

Specification for

Filament lamps for cycles

ICS 43.040.20:43.150

Confirmed December 2009

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

BSI
Documents

AVA

Document Sharing Hub

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Electrical Illumination Standards Committee (LGL/-) to Technical Committee LGL/6 upon which the following bodies were represented:

- Association of Manufacturers Allied to the Electrical and Electronic Industry (BEAMA Ltd.)
- British Lighting Association for the Preparation of Standards (Britlaps)
- Bus and Coach Council
- Chartered Institution of Building Services Engineers
- Consumer Standards Advisory Committee of BSI
- Electricity Supply Industry in England and Wales
- Engineering Equipment and Materials User's Association
- Institution of Lighting Engineers
- Lighting Industry Federation Ltd.
- London Regional Transport
- Ministry of Defence
- Society of Glass Technology
- Society of Motor Manufacturers and Traders Ltd.

The following body was also represented in the drafting of the standard, through subcommittees and panels:

- Department of Transport (Highways)

This British Standard, having been prepared under the direction of the Electrical Illumination Standards Committee, was published under the authority of the Board of BSI and comes into effect on 29 February 1988

© BSI 04-2000

The following BSI references relate to the work on this standard:
Committee reference LGL/6
Draft for comment 85/32861 DC

ISBN 0 580 16114 5

Amendments issued since publication

Amd. No.	Date	Comments
6639	April 1991	
7757	July 1993	
10461	August 1999	Indicated by a sideline in the margin

Contents

	Page
Committees responsible	Inside front cover
Foreword	ii
Section 1. General	
1 Scope	1
2 Definitions	1
3 Marking	2
4 Requirements and tests for inspection, rating and life	2
5 Conditions of compliance	3
Appendix A Statistical basis of the tests	6
Appendix B Service operation of halogen lamps	6
Appendix C Numbering system for standard lamp data sheets	6
Table 1 — Initial torque values	2
Table 2 — Inspection test quantities and compliance numbers for 5.2.1	3
Table 3 — Inspection test quantities and compliance numbers for 5.2.2	4
Table 4 — Rating test quantities and compliance numbers: wattage and luminous flux	4
Table 5 — Test quantities and compliance numbers	5
Section 2. Standard lamp data sheets	7
Publications referred to	Inside back cover

Foreword

This British Standard has been prepared by Subcommittee CPL/34/1/3, Automobile filament lamps. It includes requirements for all the filament lamps specified in BS 6102-3, some of the filament lamps previously specified in BS 941, which has been withdrawn, and also some of the filament lamps more recently developed of both halogen and non-halogen type. Section one specifies the general requirements for lamps and section 2 consists of individual standard lamp data sheets giving details pertinent to each type of lamp.

BS 6873 is one of a series of British Standards that have superseded BS 941 (which has been withdrawn). The other two British Standards in the series are: BS EN 60809, *Filament lamps for road vehicles. Dimensional, electrical and luminous requirements*.

BS EN 60810, *Specification for lamps for road vehicles. Performance requirements*.

The statistical basis for the tests on which the standard is based are given in Appendix A. Recommendations for service conditions for halogen lamps are given in Appendix B. The numbering system for standard lamp data sheets is explained in Appendix C.

The current status of each data sheet is indicated on page 7 (see Appendix C). The amendment by which each page was introduced is indicated by an extension to the shoulder heading at the top of the page (e.g. BS 6873:1998/A1:1991). Where no such extension appears, the page is part of the original British Standard.

NOTE Several of the data sheets refer to BS 5101-1, which has now been withdrawn and superseded by BS EN 60061-1. References to BS 5101-1 should be read as references to BS EN 60061-1.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 48, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Section 1. General

1 Scope

This British Standard specifies requirements for lamps for use in cycle headlamps and rear lamps that operate at supply voltages up to 6 V. It specifies the technical requirements that ensure quality and interchangeability and it describes the methods of test to be used, together with the conditions of compliance to be applied to the results, to decide whether a batch of lamps is acceptable.

Section 1 specifies general requirements for lamps and section 2 consists of individual standard lamp data sheets giving details pertinent to each type of lamp.

NOTE The titles of the publications referred to in this standard are listed on the inside back cover.

2 Definitions

For the purposes of this British Standard the following definitions apply.

2.1 type

lamps which have the same nominal dimensions, rated voltage, photometric and electrical characteristics

2.2 batch

a definite quantity of lamps of one type manufactured under conditions which are presumed uniform

2.3 rated voltage

the voltage for which the lamp is designed

2.4 rated wattage

the wattage for which the lamp is designed

2.5 initial reading

the photometric and electrical measurements made at the end of the ageing period

2.6 lumen (Im)

the unit of luminous flux. It is equal to the flux emitted within a solid angle of one steradian by a uniform point source of one candela

2.7 ageing

the operation of a new lamp for a specified period in order to stabilize its photometric and electrical characteristics

2.8 life

the number of hours the lamp operates until it fails, or the number of hours assigned to the lamp under the test conditions of this standard

2.9 rated life

the life for which the lamp is designed when operated under the test conditions of this standard

2.10 average life

the arithmetic mean of the lives of the lamps in the LTQ

2.11 lumen maintenance

the ratio between the luminous flux at 75 % of the rated life and the initial luminous flux of the lamp, expressed as a percentage

NOTE Lumen maintenance is only applicable for lamps with a rated life of 100 h or more.

2.12 life test voltage

the voltage at which the life test is carried out

NOTE This is the rated voltage unless otherwise stated on the appropriate standard lamp data sheet.

2.13 light centre length (LCL)

the distance from the centre of the rectangle which encloses the luminous section of the filament or a defined point on the filament, to a fixed reference plane on the cap

NOTE The reference point is indicated on the appropriate standard lamp data sheet.

2.14 standard lamp

a lamp with a colourless bulb and with reduced dimensional tolerances, used for the testing of lighting equipment

2.15 objective value

value to be aimed at when the lamp is operated at test voltage

2.16 lateral deviation

the perpendicular distance from the geometric centre of the filament to the reference axis of the cap

2.17 reference plane

a plane defined with reference to the cap or base and with respect to which the positions of certain parts of the lamp are measured

2.18
reference axis

an axis defined with reference to the cap or base and with respect to which positions of certain parts of the lamp are measured

2.19
inspection test quantity (ITQ)

the number of lamps to be tested to decide whether a batch satisfies the visual, mechanical and physical requirements of this standard

2.20
rating test quantity (RTQ)

the number of lamps to be tested to decide whether a batch satisfies the requirements for initial readings

2.21
life test quantity (LTQ)

the number of lamps to be tested to decide whether a batch satisfies the requirements for life and for lumen maintenance when specified in the data sheets

2.22
rated current

the current which the lamp is designed to take when operated at rated voltage

3 Marking

Each lamp shall be distinctly and durably marked with the following information:

- a) rated voltage;
- b) rated wattage or rated current.

If there is sufficient space, each lamp shall be distinctly and durably marked with the manufacturer's identity code or mark.

4 Requirements and tests for inspection, rating and life

4.1 Test quantities

4.1.1 *General*. Lamps which are accidentally broken during a test shall, when necessary, be replaced to ensure that the required number of lamps complete the test. The results obtained with replacement lamps shall be substituted for those of the broken lamps.

NOTE In order to avoid unnecessary delay, it is recommended that spare lamps be tested with each test quantity.

4.1.2 *Inspection test quantity (ITQ)*. The inspection test quantity shall be a minimum of 50 lamps selected, at random, from at least 10 containers, or from all containers if there are less than 10.

4.1.3 *Rating test quantity (RTQ)*. The rating test quantity shall be two-fifths of the ITQ selected at random from the light sources of the ITQ which satisfy the individual light source requirements of the inspection test. In the case of a fraction resulting from this calculation, the next higher whole number shall be taken.

4.1.4 *Life test quantity (LTQ)*. The life test quantity shall be all lamps which have satisfied the individual light source requirements of the rating test.

4.2 Inspection

4.2.1 *Dimensions*. The lamps shall comply with the dimensions shown on the appropriate standard lamp data sheet.

4.2.2 *Bulb*. The bulb shall exhibit no scores or spots that might impair the efficiency or optical performance of the lamp. The position of granulation or frosting is specified on the appropriate standard lamp data sheet.

NOTE The bulb should be clear unless otherwise specified by the purchaser.

4.2.3 *Terminations cap*. The caps shall be as specified on the appropriate standard lamp data sheet and shall be fixed firmly to the bulbs such that they withstand the initial torque specified in Table 1, without visible relative movement between cap and bulb. The cap shall be held firmly without distortion and the appropriate torque gradually applied to the bulb in a clockwise direction and held for 5 ± 2 s.

Table 1 — Initial torque values

Cap/base type (see BS 5101-1)	Initial torque
	N·m
E10/13	0.23
EP10/13	0.23
P13.5s	No requirement
W2.1 × 9.5d	No requirement

4.2.4 *Solder*. Where the lead-out wires are soldered to the cap, the solder shall be applied evenly and in such quantity as to allow proper engagement of the cap in the appropriate standard lamp holder and to ensure satisfactory electrical contact. The wire shall not project more than 1 mm beyond the surface of the solder.

4.3 Rating

4.3.1 *Ageing*. Before initial readings are taken, the lamps shall be aged at the life test voltage for between 15 min and 20 min.

4.3.2 Initial readings. The lamps shall be measured for wattage and luminous flux at rated voltage.

4.4 Life

4.4.1 Operating position. If not specified on the appropriate standard lamp data sheet the lamps under test shall be mounted in horizontal burning position and shall have a free circulation of air in a room temperature not exceeding 30 °C. The lamps shall maintain their respective burning positions for the entire test.

4.4.2 Test voltage. The test voltage shall be as specified on the appropriate standard lamp data sheet. The supply shall be either d.c. or a.c. at a frequency between 40 Hz and 60 Hz. Short fluctuations from the test voltage shall not exceed $\pm 1\%$.

NOTE In cases of doubt, the test with d.c. is the reference test.

4.4.3 Test procedure. Lamps shall be switched off for two periods of not less than 15 min of each day. Such periods shall not be included as part of the life of the lamp.

4.4.4 Duration of test. The test shall be deemed to have terminated at 160 % of the minimum average life specified on the appropriate standard lamp data sheet. Any lamp still operating shall be deemed to have a life 160 % of the specified minimum average life. A lamp which burns out at less than 160 % of the specified minimum average life shall be deemed to have a life of the number of hours at burn out.

4.4.5 Lumen maintenance. The lumen maintenance of individual lamps shall be measured at $75 \pm 5\%$ of the minimum average life specified in the appropriate standard lamp data sheet. If any lamp fails to comply with the specified minimum lumen maintenance it shall be deemed to have a life 75 % of the specified minimum life.

5 Conditions of compliance

5.1 General

A batch of lamps shall be deemed to comply with this standard if the requirements specified in 5.2, 5.3 and 5.4 are satisfied.

5.2 Inspection tests

5.2.1 The number of lamps failing to comply with any one of 4.2.1 to 4.2.4 inclusive shall not exceed the appropriate compliance number in Table 2.

Table 2 — Inspection test quantities and compliance numbers for 5.2.1

ITQ	Compliance number
50	3
51 – 65	4
66 – 80	5
81 – 100	6
101 – 125	7
126 – 145	8
146 – 170	9
171 – 200	10
201 – 225	11
226 – 255	12
256 – 285	13
286 – 315	14
316 – 335	15
336 – 360	16
361 – 390	17
391 – 420	18
421 – 445	19
446 – 475	20
476 – 500	21

5.2.2 The cumulative number of lamps failing to comply with all of 4.2.1 to 4.2.4 inclusive shall not exceed the appropriate compliance number in Table 3.

5.3 Rating tests

5.3.1 The number of lamps having initial wattage outside the limits shown for objective wattage on the appropriate standard lamp data sheet shall not exceed the appropriate compliance number in Table 4.

5.3.2 The number of lamps having initial luminous flux outside the limits for objective luminous flux shown on the appropriate standard lamp data sheet shall not exceed the appropriate compliance number in Table 4.

Table 3 — Inspection test quantities and compliance numbers for 5.2.2

ITQ	Compliance number
50	7
51 – 59	8
60 – 70	9
71 – 80	10
81 – 92	11
93 – 103	12
104 – 114	13
115 – 125	14
126 – 135	15
136 – 146	16
147 – 157	17
158 – 168	18
169 – 179	19
180 – 190	20
191 – 200	21
201 – 211	22
212 – 219	23
220 – 230	24
231 – 242	25
243 – 254	26
255 – 266	27
267 – 278	28
279 – 290	29
291 – 303	30
304 – 315	31
316 – 327	32
328 – 339	33
340 – 352	34
353 – 364	35
365 – 377	36
378 – 389	37
390 – 402	38
403 – 414	39
415 – 426	40
427 – 439	41
440 – 452	42
453 – 465	43
466 – 477	44
478 – 490	45
491 – 500	46

Table 4 — Rating test quantities and compliance numbers: wattage or luminous flux

RTQ	Compliance number
18 – 20	2
21 – 32	3
33 – 40	4
41 – 50	5
51 – 65	6
66 – 80	7
81 – 95	8
96 – 110	9
111 – 125	10
126 – 143	11
144 – 162	12
163 – 181	13
182 – 200	14

5.4 Life tests

5.4.1 The average life of the test quantity shall be not less than 90 % of the rated life shown on the appropriate standard lamp data sheet.

5.4.2 The total number of:

- a) lamps having less than 70 % of the minimum average life specified in the appropriate standard lamp data sheet; and
- b) lamps having failed to comply with the minimum lumen maintenance specified in the appropriate standard lamp data sheet, when tested in accordance with **4.4.5**

shall not exceed the appropriate compliance number in Table 5.

Table 5 — Test quantities and compliance numbers

Test quantity	Compliance number
18 – 20	5
21 – 26	6
27 – 32	7
33 – 39	8
40 – 45	9
46 – 50	10
51 – 57	11
58 – 65	12
66 – 72	13
73 – 80	14
81 – 85	15
86 – 92	16
93 – 99	17
100 – 105	18
106 – 112	19
113 – 118	20
119 – 125	21
126 – 134	22
135 – 142	23
143 – 150	24
151 – 158	25
159 – 165	26
166 – 173	27
174 – 181	28
182 – 189	29
190 – 197	30
198 – 200	31

Appendix A Statistical basis of the tests

It is impracticable and uneconomic to test every lamp in a batch but, by the use of statistical sampling theory, it is possible to design tests on small samples which will determine whether the quality of the batch is acceptable.

Accordingly, test quantities, quality limits and compliance numbers have been so specified that if testing the whole of a batch, the quality level for any requirement or group of requirements would have been found to be that given in a) to e), when the batch was sampled in accordance with BS 6001.

- a) 97.5 % of the lamps satisfy each single dimensional or physical requirement of **4.2.1** to **4.2.4**.
- b) 93.5 % of the lamps satisfy all the requirements of **4.2.1** to **4.2.4**.
- c) 96 % of the lamps satisfy the requirements for wattage.
- d) 96 % of the lamps satisfy the requirements for luminous flux.
- e) 90 % of the lamps satisfy the individual life requirement.

Appendix B Service operation of halogen lamps

It is recommended that halogen lamps of 6 V rating are not subjected to cycle generator voltages in excess of 8 V.

The filaments of halogen lamps are designed to operate at higher temperatures than non-halogen lamps and excessive voltage will cause premature failure of the filament.

Appendix C Numbering system for standard lamp data sheets

The first number represents the number of this standard (6873).

The second number represents the lamp group and the sheet number within that group:

- Non-halogen lamp with prefocus cap 0–20
- Non-halogen lamp with screw cap 21–40
- Non-halogen lamp with shouldered screw cap 41–50
- Non-halogen lamp with base 51–60
- Halogen lamp with prefocus cap 61–80
- Halogen lamp with screw cap 81–100
- Micro-halogen lamp with pin connection 101–120

The third number indicates the issue number of the sheet.

Example

6873-01-1

refers to the first issue of the standard lamp data sheet for a non-halogen lamp with P13.5s cap, a rated voltage of 2.4 V and rated wattage of 1.68 W.

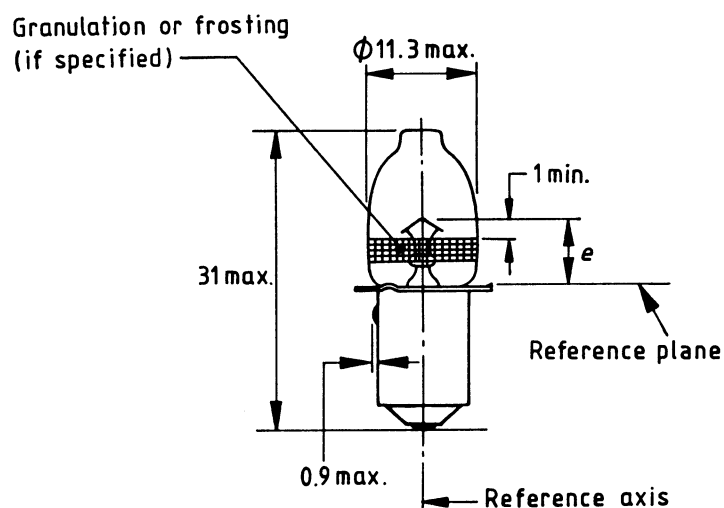
Section 2. Standard lamp data sheets

Contents list for standard lamp data sheets					
Type	Cap reference	Rated voltage V	Rated wattage W	Sheet No.	Type No. ^a
Non-halogen prefocus cap	P13.5s	2.4	1.68	6873-01-1	—
Non-halogen prefocus cap	P13.5s	2.4	1.2	6873-02-1	—
Non-halogen prefocus cap	P13.5s	2.5	0.75	6873-03-1	278
Non-halogen prefocus cap	P13.5s	2.7	1.13	6873-04-1	925
Non-halogen prefocus cap	P13.5s	2.4	2.0	6873-05-1	—
Non-halogen prefocus cap	P13.5s	2.5	0.5	6873-06-1	—
Non-halogen prefocus cap	P13.5s	2.4	1.2	6873-07-1	—
Non-halogen screw cap	E10/13	2.5	0.75	6873-21-1	972
Non-halogen screw cap	E10/13	3.5	1.05	6873-22-1	977
Non-halogen screw cap	E10/13	4	1	6873-23-1	—
Non-halogen screw cap	E10/13	6	0.6	6873-24-1	—
Non-halogen screw cap	E10/13	3.6	3.6	6873-25-1	—
Non-halogen shouldered screw cap	EP10/13	6	2.4	6873-41-1	—
Non-halogen base	W2.1 × 9.5d	6	0.6	6873-51-1	275
Halogen prefocus cap	P13.5s	6	2.4	6873-61-1	—
Halogen prefocus cap	P13.5s	2.8	2.4	6873-62-1	—
Halogen prefocus cap	P13.5s	2.8	1.4	6873-63-1	—
Halogen prefocus cap	P13.5s	2.5	1.25	6873-64-1	—
Halogen screw cap	E10/13	2.5	2	6873-81-1	—
Micro-halogen pin connection	G2.5	4.8	2.4	6873-101-1	—

^a Type numbers were previously used in BS 941 (which has now been withdrawn), and have been retained in this standard to assist manufacturers and users.

Standard sheet 6873-01-1

Non-halogen cycle lamp with prefocus cap 2.4 V 1.68 W

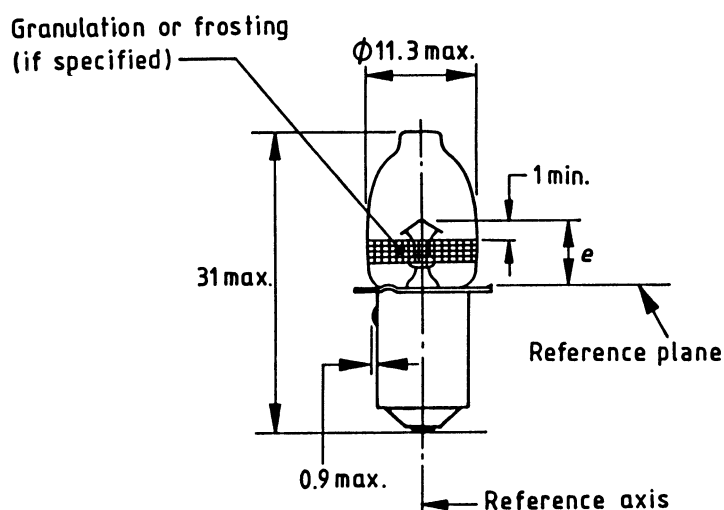


All dimensions are in millimetres.

	Lamps of normal production			Standard lamps
Dimensions (mm)	minimum	nominal	maximum	
<i>e</i> (LCL)	6.05	6.35	6.65	6.35 ± 0.15
Lateral deviation			0.4	0.2 max.
Cap ^a	P13.5s			
Electrical and photometric characteristics				
Rated voltage (V)	2.4			2.4
Rated wattage (W)	1.68			1.68
Test voltage (V)	2.4			
Objective wattage				
nominal (W)	1.68			1.68
tolerance (%)	± 10			± 10
Objective luminous flux				
nominal (lm)	16.5			
tolerance (%)	± 20			
Lumen maintenance (%)	N/A			
Rated average life (h)	15			
Reference luminous flux: 16.5 lm at approx. 2.4 V				
^a Cap dimensions are specified in sheet 7004-40 of BS 5101-1.				

Standard sheet 6873-02-1

Non-halogen cycle lamp with prefocus cap 2.4 V 1.2 W

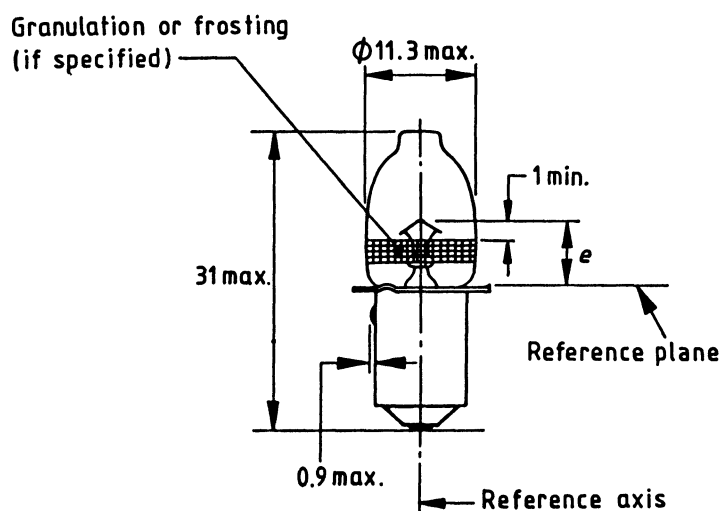


All dimensions are in millimetres.

	Lamps of normal production			Standard lamps
Dimensions (mm)	minimum	nominal	maximum	
<i>e</i> (LCL)	6.05	6.35	6.65	6.35 ± 0.15
Lateral deviation			0.4	0.2 max.
Cap ^a	P13.5s			
Electrical and photometric characteristics				
Rated voltage (V)	2.4			2.4
Rated wattage (W)	1.2			1.2
Test voltage (V)	2.4			
Objective wattage				
nominal (W)	1.2			1.2
tolerance (%)	± 10			± 10
Objective luminous flux				
nominal (Im)	11.4			
tolerance (%)	± 20			
Lumen maintenance (%)	N/A			
Rated average life (h)	15			
Reference luminous flux: 11.4 Im at approx 2.4 V				
^a Cap dimensions are specified in sheet 7004-40 of BS 5101-1.				

Standard sheet 6873-03-1

Non-halogen cycle lamp with prefocus cap 2.5 V 0.75 W



All dimensions are in millimetres.

	Lamps of normal production			Standard lamps
Dimensions (mm)	minimum	nominal	maximum	
<i>e</i> (LCL)	6.05	6.35	6.65	6.35 ± 0.15
Lateral deviation			0.4	0.2 max.
Cap ^a	P13.5s			
Electrical and photometric characteristics				
Rated voltage (V)	2.5			2.5
Rated wattage (W)	0.75			0.75
Test voltage (V)	2.5			
Objective wattage				
nominal (W)	0.75			0.75
tolerance (%)	± 10			± 10
Objective luminous flux				
nominal (lm)	7.0			
tolerance (%)	± 20			
Lumen maintenance (%)	N/A			
Rated average life (h)	12			
Reference luminous flux: 7 lm at approx. 2.5 V				
^a Cap dimensions are specified in sheet 7004-40 of BS 5101-1.				

^a Cap dimensions are specified in sheet 7004-40 of BS 5101-1.