

SASO IEC 60983

MINIATURE LAMPS

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INTRODUCTION

The Saudi Standards ,Metrology and Quality Organization (SASO) has adopted the International Standard IEC 60983 /2005Ed 2.1 “MINIATURE LAMPS” issued by the International Electro technical Commission (IEC). It has been adopted without any technical modifications with a view to its approval as a Saudi standard.

MINIATURE LAMPS

Section 1: General

1-1 Scope

This International Standard specifies requirements for miniature halogen and non-halogen lamps with a nominal voltage up to 30 V and a nominal wattage up to 25 W. It covers:

lamps to be used in road vehicles not subject to regulation and which therefore are not included in IEC 60809 (section 2).

lamps for electric torches (section 3).

lamps for miners.

caplights (section 4).

Aircraft lamps are standardized in IEC 60434.

This standard specifies dimensional, electrical and photometric requirements as well as requirements concerning life and mechanical strength.

NOTE: Requirements are for production lamps. Individual lamps might not be completely within these requirements. Where conditions of compliance are required, they are specified in the relevant section.

For some of the requirements given in this standard, reference is made to the relevant lamp data sheet. For some lamps these data sheets are contained in this standard. For other lamps, falling under the scope of this standard, the relevant data are supplied by the lamp manufacturer or responsible vendor.

This Standard may also be used for future developments, e.g. where the light is produced by light emitting diodes (LED)

1-2 Normative references

The following referenced documents are indispensable for the application of this document.

For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 6050-845:1987, International Electrotechnical Vocabulary (IEV Chapter 845: Lighting).

IEC 60061-1:1969, Lamp caps and holders together with gauges for the control of interchangeability and safety . Part 1: Lamp caps.

IEC 60434:1973, Aircraft electrical filament lamps Amendment No. 1 (1981), Amendment No. 2 (1984).

IEC 60809:1985, Lamps for road vehicles . Dimensional, electrical and luminous requirements Amendment No. 1 (1987), Amendment No. 2 (1989), Amendment No.3 (1992).

ISO 2859: Sampling procedures for inspection by attributes.

EN 50033, Electrical apparatus for potentially explosive atmospheres . Caplights for mines susceptible to firedamp (European standards).

1-3 Definitions

For the purposes of this International Standard, the following definitions apply.

- 1-3-1 lamp (incandescent): Source made in order to produce light by means of an element heated to incandescence by the passage of an electric current. (A combination of IEV 845-07-03 and IEV 845-07-04).
- 1-3-2 tungsten halogen lamp: Gas-filled lamp containing halogens or halogen compounds ,the filament being tungsten. (IEV 845-07-10).
- 1-3-3 nominal voltage: Voltage used to designate a lamp.
- 1-3-4 nominal wattage: Wattage used to designate a lamp.
- 1-3-5 test voltage: Voltage for which some characteristics of a lamp are specified and at which they shall be tested.
- 1-3-6 rated value: Quantity value for specified operating conditions of a component, device or equipment assigned by a manufacturer or specified in a product standard.
- 1-3-7 tolerance: Allowable variation from a specified value, generally expressed in per cent of this value.
- 1-3-8 limit value: Lowest and/or highest value for characteristics a lamp has to comply with when operated under test conditions.
- 1-3-9 initial readings: Photometric and electrical values measured at the end of the ageing period.
- 1-3-10 ageing period: Period of time for which an unused lamp is operated in order to stabilize its photometric and electrical characteristics.
- 1-3-11 life: The total time for which a lamp has been operated before it becomes useless, or is considered to be so, according to specific criteria. (IEV 845-07-61).

NOTE: Lamp life is normally expressed in hour.

- 1-3-12 average life: Arithmetic mean of a number of individual life test results for lamps of the same type.

- 1-3-13 truncated average life: Arithmetic mean of a number of individual life test results, where the test for the purpose of this calculation is considered to be terminated after a predetermined period.
- 1-3-14 lumen maintenance: Ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated at test voltage. (IEV 845-07-65, modified).
- NOTE: The ratio is generally expressed in per cent.
- 1-3-15 reference plane: Plane defined with reference to the cap or base and with respect to which the position of certain parts of the lamp are measured.
- 1-3-16 reference axis: Axis defined with reference to the cap or base and with respect to which the position of certain parts of the lamp are measured.
- 1-3-17 light centre length (LCL): Distance between the centre of the rectangle enclosing the luminous filament section or a defined point of the filament and the reference plane.
- 1-3-18 type: Lamps which differ in such essential characteristics as voltage, wattage or bulb design form different types. They are specified on the same lamp data sheet by different type numbers, e.g. 60983-IEC-2251 and 60983-IEC-2252 on lamp data sheet 60983-IEC-2250.

1-4 Marking

Each lamp shall be legibly and durably marked with an identification to ensure correct replacement. Details for marking requirements and compliance conditions are specified in each section.

1-5 Requirements and tests

1-5-1 Lamp dimensions

The outer lamp dimensions and the light centre length shall comply with the requirements specified on the relevant lamp data sheet.

1-5-2 Bulbs

Bulbs shall not contain scores or spots which might impair the optical performance of the lamp.

1-5-3 Caps

Caps shall comply with the requirements specified on the relevant standard sheet(s) of IEC 60061.

Further requirements are specified in the relevant sections of this standard.

1-6 Data sheets

1-6-1 Numbering system for data sheets and lamps

The first number represents the number of this standard "60983" followed by the letters "IEC".

The second number consists of a four-digit group. The first digit represents the relevant section of this standard, the second and third digits represent the sheet identifier and the fourth digit represents the lamp type except zero which is reserved as part of the sheet identifier.

The third number represents the edition of the data sheet page. In cases where a data sheet has more than one page, it is possible for the pages to have different edition numbers with the data sheet numbering remaining the same.

1-7 Recommended instructions for the use of halogen lamps

It is recommended that the following points are included in any instructions for use if supplied with tungsten halogen lamps covered by this standard :

tungsten halogen lamps operate at high bulb temperatures and care should be taken to avoid touching the bulb under any circumstances ;if lamps with a quartz bulb are touched, they should be cleaned before use with a lint-free cloth moistened with spirit (alcohol).

lamps with scratched or otherwise damaged bulbs should not be used.

NOTE: In some instances, lamp manufacturers give information that the lamp contains gas under pressure and recommend protective measures when handling it.

Section 2: Lamps for supplementary purposes in road vehicles

2-1 Scope

This section covers miniature lamps to be used in road vehicles which are not the subject of regulation and therefore are not included in IEC 60809. It specifies the basic requirements) dimensional, electrical and luminous) as well as life and torsion strength.

2-2 Definitions

For the purposes of this section, the definitions of section 1 apply, together with the following:

2-2-1 Designation

EUR means type standardized in European countries

JIS means type standardized by Japanese Industrial Standards

SAE means type standardized by the Society of Automotive Engineers

2-3 Marking

The following information shall be legibly and durably marked on the lamp:

trade name or mark of the manufacturer or the responsible vendor

trade number or lamp designation and/or nominal voltage

In addition other information may be marked, e.g. nominal wattage

Compliance is checked by rubbing by hand with a smooth cloth, dampened with water, for a period of 15 s

After this test the marking shall be legible .

2-4 Technical requirements and test procedures

Lamps shall comply with the general requirements given in clause 1.5

2-4-1 Initial readings

After the ageing period, wattage and luminous flux of a lamp operated at test voltage shall comply with the requirements specified on the relevant data sheet. A suitable integrating photometer shall be used for measuring the luminous flux.

2-4-2 Life

During the life test, lamps shall be operated at test voltage on d.c. or a.c. with a frequency between 40 Hz and 60 Hz, with reference axis and filament axis in a horizontal position at room temperature not exceeding 30 °C.

There must be no fluctuations of the supply voltage. However, momentary fluctuations (1 min), not exceeding ± 1 % of the test voltage, are allowed.

The test shall be terminated at 150 % of the life specified on the relevant lamp data sheet. Such terminated lamps shall be deemed to have a life of 150 % of the specified value.

The average life of the test sample shall be not less than:

for a sample size of 13 to 19 lamps: 90 % of the life value specified on the relevant lamp data sheet

for a sample size of 20 to 25 lamps: 92,5 % of the life value specified on the relevant lamp data sheet

2-4-3 Lumen maintenance

The lumen maintenance, if required, shall comply with the value specified on the relevant lamp data sheet.

Lamps which fail to comply are deemed to have a life of 75 % of rated life.

2-4-4 Torsion strength

When a torsion strength is specified on the relevant data sheet for a lamp type, each lamp shall withstand the specified torsion strength without visible relative movement between the cap and the bulb.

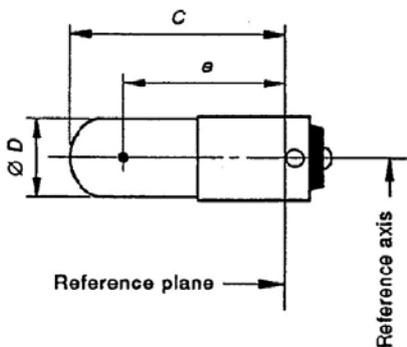
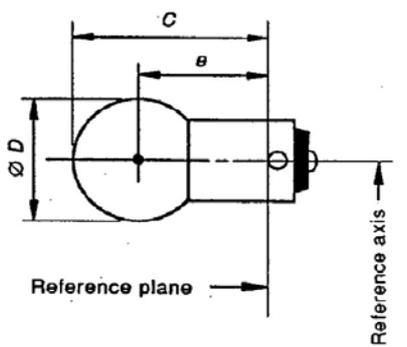
For the test the cap shall be retained firmly without distortion and the torque shall be gradually increased in clockwise direction until the specified value is reached.

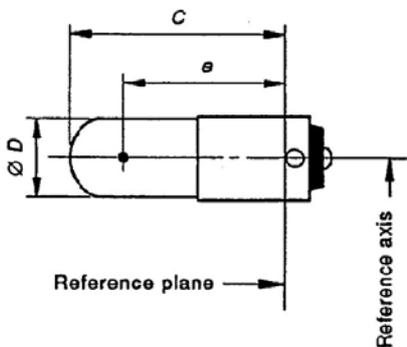
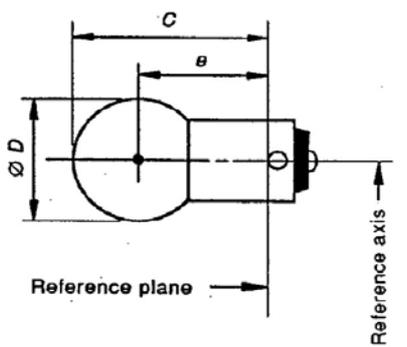
2-4-5 Electrical and photometric measurements

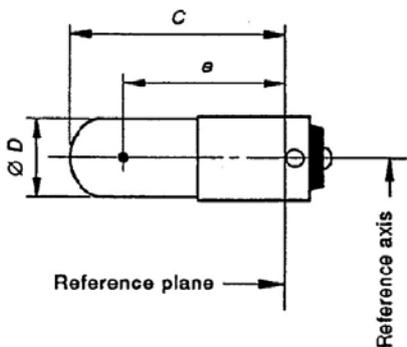
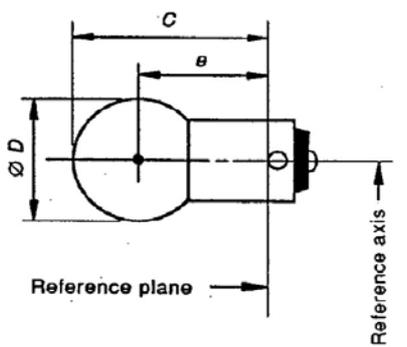
Electrical and photometric measurements shall be carried out at the test voltage.

2-5 Data sheets: Road vehicles**2-5-1 List of lamps covered by the different data sheets**

Designation	Nominal Voltage	Nominal Wttage	Cap/Base	Type	Data sheet Number
T2W	6	2	BA9s	60983-IEC-2011	60983-IEC-2010
-	6	3	BA9s	60983-IEC-2012	
T2W	12	2	BA9s	60983-IEC-2051	60983-IEC-2050
SAE57	12	3	BA9s	60983-IEC-2052	
R4W SAE1895	12	4	BA9s	60983-IEC-2053	
T3W	24	3	BA9s	60983-IEC-2101	60983-IEC-2100
-	24	3	BA9s	60983-IEC-2102	
H5W	12	5	BA9s	60983-IEC-2151	60983-IEC-2150
H10W	12	10	BA9s	60983-IEC-2152	
H20W	12	20	BS9s	60983-IEC-2153	
W1.2W SAE14	12	1.2	W2x4.6d	60983-IEC-2201	60983-IEC-2200
W2W	12	2	W2x4.6d	60983-IEC-2202	
W2.2W SAE161	12	2.2	W2 1x9.5d	60983-IEC-2251	60983-IEC-2250
W2.5W	24	2.5	W2 1x9.5d	60983-IEC-2252	
TX1.4W	12	1.4	Special	60983-IEC-2301	60983-IEC-2300
-	12	1.1	BX8.4d	60983-IEC-2401	60983-IEC-2400
-	12	1.2	BX8.4d	60983-IEC-2402	
-	12	1.3	BX8.4d	60983-IEC-2403	
-	12	1.5	BX8.4d	60983-IEC-2404	
-	12	1.9	BX8.4d	60983-IEC-2405	
-	12	2.0	BX8.4d	60983-IEC-2406	
-	12	2.3	BX8.4d	60983-IEC-2407	

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP CAP : BA9s			
Characteristics		Specifications and tolerances	
Type		60983-IEC-2011	60983-IEC-2012
Designation: EUR/JIS/SAE		T2W/-/-	-/-/-
Nominal Voltage	V	6	6
Nominal wattage	W	2	3
Test voltage	V	6.75	6.75
Rated wattage	W	2.0 ± 15 %	3.0 ± 15 %
Rated luminous flux	lm	12.5 ± 30 %	26.5 ± 25 %
Rated truncated average life	h	1000 1)	500
Torsion strength	Nm	0.3 min	0.3 min
Dimensions	mm		
D		8.8 max	11.7 max
e		13 ± 1.5 %	12.7 approx
C		18 max	17.8 max
1) Under consideration			
The drawings intended only to indicate the dimensions essential for interchangeability			
 <p style="text-align: center;">IEC 703194</p> <p style="text-align: center;">Type 60983-IEC-2011</p>		 <p style="text-align: center;">IEC 704194</p> <p style="text-align: center;">Type 60983-IEC-2012</p>	
Cap BA9s according to sheet 7004-14, IEC-60061			
Over the entire length of the cap there shall be no projections or soldering exceeding the permissible maximum diameter of the cap.			
IEC-60983		60983-IEC-2010-1	Date: 1995

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP CAP : BA9s				
Characteristics		Specifications and tolerances		
Type		60983-IEC-2051	60983-IEC-2052	60983-IEC-2053
Designation: EUR/JIS/SAE		T2W/-/-	-/-/57	R4W/-/1895
Nominal Voltage	V	12	12	12
Nominal wattage	W	2	3	4
Test voltage	V	13.5	13.5	13.5
Rated wattage	W	2.0 ± 15 %	3.2 ± 15 %	3.6 ± 15 %
Rated luminous flux	lm	12.5 ± 30 %	22.0 ± 25 %	22.0 ± 20 %
Rated truncated average life	h	1000 1)	500	2000
Torsion strength	Nm	0.3 min	0.3 min	0.3 min
Dimensions	mm			
D		8.8 max	11.7 max	11.7 max
e		13 ± 1.0	12.7 approx	12.7 approx
C		18 max	17.8 max	17.8 max
1) Under consideration				
The drawings intended only to indicate the dimensions essential for interchangeability				
 <p style="text-align: center;">IEC 703194</p> <p style="text-align: center;">Type 60983-IEC-2051</p>		 <p style="text-align: center;">IEC 704194</p> <p style="text-align: center;">Type 60983-IEC-2052, -2053</p>		
Cap BA9s according to sheet 7004-14, IEC-60061				
Over the entire length of the cap there shall be no projections or soldering exceeding the permissible maximum diameter of the cap.				
IEC-60983		60983-IEC-2050-1		Date: 1995

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP CAP : BA9s			
Characteristics		Specifications and tolerances	
Type		60983-IEC-2101	60983-IEC-2102
Designation: EUR/JIS/SAE		T3W/-/-	-/-/-
Nominal Voltage	V	24	24
Nominal wattage	W	3	3
Test voltage	V	28.0	28.0
Rated wattage	W	3.0 ± 15 %	3.1 ± 15 %
Rated luminous flux	lm	17.0 ± 30 %	20 ± 25 %
Rated truncated average life	h	1000	500 1)
Torsion strength	Nm	0.3 min	0.3 min
Dimensions	mm		
D		8.8 max	11.7 max
e		13 ± 1.5 %	12.7 approx
C		18.0 max	17.8 max
1) Under consideration			
The drawings intended only to indicate the dimensions essential for interchangeability			
 <p style="text-align: center;">IEC 703194</p> <p style="text-align: center;">Type 60983-IEC-2101</p>		 <p style="text-align: center;">IEC 704194</p> <p style="text-align: center;">Type 60983-IEC-2102</p>	
Cap BA9s according to sheet 7004-14, IEC-60061			
Over the entire length of the cap there shall be no projections or soldering exceeding the permissible maximum diameter of the cap.			
IEC-60983		60983-IEC-2100-1	Date: 1995

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP CAP : BA9s				
Characteristics		Specifications and tolerances		
Type		60983-IEC-2151	60983-IEC-2152	60983-IEC-2153
Designation: EUR/JIS/SAE		H5W/-/-	H10W/-/-	H20W/-/-
Nominal Voltage	V	12	12	12
Nominal wattage	W	5	10	20
Test voltage	V	13.5	13.5	13.5
Rated wattage	W	5.0 ± 6 %	11 ± 6 %	22.5 ± 6 %
Rated luminous flux	lm	80 ± 10 %	200 ± 10 %	470 ± 10 %
Rated truncated average life	h	240	240	240
Dimensions	mm			
D		9 max	9 max	9 max
e		15.0 ± 1.0	15.0 ± 1.0	15.0 ± 1.0
C		27 max	27 max	27 max
β	(°)	90 ± 10	90 ± 10	90 ± 10
Lateral deviation (1)		± 1.0	± 1.0	± 1.0
1) Maximum lateral deviation of filament center from two mutually perpendicular planes both containing the reference axis and one containing the axis of pins.				
The drawings intended only to indicate the dimensions essential for interchangeability				
Cap BA9s according to sheet 7004-14, IEC-60061				
Over the entire length of the cap there shall be no projections or soldering exceeding the permissible maximum diameter of the cap.				
IEC-60983		60983-IEC-2150-1		Date: 1995

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP BASE : W2x4.6d			
Characteristics		Specifications and tolerances	
Type		60983-IEC-2201	60983-IEC-2202
Designation: EUR/JIS/SAE		W1.2W/-/74*	W2W/-/-
Nominal Voltage	V	12	12
Nominal wattage	W	1.2	2
Test voltage	V	13.5	13.5
Rated wattage	W	1.2 ± 15 %	2.0 ± 15 %
Rated luminous flux	lm	6 min	9.75 ± 23 %
Rated truncated average life	h	1000	1000
Lumen maintenance	%	60	60
Dimensions	mm		
D		5.8 max	5.8 max
C		15.2 max	15.2 max

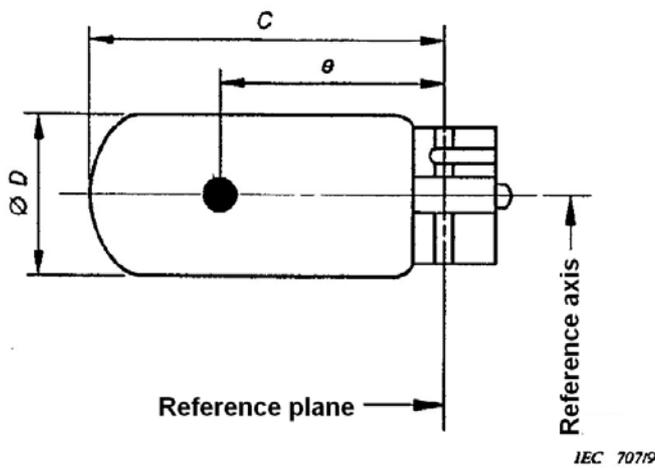
The drawings intended only to indicate the dimensions essential for interchangeability

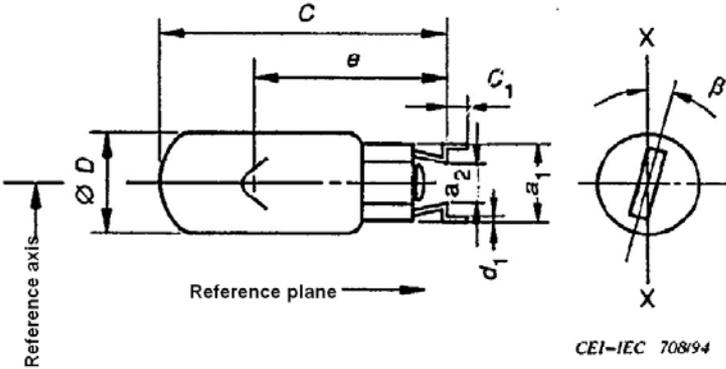
IEC 706/94

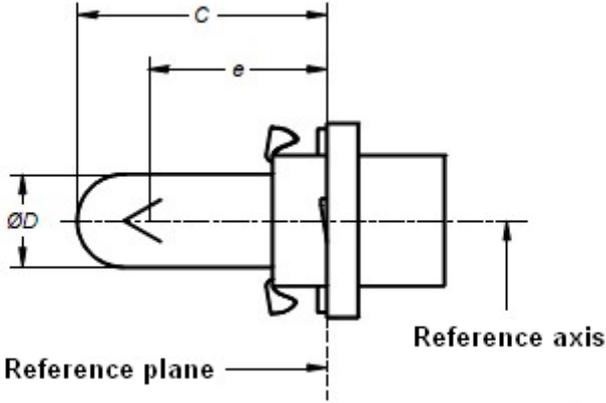
Base W2x4.6d according to sheet 7004-94, IEC-60061

* The SAE type may be equipped with base W2.1x4.9d according to ANSI C81-61.

IEC-60983	60983-IEC-2200-1	Date: 1995
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MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP BASE : W2.1x9.5d			
Characteristics		Specifications and tolerances	
Type		60983-IEC-2251	60983-IEC-2252
Designation: EUR/JIS/SAE		W2.2W/-/161*	W2.5W/-/-
Nominal Voltage	V	12	24
Nominal wattage	W	2.2	2.5
Test voltage	V	13.5	28
Rated wattage	W	2.2 ± 15 %	2.5 ± 15 %
Rated luminous flux	lm	13 ± 30 %	12.5 ± 30 %
Rated truncated average life	h	1000	1000 (1
Dimensions	mm		
D		10.29 max	10.29 max
e		12.7 ± 2.2 %	12.7 ± 2.2 %
C		20.7 max	20.7 max
1) Under consideration			
The drawings intended only to indicate the dimensions essential for interchangeability			
 <p style="text-align: center;">IEC 707194</p>			
Base W2.1x9.5d according to sheet 7004-94, IEC-60061			
* The SAE type may be equipped with base W2.1x9.2d according to ANSI C81-61.			
IEC-60983	60983-IEC-2250-1	Date: 1995	

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP BASE : special		
Characteristics		Specifications and tolerances
Type		60983-IEC-2301
Designation: EUR/JIS/SAE		TX1.44/-/-
Nominal Voltage	V	12
Nominal wattage	W	1.4
Test voltage	V	13.5
Rated wattage	W	$1.4 \pm 10 \%$
Rated luminous flux	lm	$8.0 \pm 15 \%$
Rated truncated average life	h	1500 (1)
Lumen maintenance	%	(1)
Dimensions	mm	
Lateral deviation (2)		1.0 (3 max
β	(°)	± 15
a1		$5.0 \pm 0.5 \%$
a2		3.2 max
D		5.8 max
d1		0.41 ± 0.02 nom
e		12.0 ± 0.8
C		14.5 max
C1		$3.5 + 0.5$ (1)
<p>1) Under consideration.</p> <p>2) Maximum lateral deviation of filament center from two mutually perpendicular planes both containing the reference axis and one containing the axis X-X.</p> <p>3) Under consideration 0.7 r.</p>		
<p>The drawings intended only to indicate the dimensions essential for interchangeability</p> 		
IEC-60983	60983-IEC-2300-1	Date: 1995

MINIATURE LAMP DATA SHEET ROAD VEHICLE LAMP CAP : BX8.4d								
Characteristics		Specifications and tolerances						
Type: 60983-IEC- Designation: EUR/JIS/SAE		2401 -/-	2402 -/-	2403 -/-	2404 -/-	2405 -/-	2406 -/-	2407 -/-
Nominal Voltage	V	12	12	12	12	12	12	12
Nominal wattage	W	1.1	1.2	1.3	1.5	1.9	2.0	2.3
Test voltage	V	13.5	13.5	13.5	13.5	13.5	13.5	13.5
Rated wattage	W	1.1 ±15	1.3 ±15	1.3 ±15	1.8 ±15	2.0 ±15	2.1 ±15	2.3 ±15
Rated luminous flux	lm	3.1 ±25	7.5 ±25	6.5 ±25	6.5 ±25	10.0±25	11.8±25	17.3±25
Rated truncated average life	h ₍₁₎	500 5000	600 3000	1300 6000	1700 6500	750 3000	1500 6000	350 1200
Dimensions	mm							
D		5.3 max	5.3 max	5.3 max	5.3 max	5.3 max	5.3 max	5.3 max
e		8.5 ±1.5	8.5 ±1.5	8.5 ±1.5	8.5 ±1.5	8.5 ±1.5	8.5 ±1.5	9.2 ±1.5
C		12 max	12 max	13 max	12 max	12 max	12 max	13 max
1) Definition of life as specified in IEC-60810.								
The drawings intended only to indicate the dimensions essential for interchangeability								
 <p style="text-align: right;">IEC 363/05</p>								
Cap BX8.4d according to sheet 7004-140, IEC-60061-1								
IEC-60983		60983-IEC-2400-1				Date: 1995		

Section 3: Torch lamps

3-1 Scope

This section covers miniature filament lamps to be used in torches.

3-2 Definitions

For the purposes of this section, the definitions of section 1 apply, together with the following.

3-2-1 Torch

Portable luminaire fed by a built-in power source, usually a dry battery or an accumulator (sometimes a manual generator). (IEV 845-10-23).

NOTE: In French, the term "lamp torche" refers to a torch with a cylindrical container.

3-3 Marking

The following information shall be legibly and durably marked on the lamp:

trade name or mark of the manufacturer or the responsible vendor

trade number and/or nominal voltage

In addition other information may be marked, e.g. nominal wattage

Compliance is checked by rubbing by hand with a smooth cloth, dampened with water, for a period of 15 s.

After this test the marking shall be legible.

3-4 Technical requirements

The test voltage shall be the nominal voltage. Lamps shall comply with the general requirements given in clause 1.5.

3-4-1 Initial readings

After the ageing period, current and luminous flux of a lamp operated at test voltage shall comply with the requirements specified on the relevant data sheet. A suitable integrating photometer shall be used for measuring the luminous flux.

3-4-2 rrrr

During the life test, lamps shall be operated at test voltage of either d.c. or a.c. with a frequency between 40 Hz and 60 Hz in a horizontal position at room temperature not exceeding 30 °C.

There shall be no fluctuations of the supply voltage. However, momentary fluctuations (1 min), not exceeding ± 1 % of the test voltage, are allowed.

The average life of the test sample shall be not less than the rated life specified on the relevant data sheet.

3-4-3 Lumen maintenance

The lumen maintenance, if required, shall comply with the value specified on the relevant data sheet.

Lamps which fail to comply are deemed to have a life of 75 % of rated life.

3-4-4 Torsion strength

When a torsion strength is specified on the relevant data sheet for a lamp type, each lamp shall withstand the specified torsion strength without visible relative movement between the cap and the bulb.

For the test, the cap shall be retained firmly without distortion and the torque shall be gradually increased in clockwise direction until the specified value is reached.

3-5 Data sheets: Lamps for torches

3-5-1 List of lamps covered by the different data sheets

Nominal Voltage V	Rated current A	Cap	Type	Data sheet Number
2.8	0.85	EY10	60983-IEC-2011	60983-IEC-3010
4.0	0.50	EY10	60983-IEC-2012	
4.0	0.85	EY10	60983-IEC-2051	
5.2	0.52	EY10	60983-IEC-2052	
5.2	0.85	EY10	60983-IEC-2053	
6.5	0.70	EY10	60983-IEC-2101	
2.8	0.85	P13.5s	60983-IEC-2102	60983-IEC-3050
4.0	0.50	P13.5s	60983-IEC-2151	
4.0	0.85	P13.5s	60983-IEC-2152	
5.2	0.50	P13.5s	60983-IEC-2153	
5.2	0.85	P13.5s	60983-IEC-2201	
6.5	0.70	P13.5s	60983-IEC-2202	
2.2	0.47	P13.5s	60983-IEC-2251	60983-IEC-3100
2.4	0.70	P13.5s	60983-IEC-2252	
3.6	0.75	P13.5s	60983-IEC-2301	
6.0	0.75	P13.5s	60983-IEC-2401	
4.8	0.75	P13.5s	60983-IEC-2402	
7.2	0.55	P13.5s	60983-IEC-2403	
2.4	0.85	P13.5s	60983-IEC-2404	
3.6	0.85	P13.5s	60983-IEC-2405	
4.8	0.85	P13.5s	60983-IEC-2406	

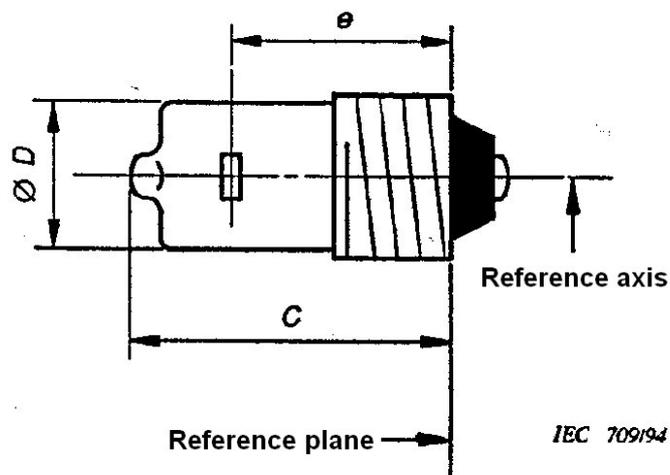
MINIATURE LAMP
DATA SHEET
HALOGEN LAMP FOR TORCHES
CAP : EY10

Nominal Voltage V	Current A		Minimum luminous flux lm	Rated Average life	Type	ANSI designation
	Rated	Max				
2.8	0.85	0.90	28	10	60983-IEC-3011	
4.0	0.50	0.53	26	15	60983-IEC-3012	
4.0	0.85	0.90	48	25	60983-IEC-3013	
5.2	0.50	0.54	38	15	60983-IEC-3014	
5.2	0.85	0.91	70	25	60983-IEC-3015	
6.5	0.7	0.75	72	25	60983-IEC-3016	

Lumen maintenance: 80 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter



Dimensions	Max	Min
D	9.3	-
e	18	16
C	31	-

Cap EY10 according to sheet 7004-7 IEC-60061

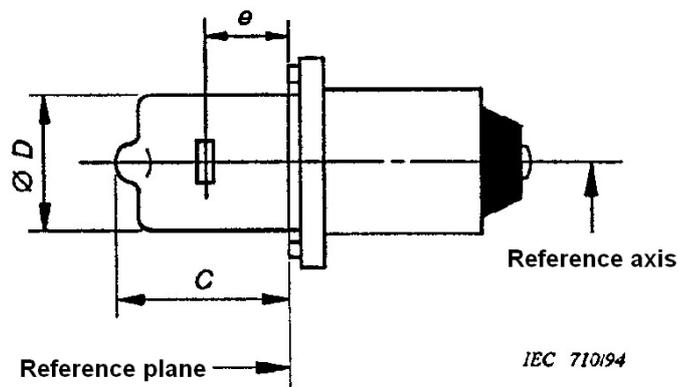
MINIATURE LAMP
DATA SHEET
HALOGEN LAMP FOR TORCHES
CAP : P13.5s

Nominal Voltage V	Current A		Minimum luminous flux lm	Rated Average life	Type	ANSI designation
	Rated	Max				
2.8	0.85	0.90	28	10	60983-IEC-3051	HPR52
4.0	0.50	0.53	26	15	60983-IEC-3052	HPR54
4.0	0.85	0.90	48	25	60983-IEC-3053	HPR53
5.2	0.50	0.54	38	15	60983-IEC-3054	HPR55
5.2	0.85	0.91	70	25	60983-IEC-3055	HPR50
6.5	0.7	0.75	72	25	60983-IEC-3056	HPR51

Lumen maintenance: 80 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter



Dimensions	Max	Min
D	9.3	-
e	6.6	6.1
C	15.6	-

Cap P13.5s according to sheet 7004-40, IEC-60061 – The use of the cap PX13.5s is permitted (7004-35)

MINIATURE LAMP
DATA SHEET
LAMP FOR TORCHES
CAP : P13.5s

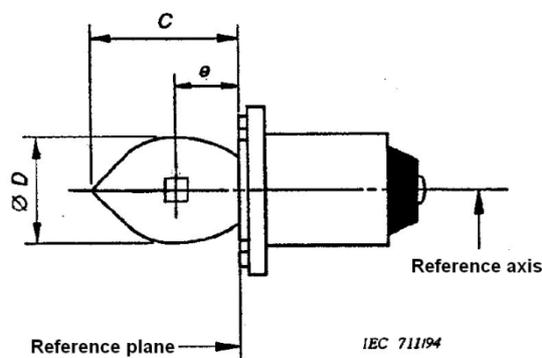
Nominal Voltage V	Current A		Minimum luminous flux lm	Rated Average life	Type	ANSI designation
	Rated	Max				
2.2	0.47	0.50	5.5	15	60983-IEC-3101	KPR104
2.4	0.70	0.74	15	15	60983-IEC-3102	KPR102
3.6	0.75	0.83	31	20	60983-IEC-3103	KPR103
6.0	0.75	0.80	63	20	60983-IEC-3104	KPR112
4.8	0.75	0.84	46	20	60983-IEC-3105	KPR113
7.2	0.55	0.58	60	15	60983-IEC-3106	KPR118
2.4	0.85	0.95	20	15	60983-IEC-3107	-
3.6	0.85	0.90	41	15	60983-IEC-3108	-
4.8	0.85	0.90	59	15	60983-IEC-3109	-

Lumen maintenance: 80 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability

Dimensions in millimeter



Dimensions	Max	Min
D	11.3	-
e	6.6	6.1
C	15.6	-

Cap P13.5s according to sheet 7004-40, IEC-60061 – The use of the cap PX13.5s is permitted (7004-35)

Section 4: Lamps for miners' caplights

4-1 Scope

This section specifies requirements for lamps used in miners' caplights, or in other miners' portable luminaires as main and/or auxiliary light source. It describes methods of test to be used and gives the conditions of compliance for a batch of lamps.

NOTE: In some countries, national regulations may take precedence over the requirements of this standard.

4-2 Definitions

For the purposes of this section, the definitions of section 1 apply, together with the following:

- 4-2-1 caplight: Apparatus comprising a headpiece, connecting cable and rechargeable secondary cell(s)/battery in a container. (EN 50033)
- 4-2-2 main lamp: Source intended to provide a primary source of light.
- 4-2-3 auxiliary lamp: Source intended to provide a secondary source of light.
- 4-2-4 batch: All the lamps of one type manufactured under conditions which are presumed uniform.
- 4-2-5 inspection test: Test for visual, mechanical and physical characteristics.
- 4-2-6 rating test: Test for initial current and luminous flux made at the end of the ageing period.
- 4-2-7 life test: Test in which lamps are operated under specified conditions for a specified time or to the end of life and during which photometric and electrical measurements may be made at specified intervals. (IEV 845-07-62).
- 4-2-8 elevated temperature test: Test or series of tests made on an elevated temperature test sample for the purpose of checking compliance of the design of a given product with the requirements of this standard.
- 4-2-9 elevated temperature test sample: Sample consisting of one or more similar units submitted by the manufacturer or responsible vendor for the purpose of an optional elevated temperature test.
- 4-2-10 inspection test quantity (ITQ): Sample of lamps required to be tested in accordance with the inspection test.

IEV 845-10-51, which differs from EN 50033 is currently due for updating.
- 4-2-11 rating test quantity (RTQ): Sample of lamps required to be tested in accordance with the rating test.

- 4-2-12 life test quantity (LTQ): Sample of lamps required to be tested in accordance with the life test.
- 4-2-13 elevated temperature test quantity (TTQ): Sample of lamps required to be tested in accordance with the elevated temperature test.
- 4-2-14 lateral deviation: Perpendicular distance from the geometric centre of the filament to the reference axis of the cap.
- 4-2-15 average life: Arithmetic mean of the lives of the individual lamps of the LTQ or TTQ.

4-3 Requirements

4-3-1 General requirements

Main lamps shall comply with all of the following requirements.

Auxiliary lamps shall comply with the requirements of annex A.

Tests shall be carried out at an ambient temperature of 15 °C to 30 °C unless otherwise specified.

The test voltage shall be the nominal voltage.

4-3-2 Marking

4-3-2-1 Mandatory marking

The cap of each lamp shall be distinctly and durably marked with the following information:

- a) nominal voltage (see note 3)
- b) rated current (see note 3)
- c) trade name or mark of the manufacturer or the responsible vendor.

NOTES:

Marking with an approval mark may be required by the approving authority.

Other markings are permitted provided they do not lead to confusion.

It is permissible to use an abbreviated code for voltage and current ratings.

The packaging of each lamp shall be distinctly and durably marked with the information specified above and, in addition, with the following information:

- a) cap type
- b) halogen, if appropriate.

NOTE: Other markings are permitted provided they do not lead to confusion.

4-3-2-2 Non-mandatory marking

When necessary the lamp and/or the packaging can be marked batch.

4-3-3 Bulbs

Bulbs shall be either clear or granulated and uncoloured.

NOTE: Bulbs should be supplied clear unless specified otherwise by the user.

4-3-4 Dimensions

The lamps shall comply with the dimensions shown on the relevant lamp data sheet.

4-3-5 Cap torsion test

For E10 capped lamps the cap and bulb shall withstand a torque of 0,23 Nm without visible relative movement between them.

4-3-6 Cap solder

Solder shall be evenly applied in such quantity as to allow proper engagement of the cap in the appropriate holder for the lamp and to ensure satisfactory electrical contact.

NOTE: It is not essential that the surface of the contact plate be completely covered with solder.

4-3-7 Initial ageing, rated current and rated photometric requirements

The initial requirements after ageing shall be in accordance with the data specified on the relevant data sheets and the compliance requirements given in 4.6.2 to 4.6.5.

4-3-8 Lumen maintenance

The lumen maintenance of individual lamps shall be measured at (75 ± 5) % of the minimum average life specified in the relevant lamp data sheet. If any lamp fails to comply with the specified minimum lumen maintenance it shall be deemed to have a life of 75 % of the specified minimum life.

4-3-9 Life

The life of the LTQ or TTQ shall be taken as being the arithmetic mean of the lives of the individual lamps of the LTQ or TTQ. It shall meet the compliance requirements given in 4.6.6.

4-3-10 Non-mandatory elevated temperature test

Where there is mutual agreement between the supplier/vendor and the test authority that life tests at an elevated ambient temperature are necessary, these

tests shall be conducted at an ambient temperature of (80 ± 2) °C. All other test methods and all requirements shall remain the same as for normal life tests.

4-4 Sampling test quantities

4-4-1 Inspection test quantity (ITQ) (For testing in accordance with the requirements of 4.3.2 to 4.3.6, the ITQ shall be 5 % of the batch, with a minimum of 35 lamps and a maximum of 70 lamps.

In order to ensure proper representation of the batch, the ITQ shall be selected at random as given in (a to c).

a) For a batch of 1 000 lamps or less, packed in 10 or less containers, lamps shall be selected from every container.

b) For a batch of 1 000 lamps or less, packed in more than 10 containers, lamps shall be selected from at least one-half of the total number of containers, with a minimum of 10 containers.

c) For a batch of more than 1 000 lamps, lamps shall be selected, as far as possible, from one-third of the total number of containers with a minimum of 10 containers.

4-4-2 Rating test quantity (RTQ).

For testing in accordance with the requirements of 4.3.7, the RTQ shall be five-sevenths of the ITQ selected at random from the lamps of the ITQ which satisfy the individual lamp requirements of the inspection test. If a fraction results from this calculation, the next highest whole number shall be taken.

4-4-3 Life test quantity (LTQ).

For testing in accordance with the requirements of 4.3.9, the LTQ shall be half of the RTQ selected at random from the lamps of the RTQ which satisfy the individual lamp requirements of the rating test. If a fraction results from this calculation, the next highest whole number shall be taken.

4-4-4 Elevated temperature test quantity (TTQ).

The non-mandatory elevated temperature test quantity shall be a minimum of 13 lamps and shall be representative of the materials, processing and construction of the manufactured product.

4-4-5 Accidentally broken lamps

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

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

4-5 Test methods

The test voltage shall be the nominal voltage.

4-5-1 Ageing

The lamps shall be aged in a vertical cap-down or horizontal position for 2 h at the test voltage.

4-5-2 Torsion strength

When a torsion strength is specified on the relevant data sheet for a lamp type, each lamp shall withstand the specified torsion strength without visible relative movement between the cap and the bulb.

For the test the cap shall be retained firmly without distortion and the torque shall be gradually increased in clockwise direction until the specified value is reached.

4-5-3 Supply voltage and control

The supply voltage shall be the test voltage and shall be either d.c. or a.c. at a nominal frequency of 50 Hz or 60 Hz. The mean value of the supply voltage throughout the test shall be within ± 1 % of the test voltage.

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

4-5-4 Initial current and luminous flux

Following a period of ageing as specified in 4.5.1, the measurements shall be made after an uninterrupted period of operation of 4 min in a suitable integrating photometer.

4-5-5 Operating position for photometry

The lamps shall be operated in the vertical cap-down position.

4-5-6 Operating position for life test

The lamp shall be operated in a horizontal position with the horizontal plane containing the filament support wires for P13.5s capped lamps.

4-5-7 Life test procedure

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

The test shall be deemed to have terminated at 150 % of the minimum average life specified on the relevant lamp data sheet. Any lamps still operating shall be deemed to have a life % 100 of the specified minimum average life. A lamp which burns out at less than 150 % of the specified minimum average life shall be deemed to have a life equal to the number of hours at burn-out.

4-5-8 Durability of marking

Lamp marking shall be checked by rubbing by hand with a smooth cloth, dampened with water, for a period of 15 s.

After this test the marking shall remain legible.

4-6 Compliance requirements

- 4-6-1 The number of lamps failing to comply with the requirements for marking, bulbs dimensions, torsion strength and solder quality (4.3.2 to 4.3.6) shall not exceed the acceptance numbers given in table 1.
- 4-6-2 The number of lamps not operative at the end of the ageing period (4.3.7 and 4.5.1) shall not exceed the acceptance numbers given in table 2.
- 4-6-3 The number of lamps, the current of which is above the relevant maximum value specified in the relevant data sheet shall not exceed the acceptance number in table 3.
- 4-6-4 The number of lamps, the luminous flux of which is below the relevant minimum value specified in the relevant data sheet shall not exceed the acceptance number in table 3.
- 4-6-5 The total number of lamps outside the limits specified in 4.6.3 and 4.6.4 added together shall not exceed the acceptance number in table 4.

A lamp which is outside both limits, shall be counted once only.

- 4-6-6 For life test compliance the total number of:

a (lamps having less than 70 % of the rated average life specified in the relevant lamp data sheet; and

b (lamps having failed to comply with the minimum lumen maintenance specified in the relevant lamp data sheet, when tested in accordance with 4.3.8 shall not exceed the appropriate acceptance number in table 5.

The life of the LTQ or TTQ (as determined in accordance with 4.3.9) shall be not less than the following:

for 13 to 19 lamps: 90 % of the rated average life specified in the relevant lamp data sheet

for 20 to 25 lamps: 92,5 % of the rated average life specified in the relevant lamp data sheet.

NOTE: These values are lower than the minimum average life specified in the relevant lamp data sheet in order to cover the statistical uncertainty in testing small quantities.

4-7 Conditions of compliance

- 4-7-1 A batch of lamps shall be deemed to comply with this standard if all the requirements of clause 4.6 are satisfied for main lamps, and those of 4.6.1 and 4.6.6a for auxiliary lamps.
- 4-7-2 Where a batch of lamps has been elected to be tested to the non-mandatory elevated temperature test they shall be deemed to comply with this option if the requirements of 4.6.6 are satisfied.

Table 1

Inspection test quantities and acceptance numbers			
For any one subclause 4-3-2 to 4-3-6		For all subclauses 4-3-2 to 4-3-6	
ITQ	Acceptance number	ITQ	Acceptance number
35 to 54	3	34 to 44	5
55 to 70	4	45 to 56	6
		55 to 70	7

Table 2 – Ageing

Rating test quantities and acceptance numbers	
RTQ	Acceptance number
25 to 31	2
32 to 50	3

Table 3 – Current or luminous flux

Rating test quantities and acceptance numbers	
RTQ	Acceptance number
25 to 31	5
32 to 40	6
41 to 50	7

Table 4 – Current and luminous flux

Rating test quantities and acceptance numbers	
RTQ	Acceptance number

25 to 28	6
29 to 34	7
32 to 41	8
42 to 50	9

Table 5

Life test quantities and acceptance numbers	
LTQ or RTQ	Acceptance number
13 to 15	3
16 to 23	4
24 to 25	5

4-8 Data sheets: Lamps for miners' caplights

4-8-1 List of lamps covered by the different data sheets

Nominal Voltage V	Rated current A	Cap	Type	Source classification	Lamp data sheet Number
4.0	0.75	P13.5s	60983-IEC-4011	Main lamp	60983-IEC-4010
4.0	1.00	P13.5s	60983-IEC-4012	Main lamp	
4.0	1.25	P13.5s	60983-IEC-4013	Main lamp	
4.0	1.50	P13.5s	60983-IEC-4014	Main lamp	
4.0	1.00	P13.5s	60983-IEC-4021	Main lamp	60983-IEC-4020
4.0	0.90	E10	60983-IEC-4031	Main lamp	60983-IEC-4030
4.0	1.00	E10	60983-IEC-4032	Main lamp	
4.0	0.25	E10	60983-IEC-4111	Main lamp	60983-IEC-4110
4.0	0.46	E10	60983-IEC-4112	Main lamp	
4.0	0.30	E10	60983-IEC-4113	Main lamp	
2.5	1.00	BA15d/19	60983-IEC-4211	Main/reserve filament	60983-IEC-4210
2.5	1.00	BA15d/19	60983-IEC-4211A	Main/reserve filament	
3.75	1.00	BA15d/19	60983-IEC-4212	Main/reserve filament	
3.75	1.00	BA15d/19	60983-IEC-4212A	Main/reserve filament	
2.5	1.00	BA15d/19	60983-IEC-4221	Main/reserve filament	60983-IEC-4220
2.5	1.00	BA15d/19	60983-IEC-4221A	Main/reserve filament	
3.75	0.80	BA15d/19	60983-IEC-4222	Main/reserve filament	
3.75	0.80	BA15d/19	60983-IEC-4222A	Main/reserve filament	
3.75	0.90	BA15d/19	60983-IEC-4223	Main/reserve filament	
3.75	1.00	BA15d/19	60983-IEC-4224	Main/reserve filament	
3.75	1.00	BA15d/19	60983-IEC-4224A	Main/reserve filament	
3.75	1.00	BA15d/19	60983-IEC-4224B	Main/reserve filament	
3.75	1.10	BA15d/19	60983-IEC-4225	Main/reserve filament	
3.75	1.30	BA15d/19	60983-IEC-4226	Main/reserve filament	

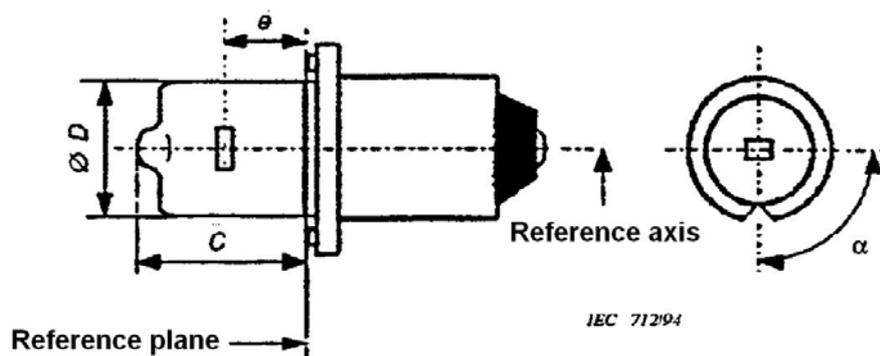
MINIATURE LAMP
DATA SHEET
MAIN HALOGEN LAMPS FOR MINERS' CAPLIGHTS
CAP : P13.5s

Nominal Voltage V	Current A		Minimum luminous flux lm	Rated average life h	Type number
	Rated	Max			
4.0	0.75	0.79	30	600	60983-IEC-4011
4.0	1.00	1.05	45	600	60983-IEC-4012
4.0	1.25	1.31	56	600	60983-IEC-4013
4.0	1.50	1.60	67	600	60983-IEC-4014

Lumen maintenance: 80 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter



Dimensions	Max	Min
D	10 (1)	-
e	6.8 (1)	6.3 (1)
C	16.5 (1)	-
α	110 (1)	70 (1)
Lateral deviation	0.6	-
1) Under consideration		

Cap P13.5s according to sheet 7004-40, IEC-60061 – The use of the cap PX13.5s is permitted (7004-35)

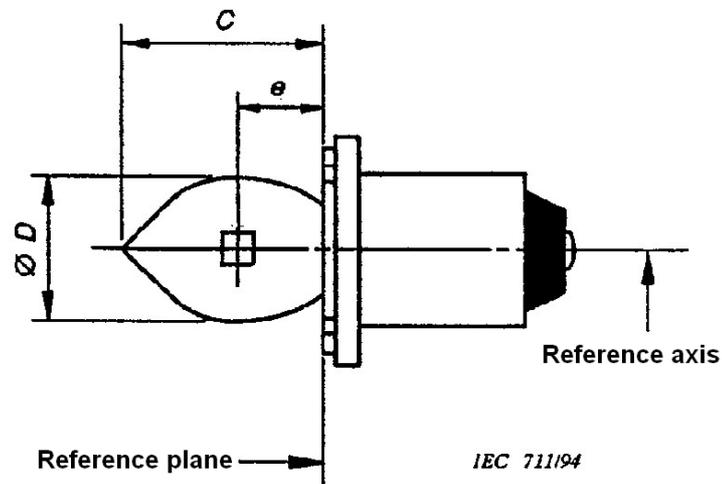
MINIATURE LAMP
DATA SHEET
MAIN LAMPS FOR MINERS' CAPLIGHTS
CAP : P13.5s

Nominal Voltage V	Current A		Minimum luminous flux lm	Rated average life h	Type number
	Rated	Max			
4.0	1.00	1.05	44	200	60983-IEC-4021

Lumen maintenance: 80 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter



Dimensions	Max	Min
D	11.3 (1)	-
e	7 (1)	6.4 (1)
C	16.5 (1)	-
Lateral deviation	0.3	-
1) Under consideration		

Cap P13.5s according to sheet 7004-40, IEC-60061 – The use of the cap PX13.5s is permitted
(7004-35)

MINIATURE LAMP
DATA SHEET
MAIN LAMPS FOR MINERS' CAPLIGHTS
CAP : E10

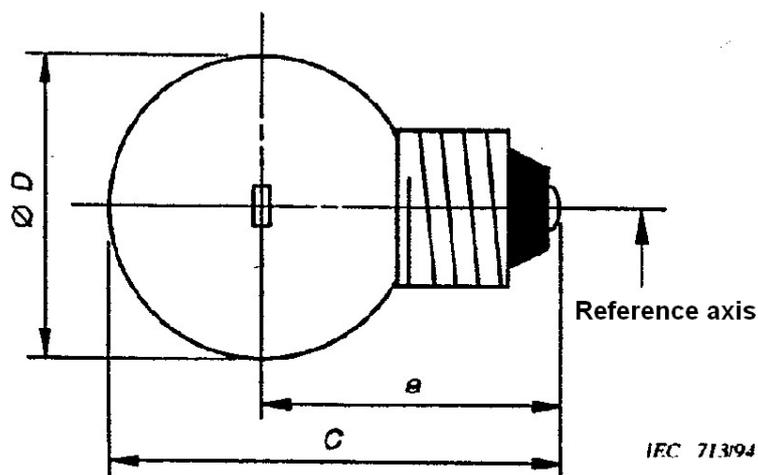
Nominal Voltage V	Current A		Minimum luminous flux lm	Rated average life h	Type number
	Rated	Max			
4.0	0.90	0.95	38	250	60983-IEC-4031
4.0	1.00	1.05	44	250	60983-IEC-4032

Lumen maintenance: 90 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability

Dimensions in millimeter



Dimensions	Max	Min
D	19.0	-
e	24.5	21.5
C	31.5	-
Lateral deviation	1.0	-

Cap E10 according to sheet 7004-22, IEC-60061

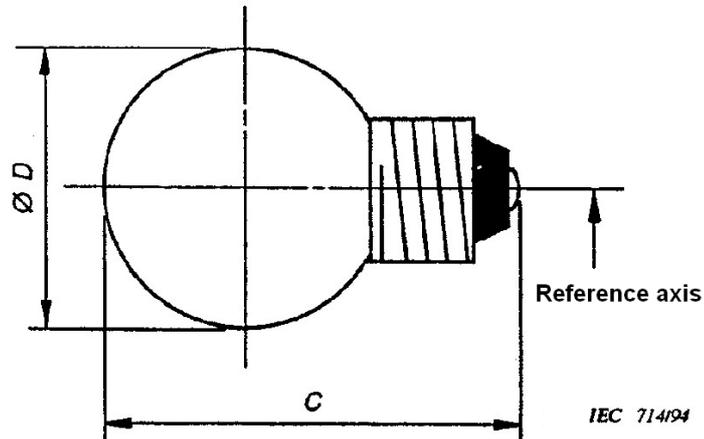
MINIATURE LAMP
DATA SHEET
AUXILIARY LAMPS FOR MINERS' CAPLIGHTS
CAP : E10

Nominal Voltage V	Current A		Rated average life h	Type number
	Rated	Max		
4.0	0.25	0.275	50	60983-IEC-4111
4.0	0.46	0.500	50	60983-IEC-4112
4.0	0.30	0.300	50	60983-IEC-4113

Lumen maintenance: 90 % at 75 % of rated life.

Operating position: any

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter



Dimensions	Max	Min
D	12.0	-
C	25.0	-

Cap E10 according to sheet 7004-22, IEC-60061

MINIATURE LAMP DATA SHEET MAIN / RESERVE LAMPS FOR MINERS' CAPLIGHTS CAP : BA15d/19					
Nominal Voltage V	Current A		Minimum luminous flux lm	Rated average life h (1)	Type number
	Rated	Max			
2.5	1.0	1.06	20	220	60983-IEC-4211
			23	300	60983-IEC-4211A
3.75	1.0	1.06	36	300	60983-IEC-4212
			45	400	60983-IEC-4212A

Lumen maintenance: 85 % at 75 % of rated life. Operating position: any
1) The values relate to main filament.

The drawings intended only to indicate the dimensions essential for interchangeability
Dimensions in millimeter

Note: The supply contact to the main filament / reserve filament is the right / left contact, viewing on the bottom of the cap and having the shell contact above.

* Reserve filament for the case of failing main filament

Dimensions	Max	Min
D	18.5	17.5
F	9.7	8.7
C	36	35

Cap BA15d/19 according to sheet 7004-11A, IEC-60061

Annex A

(Normative)

Auxiliary lamps

Auxiliary lamps shall be free from defects detrimental to service and comply with the relevant requirements, test quantities, test methods and compliance requirements, with the exception that clauses 4.3.7, 4.3.8, 4.3.10, 4.4.4, 4.5.1, 4.5.4, 4.5.5, 4.6.2, 4.6.3, 4.6.4, 4.6.5, 4.6.6b and 4.7.2 shall not apply.

Annex B**(Informative)****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.

In accordance with ISO 2859 test quantities, quality limits and acceptance 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 g) below; then, if the batch were tested by sampling in accordance with this standard, there would be at least a $(\frac{1}{3})^{0.970}$ probability that it would meet the condition of compliance for that requirement or group of requirements.

- a) 98 % of the lamps satisfy each single mechanical or physical requirement of 4.3.2 to 4.3.6 and the ageing requirement
- b) 95 % of the lamps satisfy all the requirements of 4.3.2 to 4.3.6
- c) 93 % of the lamps satisfy the requirements for current
- d) 93 % of the lamps satisfy the requirements for luminous flux
- e) 91 % of the lamps satisfy the requirements for both current and luminous flux
- f) 93 % of the lamps satisfy the individual life requirement
- g) the average life is at the minimum specified

The preliminary draft of this standard has been developed by the work team composed of:

Name	Agency
1. . AbdulRahman Saddiq Al-Fattani	Saudi Arabian Airlines – Jeddah

The draft standard was studied and the comments received thereon from concerned bodies discussed. It has been adopted in its present form, by the following members of Technical Committee No. (4):

Name	Agency
1-Dr. Mohammed Salah Simaie	King Abdul Aziz City for Sciences & Technology
2-Dr. Ibrahim Omar Habiballah	King Fahad University for Petroleum & Mineral
3-Eng. Mohammed J. Yousef Saleh	Saudi Lighting Company
4-Eng. Abbas Mohammad Abo Al-Naja	Ministry of Transportation
5-Dr. Rizk Elsayed	King saud University –faculty of Engineering
6-Eng. Abdulrahman alfutni	Saudi airlines
7-Eng. Mohamed bazz	Saudi Electricity Company
8-Eng. Ibrahim Elmohani	SASO-Riyadh
9-Eng. Soliman M Elshahat	SASO-Riyadh