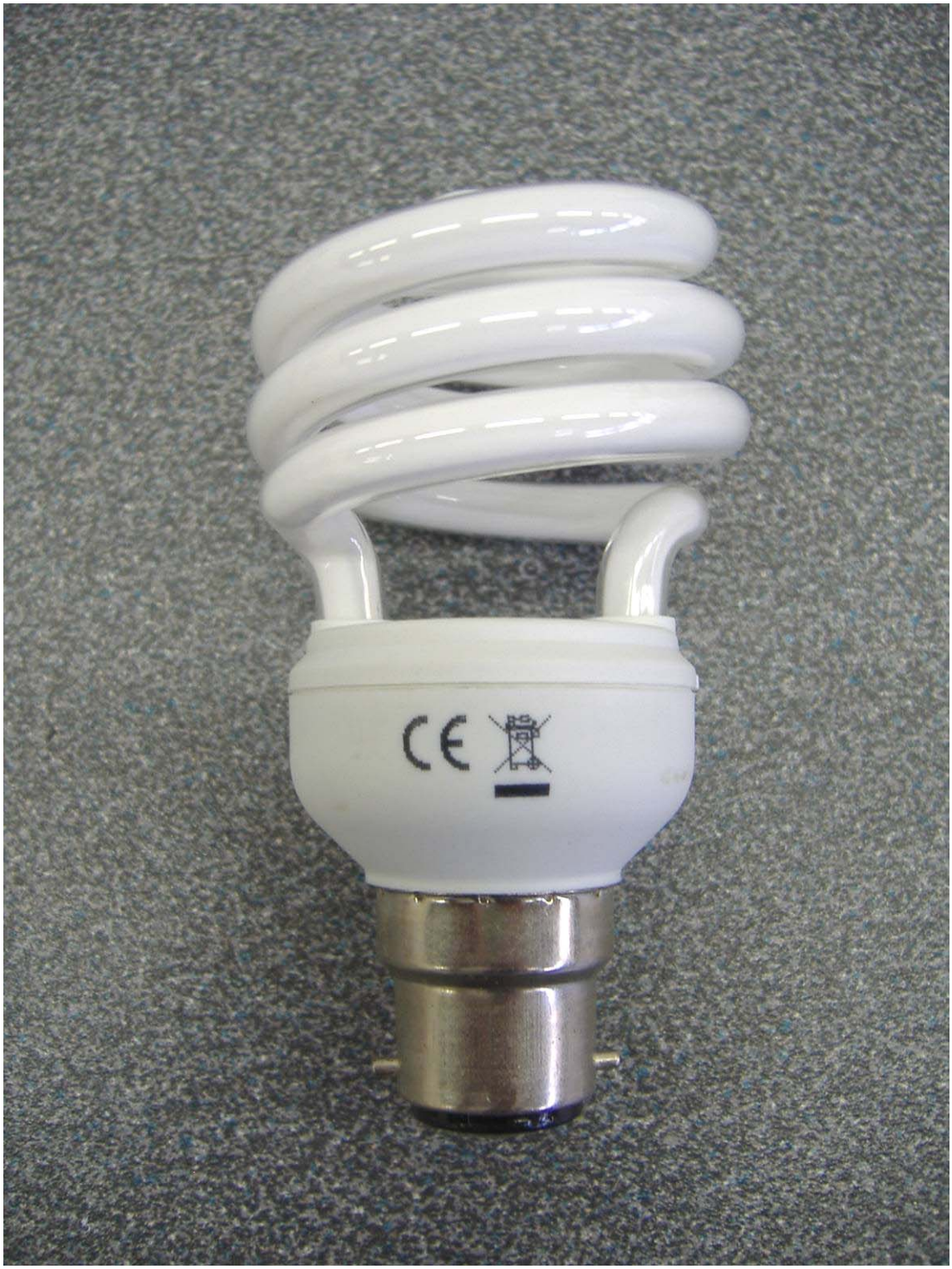
RESULTS OF TESTS CONDUCTED: Continued/…

Clause 12.4 Thermal test (Normal operation): Lamp reference L6 with pendant set

Table 38			
Lamp reference	L6		
Marked lamp voltage range	220-240V~		
Test voltage: Test 1	240V~		
Test voltage: Test 2	1.06 x 240 = 254.4V~		
Circuit conditions	Test 1	Test 2	
Voltage	239.9	254.7	
Current	0.117	0.120	
Wattage	15.3	16.3	
VA	28.3	30.2	
Power factor	0.54	0.54	
Thermocouple locations	Measured temperatures: ºC		Limits: ºC
	Test 1	Test 2	
Mounting surface	28	28	90
Pendant set:			
Ceiling rose: Mounting plate	28	28	Unknown
Ceiling rose: Cover plate	29	29	Unknown
Neutral supply wire insulation at ceiling rose terminal	29	28	90
Live wiring insulation at lampholder terminal	45	46	90
Neutral wiring insulation at lampholder terminal	46	47	90
Lampholder (plastic)	62	64	Unknown
Glass shade	41	43	-
Shade reducer (metal)	53	54	-
Lamp:			
Lamp cap	73	76	150
Moulding adjacent glass	112	117	Unknown
Lamp glass (limb)	131	136	-

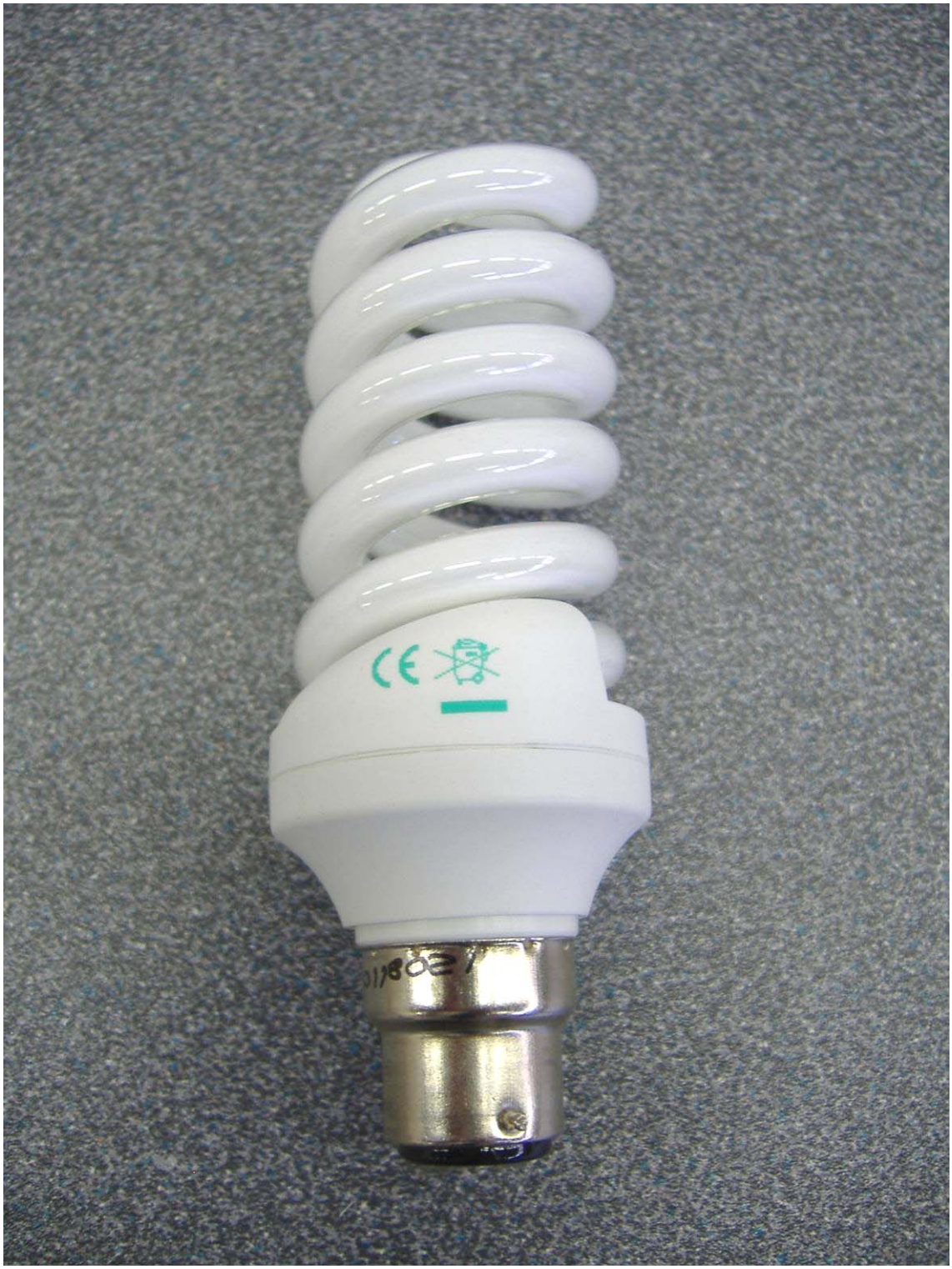
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED

Lamp sample reference: L1



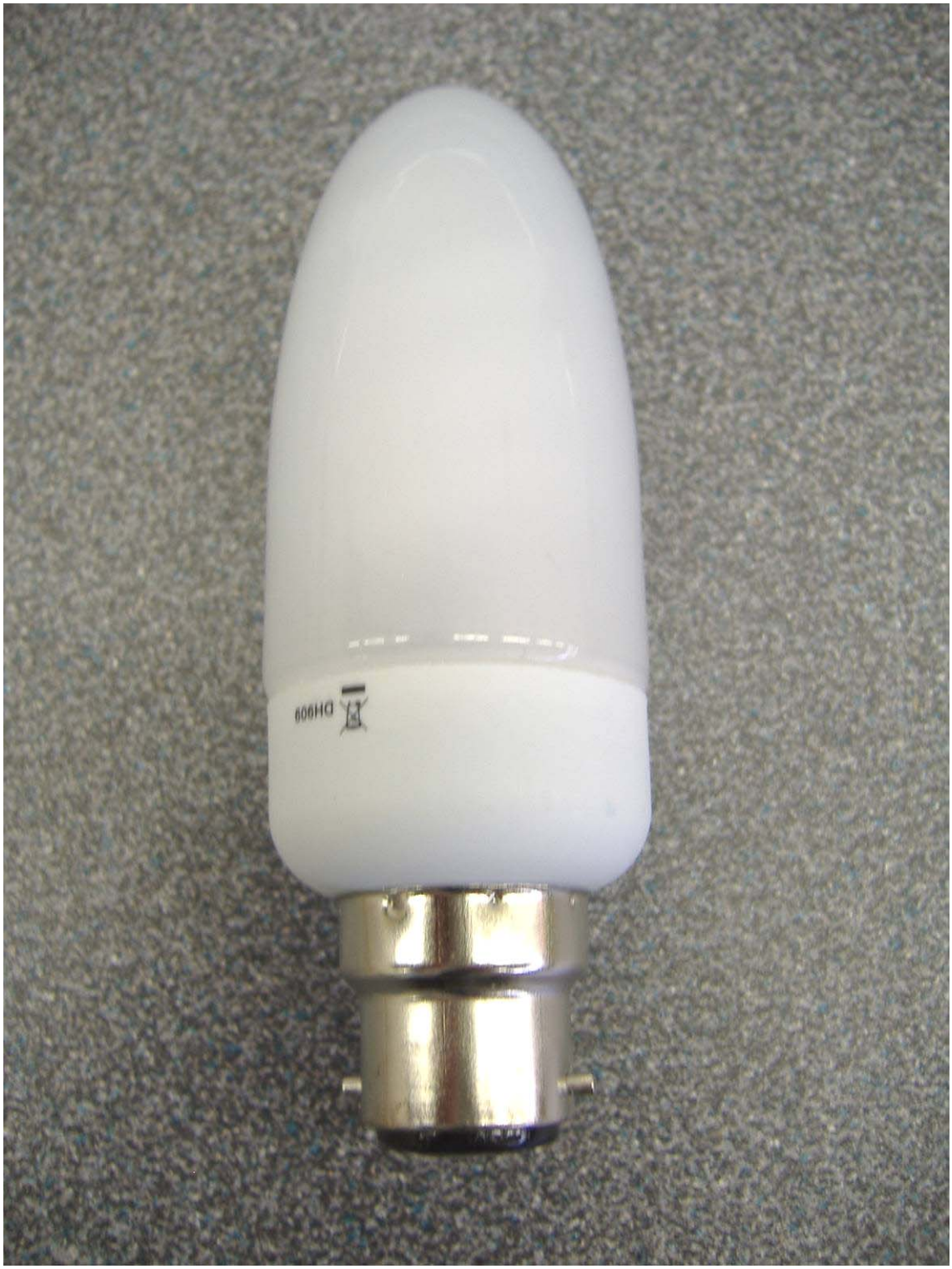
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

Lamp sample reference: L2



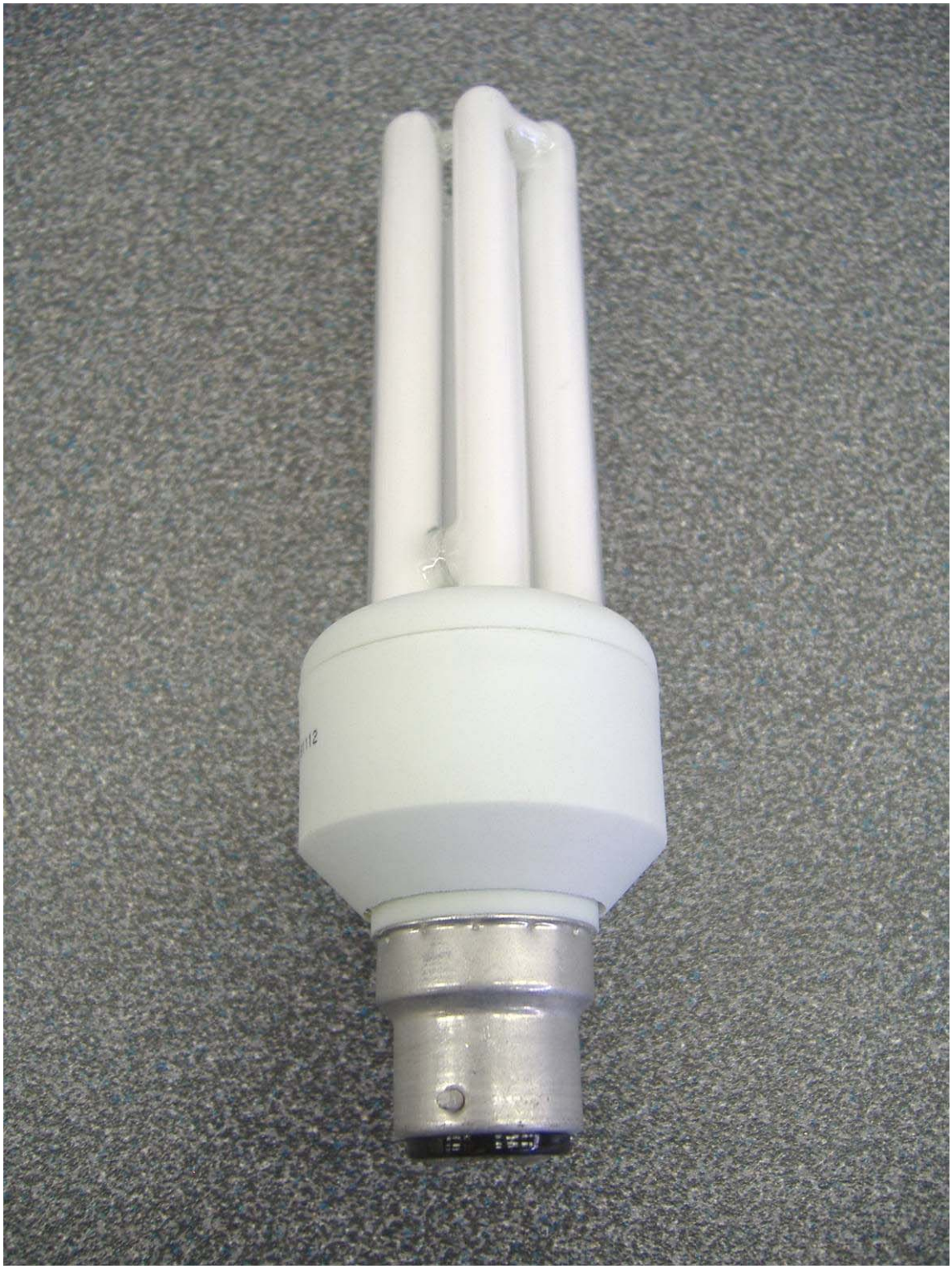
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

Lamp sample reference: L3



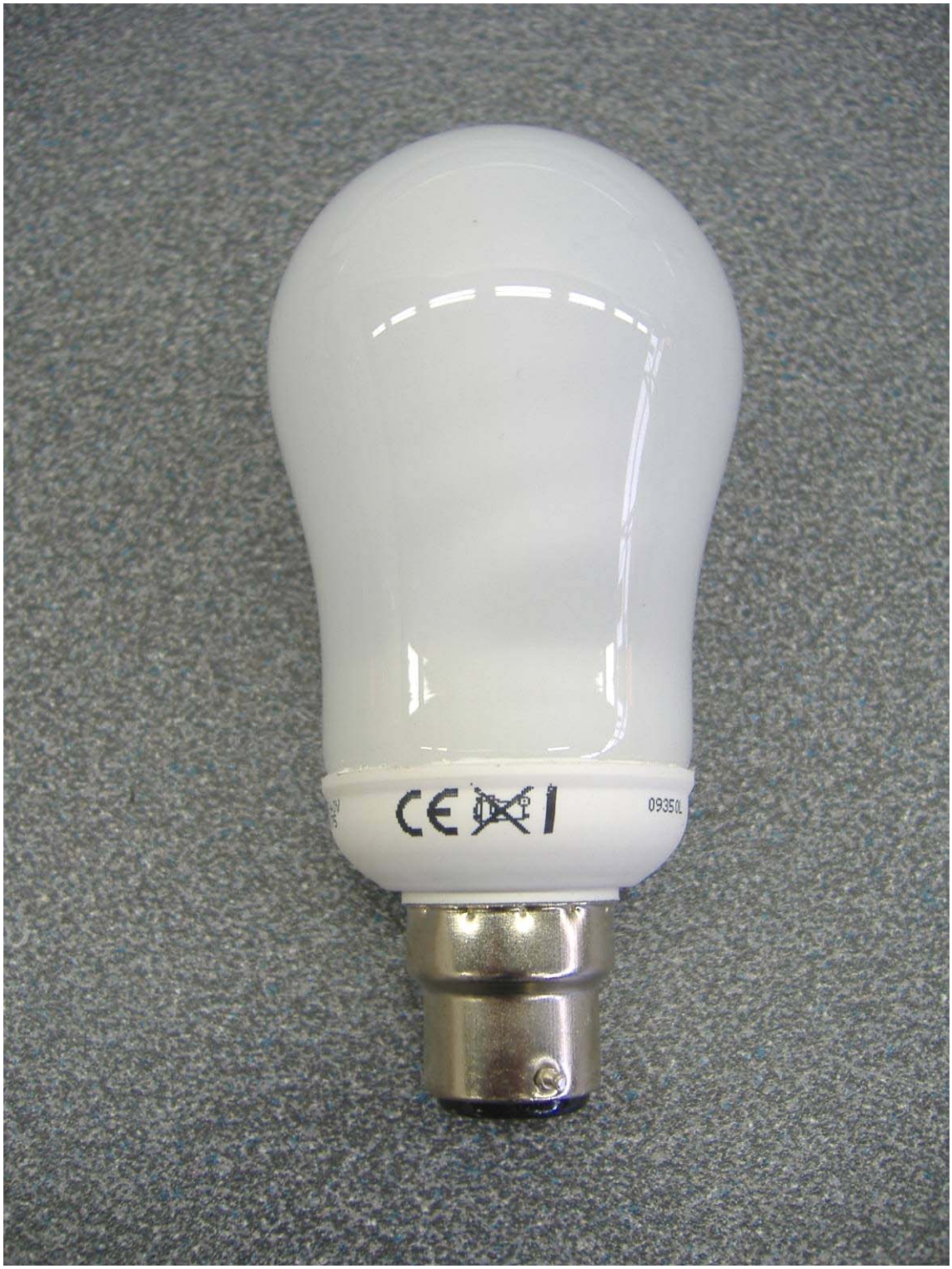
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

Lamp sample reference: L4



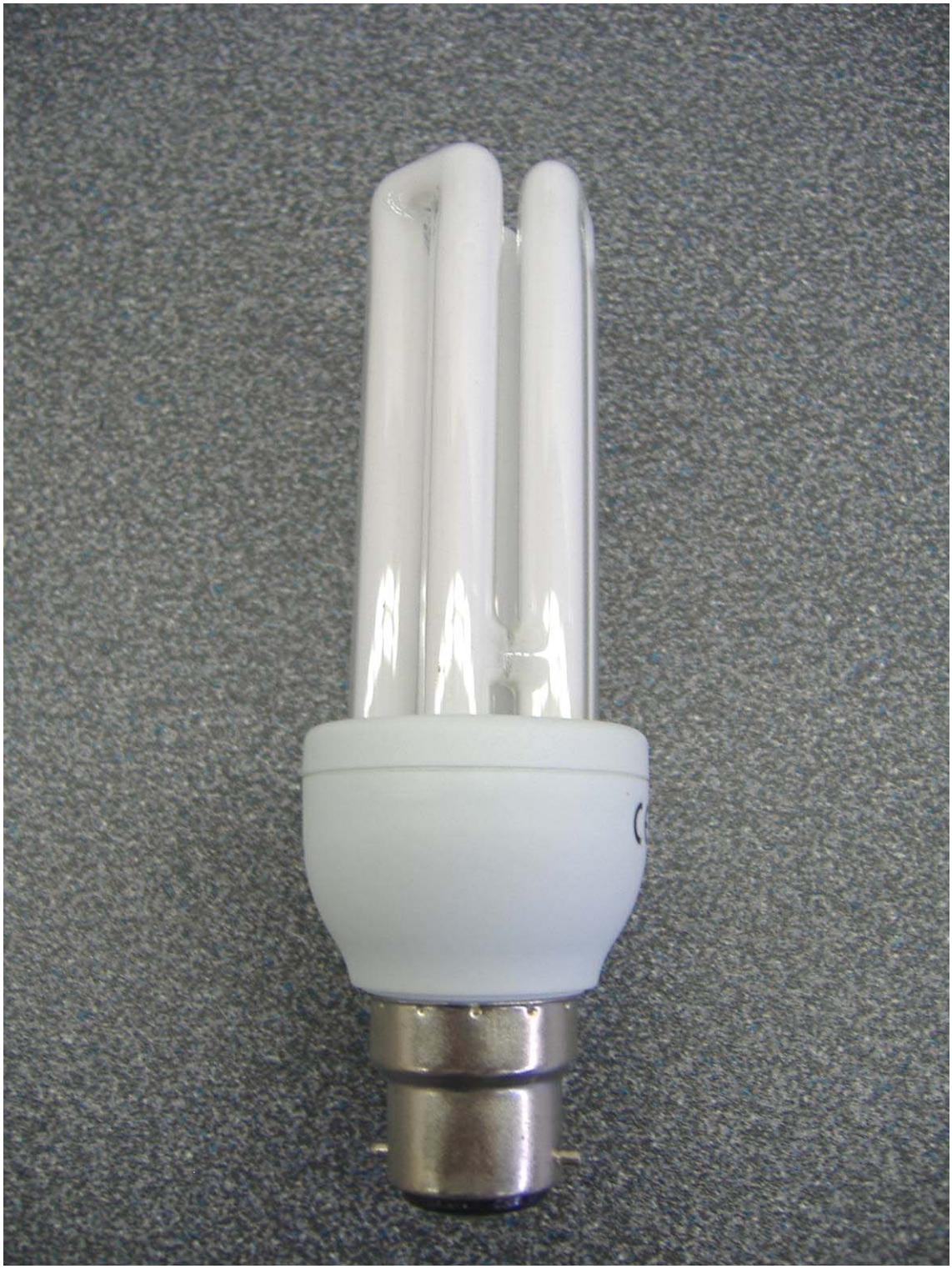
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

Lamp sample reference: L5



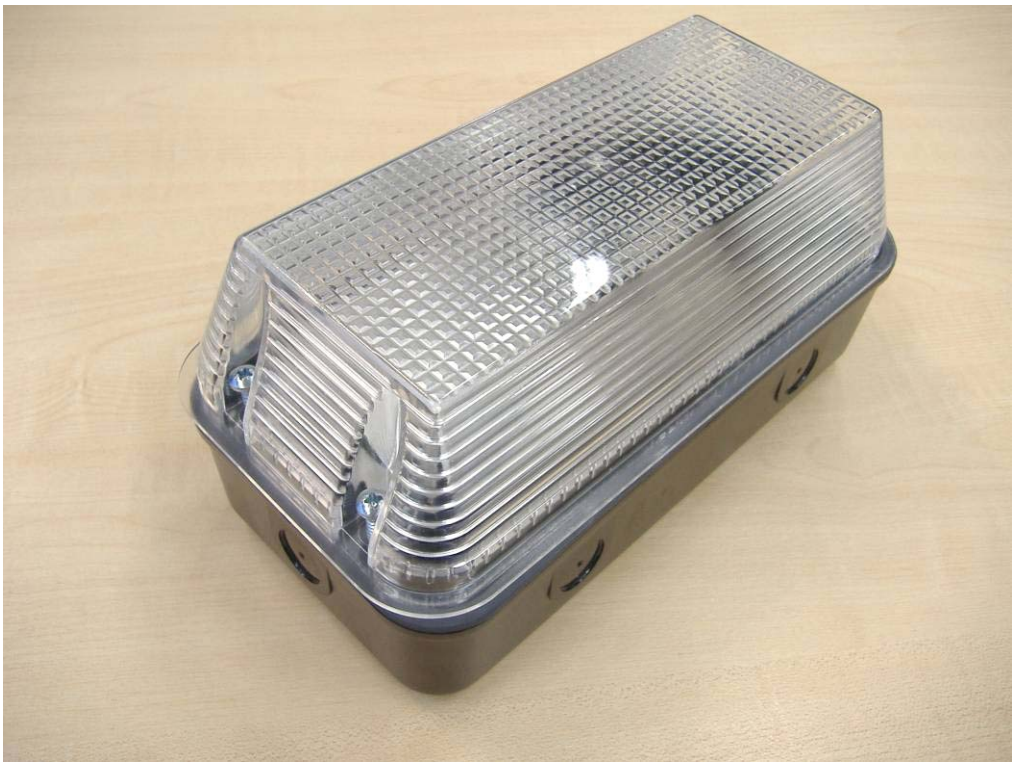
PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

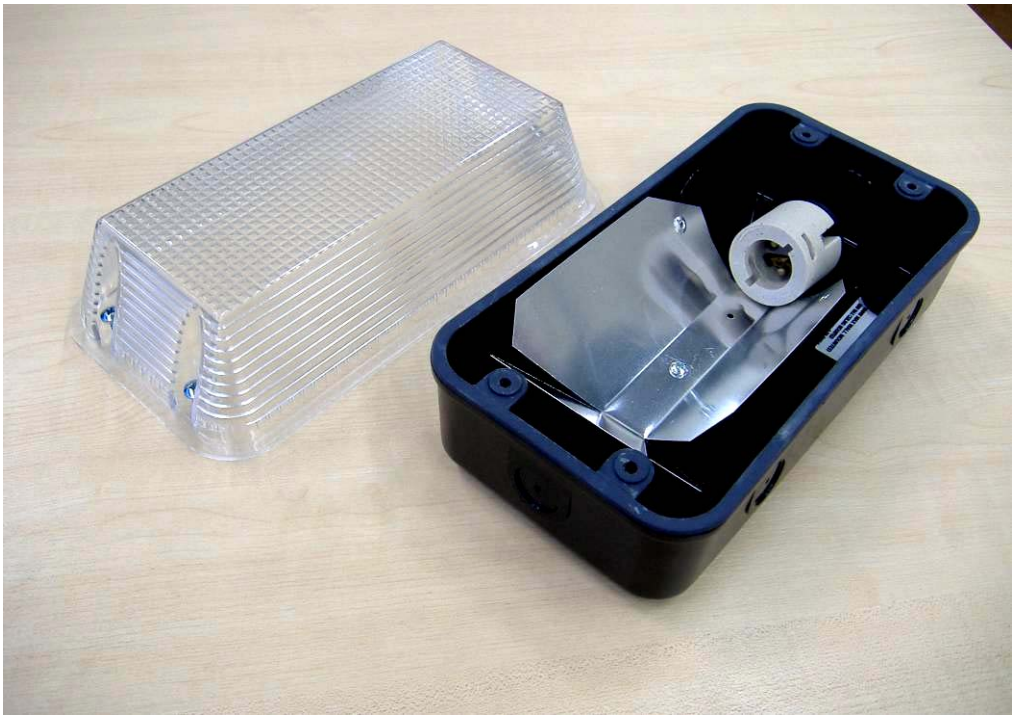
Lamp sample reference: L6



PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

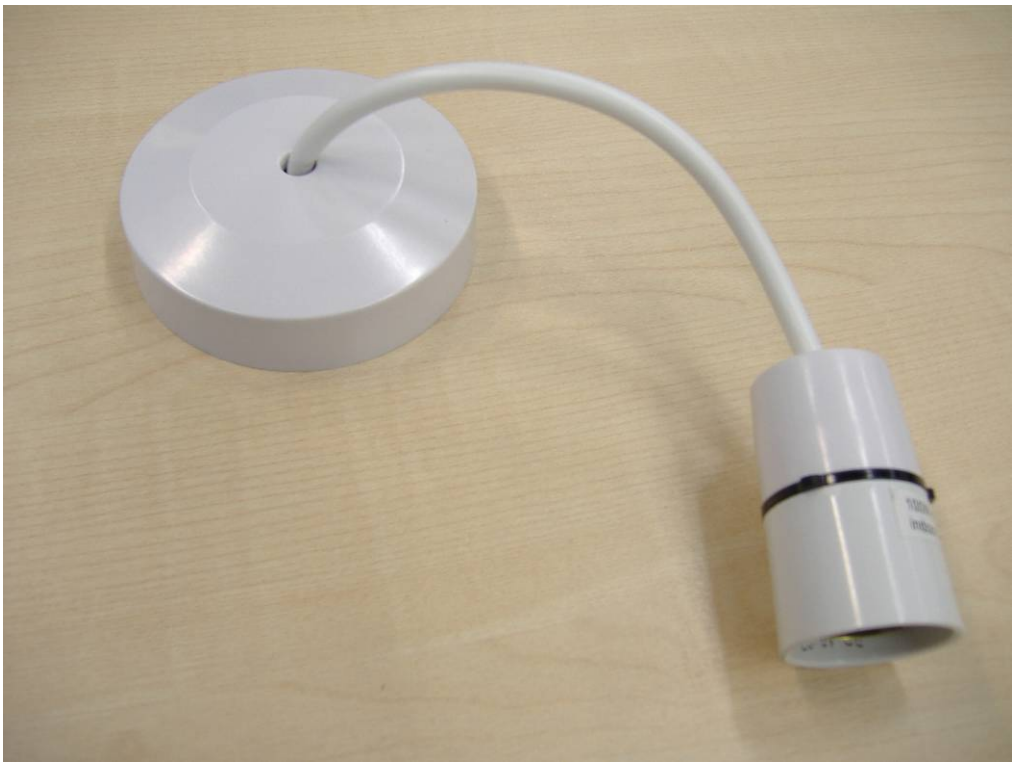
Bulkhead luminaire



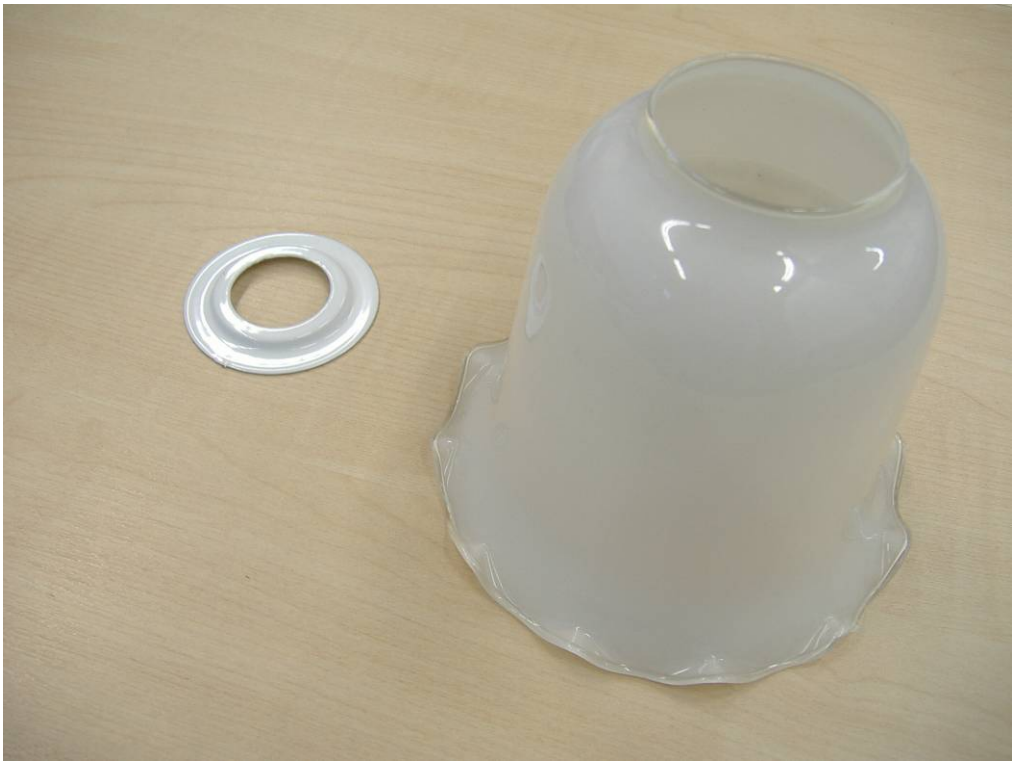


PHOTOGRAPHIC EVIDENCE OF SAMPLES SUBMITTED: Continued/…

Pendant set



Glass shade with shade reducer



End of Report.