

Tungsten halogen lamps (non-vehicle) — Performance specifications (IEC 60357:2002, modified)

ICS 29.140.20

National foreword

This British Standard is the UK implementation of EN 60357:2003+A11:2016. It is derived from IEC 60357:2002, incorporating amendments 1:2006, 2:2008 and 3:2011. It supersedes BS EN 60357:2003+A3:2011 which is withdrawn.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by common modification tags **C** **C**.

The start and finish of text introduced or altered by amendment is indicated in the text by tags. Tags indicating changes to CEN text carry the number of the IEC amendment. For example, text altered by IEC amendment 1 is indicated by **A**₁ **A**₁.

Where a common modification to an IEC amendment has been introduced, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC to IEC amendment 1 are indicated by **C**₁ **C**₁.

Where a common modification has been introduced by CENELEC amendment, the tags carry the number of the amendment. For example, the common modifications introduced by CENELEC amendment A11 are indicated by **C**₁₁ **C**₁₁.

The UK participation in its preparation was entrusted by Technical Committee CPL/34, Lamps and related equipment, to Subcommittee CPL/34/1, Electric lamps.

A list of organizations represented on this subcommittee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

Amendments/corrigenda issued since publication

Date	Comments
28 February 2010	Implementation of IEC amendment 1:2006 with CENELEC modifications and IEC amendment 2:2008 with CENELEC endorsement A2:2008
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English version

**Tungsten halogen lamps (non-vehicle) -
Performance specifications
(IEC 60357:2002, modified)**

Lampes tungstène-halogène
(véhicules exceptés) -
Prescriptions de performances
(CEI 60357:2002, modifiée)

Halogen-Glühlampen
(Fahrzeuglampen ausgenommen) -
Anforderungen an die Arbeitsweise
(IEC 60357:2002, modifiziert)

This European Standard was approved by CENELEC on 2002-12-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 34A/1001/FDIS, future edition 3 of IEC 60357, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60357 on 2002-12-01.

By Technical Board decision D115/066 it was decided that the common modifications to the previous edition should be maintained.

This European Standard Supersedes EN 60357:1988 + A4:1991 + A5:1993 + A6:1994 + A7:1994 + A8:1995 + A9:1996 + A10:1997 + A11:1997 + A12:1999 + A13:2000.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
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- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2005-12-01

Annexes designated "normative" are part of the body of the standard.

Annexes designated "informative" are given for information only.

In this standard, annexes A, B and ZA are normative and annexes C, D and E are informative.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60357:2002 was approved by CENELEC as a European Standard with agreed common modifications.

Foreword to amendment A1

The text of amendment 1:2006 to the International Standard IEC 60357:2002, prepared by 34A, Lamps, of IEC TC 34, Lamps and related equipment, together with common modifications prepared by CENELEC Reporting Secretariat SR 34A, was submitted to the formal vote and was approved by CENELEC as amendment A1 to EN 60357:2003 on 2008-03-01.

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- latest date by which the national standards conflicting
with the amendment have to be withdrawn (dow) 2011-03-01

Edorsement notice

The text of amendment 1:2006 to the International Standard IEC 60357:2002 was approved by CENELEC as an amendment to the European Standard with agreed common modifications.

Foreword to amendment A2

The text of document 34A/1246/CDV, future amendment 2 to IEC 60357:2002, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A2 to EN 60357:2003 on 2008-11-01.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2009-08-01
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2011-11-01

Endorsement notice

The text of amendment 2:2008 to the International Standard IEC 60357:2002 was approved by CENELEC as an amendment to the European Standard without any modification.

Foreword to amendment A3

The text of document 34A/1394/CDV, future amendment 3 to IEC 60357:2002, prepared by SC 34A, Lamps, of IEC TC 34, Lamps and related equipment, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as amendment A3 to EN 60357:2003 on 2011-03-03.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN and CENELEC shall not be held responsible for identifying any or all such patent rights.

The following dates were fixed:

- latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2011-12-03
- latest date by which the national standards conflicting with the amendment have to be withdrawn (dow) 2014-03-03

Endorsement notice

The text of amendment 3:2011 to the International Standard IEC 60357:2002 was approved by CENELEC as an amendment to the European Standard without any modification.

Foreword to amendment A11

This document (EN 60357:2003/A11:2016) has been prepared by CLC/TC 34A "Lamps".

The following dates are fixed:

- latest date by which this document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2017-03-14
- latest date by which the national standards conflicting with this document have to be withdrawn (dow) 2019-03-14

Clauses, subclauses, notes, tables, figures and annexes which are additional to those in IEC 60357:2002 and its amendments are prefixed "Z".

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

This standard provides test methods related to parameters as prescribed by Commission Regulation (EC) 244/2009, Commission Regulation (EU) 1194/2012 and Commission Regulation (EU) 874/2012 while conformity assessment (sampling, conformity procedures as well as limits) for market surveillance are specified in the text of the above Regulations.

This document has been prepared under a mandate given to CENELEC by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For the relationship with EU Directive(s) see informative Annex ZZA, ZZB and ZZC, which are integral parts of this document.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
		Light and lighting – Measurement and presentation of photometric data of lamps and luminaires – Part 1: Measurement and file format	EN 13032-1 A1	2004 2012
		Light and lighting — Measurement and presentation of photometric data of lamps and luminaires — Part 2: Presentation of data for indoor and outdoor work places	EN 13032-2	2004
		Light and lighting – Measurement and presentation of photometric data – Part 4: LED lamps, modules and luminaires	EN 13032-4	2015
IEC 60050-845	-	International Electrotechnical Vocabulary—Lighting	-	-
IEC 60061-1	-	Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps	EN 60061-1	-
IEC 60432-2	-	Incandescent lamps - Safety specifications Part 2: Tungsten halogen lamps for domestic and similar general lighting purposes	EN 60432-2	-
IEC 60432-3	-	Incandescent lamps - Safety specifications Part 3: Tungsten halogen lamps (non-vehicle)	EN 60432-3	-
IEC 60630	-	Maximum lamp outlines for incandescent lamps	EN 60630	-
IEC 60969	201x	Self-ballasted compact fluorescent lamps for general lighting services - Performance requirements	FprEN 60969 FprAA	2013 2014
IEC/TR 61341	2010	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps	EN 61341	2011
CIE 13.3	1995	Method of Measuring and Specifying Colour Rendering Properties of Light Source	-	-
CIE 015	2004	Colorimetry	-	-
CIE 63	1984	The spectroradiometric Measurement of light sources	-	-
CIE 84	1989	The measurement of luminous flux	-	-

Annex ZZA (informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EC) No 244/2009 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps [2009 OJ L76].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA Regulations.

Table ZZA.1 – Correspondence between this European Standard and Commission Regulation (EC) No 244/2009 of 18 March 2009 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for non-directional household lamps [2009 OJ L76] and Commission's standardization request M/495

Ecodesign requirements of Regulation No 244/2009 [2009 OJ L76]	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Annex II, Article 1	Clause 1.4.1, Annex A	Lamp power
Annex II, Article 1	Annex A	Luminous flux
Annex II Table 5	Annex A	Lamp life
Annex II Table 5	Annex A	Lumen maintenance
Annex II Table 5	Clause 1.4.Z7	Number of switching cycles before failure
Annex II Table 5	Annex A	Premature failure rate
Annex II Table 5	Clause 1.4.Z3	Starting time
Annex II Table 5	Clause 1.4.Z3	Warm-up time to 60% ϕ
Article 1 (a)	Clause 1.4.Z2	Chromaticity coordinates
Annex II, Article 3.2 (h), Table 3	Clause 1.4.Z4 and Annex A	Colour rendering index (CRI)
Annex II, article 3.1 (d)	Clause 1.4.Z2	Correlated colour temperature (CCT)
Annex II Table 5	Clause 1.4.Z5	Power factor (only for lamps with integrated control gear)
Annex II 3.1. (h)	Clause 1.4.3	Lamp dimensions
Annex II 3.1. (f)	Clause 1.4.Z6	Dimmability
Annex II 3.1. (g)	Not applicable	Information on design for non-standard conditions

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this

standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard.

Annex ZZB (informative)

Relationship between this European Standard and the ecodesign requirements of Commission Regulation (EU) No 1194/2012 aimed to be covered

This European Standard has been prepared under a Commission's standardization request M/495 to provide one voluntary means of conforming to the ecodesign requirements of Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment [2012 OJ L342].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZB.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding ecodesign requirements of that Regulation and associated EFTA Regulations.

Table ZZB.1 – Correspondence between this European Standard and Commission Regulation (EU) No 1194/2012 of 12 December 2012 implementing Directive 2009/125/EC of the European Parliament and of the Council with regard to ecodesign requirements for directional lamps, light emitting diode lamps and related equipment [2012 OJ L342] and Commission's standardization request M/495

Ecodesign requirements of Regulation No 1194/2012 [2012 OJ L342]	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Annex III, article 1 Annex III, Table 4	Clause 1.4.1, Annex A	Lamp power
Annex III, article 3.1.1, 3.1.2 (a), 3.1.3 (c)	Annex A	Useful luminous flux
Annex III, article 3.1.2 (i), 3.1.3 (k)	Annex A	Beam angle
Annex III, Table 4	Annex A	Lamp life
Annex III, Table 4, Table 7	Annex A	Lumen maintenance
Annex III, Table 4	Clause 1.4.Z7	Number of switching cycles before failure, number of switching cycles in accordance with Commission regulation 244/2009
Annex III, Table 4	Annex A	Premature failure rate
Annex III, Table 4	Clause 1.4.Z3	Starting time
Annex III, Table 4	Clause 1.4.Z3	Warm-up time to 60% ϕ
Annex I	Clause 1.4.Z2	Chromaticity coordinates
Annex III, article 3.1.3 (h)	Clause 1.4.Z4 and Annex A	Colour rendering index (CRI)
Annex III, article 3.1.1, 3.1.2 (c)	Clause 1.4.Z2	Correlated colour temperature (CCT)
Annex III, Table 4	Clause 1.4.Z5	Power factor (only for lamps with integrated control gear)

Annex III, article 3.1.2 (h),	Clause 1.4.3	Lamp dimensions
Annex III, article 3.1.3 (m)	Clause 1.4.Z1	Spectral power distribution
Annex III, article 3.1.2 (f)	Clause 1.4.Z6	Dimmability
Annex III, article 3.1.2 (k, l, m)	Clause 1.4.3.Z2	Lamp type (MR11 GU4 etc.)
Annex III, article 3.1.3 (j)	Annex A	Peak intensity in candela
	Not applicable	Information on design for non-standard conditions

WARNING 1 — Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2 — Other Union legislation may be applicable to the products falling within the scope of this standard.

Annex ZZC (informative)

Relationship between this European Standard and the energy labelling requirements of Commission Delegated Regulation (EU) No 874/2012 aimed to be covered

This European standard has been prepared under a Commission's standardisation request M/495 to provide one voluntary means of conforming to the energy labelling requirements of Commission Delegated Regulation (EU) No 874/2012 of 12 July 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of electrical lamps and luminaires [2012 OJ L258].

Once this standard is cited in the Official Journal of the European Union under that Regulation, compliance with the normative clauses of this standard given in Table ZZC.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding energy labelling requirements of that Regulation and associated EFTA Regulations.

Table ZZC.1 – Correspondence between this European Standard and Commission Delegated Regulation (EU) No 874/2012 of 12 July 2012 supplementing Directive 2010/30/EU of the European Parliament and of the Council with regard to energy labelling of electrical lamps and luminaires [2012 OJ L258] and Commission's standardisation request M/495

Energy labelling requirements of Regulation No 874/2012 [2012 OJ L258]	Clause(s) / sub-clause(s) of this EN	Remarks / Notes
Article 1	Annex A	Applicable parameter according to Article 1: luminous flux
Annex VII	Clause 1.4.1, Annex A	Lamp power
Annex VII	Annex A	Luminous flux (non-directional only)
Annex VII	Annex A	Useful luminous flux (directional only)
Annex VII	Annex A	Beam angle

WARNING 1: Presumption of conformity stays valid only as long as a reference to this European Standard is maintained in the list published in the Official Journal of the European Union. Users of this standard should consult frequently the latest list published in the Official Journal of the European Union.

WARNING 2: Other Union legislation may be applicable to the products falling within the scope of this standard.

CONTENTS

1	General	12
1.1	Scope	12
1.2	Normative references	12
1.3	Definitions	13
1.4	Lamp requirements	15
1.4.1	General	15
1.4.2	Caps and bases	16
1.4.3	Dimensions	16
1.4.4	Wattage	17
1.4.5	Photometric characteristics	17
1.4.6	Lumen maintenance and centre beam intensity maintenance	18
1.4.7	Cautionary notices for lamps without outer envelope	18
1.5	Information for luminaire design	19
1.6	General data sheets and lamp data sheets	19
1.6.1	Numbering system	19
1.6.2	General data sheets	20
1.6.3	Lamp data sheets	20
2	Projection lamps	61
3	Photographic lamps (including studio)	121
4	Floodlight lamps	153
5	Special purpose lamps	161
6	General purpose lamps	175
7	Stage lighting lamps	235
	Annex A (normative) Method of test for photometric, maintenance and life characteristics	241
	Annex B (normative) Symbols	244
	Annex C (informative) Information for luminaire design	245
	Annex D (informative) Bulb wall temperature measurement	248
	Annex E (informative) ILCOS codes	249
	Annex ZA (normative) Normative references to international publications with their corresponding European publications	257
	Bibliography	258

TUNGSTEN HALOGEN LAMPS (non-vehicle) – PERFORMANCE SPECIFICATIONS

1 General

1.0.Z1 Overall statement

Where a Commission Regulation specifies limits for parameters these limits shall be used instead of the limits specified in this standard. 

1.1 Scope

This International Standard specifies the performance requirements for single-capped and double-capped tungsten halogen lamps, having rated voltages of up to 250 V, used for the following applications:

- Projection (including cinematograph and still projection)
- Photographic (including studio)
- Floodlighting
- Special purpose
- General purpose
- Stage lighting

For some of the requirements given in this standard reference is made to "the relevant 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.

The requirements of this standard relate only to type testing.

NOTE The requirements and tolerances permitted by this standard correspond to testing of a type test sample, submitted by the manufacturer for that purpose. In principle this type test sample should consist of units having characteristics typical of the manufacturer's production and being as close to the production centre point values as possible.

It may be expected with the tolerances given in the standard that products manufactured in accordance with the type test sample will comply with the standard for the majority of production. Due to the production spread however, it is inevitable that there will sometimes be products outside the specified tolerances. For guidance on sampling plans and procedures for inspection by attributes, see IEC 60410.

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 60050-845: 1987, *International Electrotechnical Vocabulary (IEV) - Chapter 845: Lighting*

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

IEC 60432-2: *Incandescent lamps – Safety specifications – Part 2: Tungsten halogen lamps for domestic and similar general lighting purposes*

IEC 60432-3: *Incandescent lamps - Safety specifications – Part 3: Tungsten halogen lamps (non-vehicle)* ¹⁾

¹⁾ To be published.

IEC 61341: *Method of measurement of centre beam intensity and beam angle(s) of reflector lamps*

CIE 84: 1989, *The measurement of luminous flux*

1.3 Definitions

For the purpose of this International Standard, the following definitions apply, as well as others given in IEC 60050 (845):

1.3.1

tungsten halogen lamp

gas-filled lamp containing halogens or halogen compounds, the filament being of tungsten

1.3.2

single-capped tungsten halogen lamp

tungsten halogen lamp having a single cap or base

1.3.3

double-capped tungsten halogen lamp

tungsten halogen lamp having a cap or base on each end of the lamp

1.3.4

outer envelope

transparent or translucent enclosure containing a tungsten halogen light source.

NOTE The enclosure can also consist of a reflector with integral front cover.

1.3.5

rated value

quantity value for a characteristic of a lamp for specified operating conditions. The value and the conditions are specified in this standard, or assigned by the manufacturer or responsible vendor

NOTE In this standard, a number of data sheets still refer, in the French text, to "nominales" values, instead of "assignées", as an outdated translation of "rated".

1.3.6

rated voltage

voltage or voltage range specified in this standard or assigned by the manufacturer or responsible vendor

NOTE If lamps are marked with a voltage range, they are appropriate for use on any supply voltage within that range.

1.3.7

test voltage

rated voltage unless otherwise specified

NOTE If lamps are marked with a voltage range, the test voltage is the mean of the voltage range, unless otherwise specified.

1.3.8

rated wattage

wattage specified in this standard or assigned by the manufacturer or responsible vendor

1.3.9

rated current

current specified in this standard or assigned by the manufacturer or responsible vendor

1.3.10

test current

rated current unless otherwise specified

1.3.11

maximum pinch temperature

maximum temperature which the components in the pinch/seal of a lamp are designed to withstand over the expected life of the lamp

1.3.12

initial luminous flux

the luminous flux of a lamp after ageing

1.3.13

rated luminous flux

the value of the initial luminous flux of the lamp declared by the manufacturer or responsible vendor, the lamp being operated under specified conditions

1.3.14

lumen maintenance

the ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specified conditions

NOTE This ratio is generally expressed as a percentage.

1.3.15

centre beam intensity maintenance

the ratio of the centre beam intensity of a reflector lamp at a given time in its life to its initial centre beam intensity, the lamp being operated under specified conditions

NOTE This ratio is generally expressed as a percentage.

1.3.16

average life

the number of operating hours after which 50 % of a representative group of lamps have survived, when operated under specified test conditions (life to 50 % lamp failure)

1.3.17

rated average life

the average life declared by the manufacturer or responsible vendor

NOTE The rated average life is not necessarily the average of all individual lamp lives. It may only be used for comparison, since operating conditions in practice may differ from the specified conditions used in life testing.

1.3.18

end of life

instant when the energized lamp ceases to emit light

3.Z1

directional lamp

lamp having at least 80 % light output within a solid angle of π sr (corresponding to a cone with angle of 120°)

[SOURCE: Regulation 1194/2012 Article 2]

3.Z2

partial luminous flux (of a light source, within a specified cone angle)

luminous flux emitted from a light source within a specified cone angle α , determined from the luminous intensity distribution $I(\theta, \varphi)$ of the source:

$$\Phi_\alpha = \int_{\varphi=0}^{2\pi} \int_{\theta=0}^{\alpha/2} I(\theta, \varphi) \sin \theta \, d\theta \, d\varphi \quad (2)$$

Note 1 to entry: Partial luminous flux is expressed in lumen (lm)

Note 2 to entry: $(\theta, \varphi)=(0,0)$ is the direction of the cone axis

Note 3 to entry: The cone angle α is the full angle (diameter) of the cone

[SOURCE: EN 13032-4:2015, 3.41, modified, – Notes 4 and 5 removed]

3.Z3

useful luminous flux, Φ_{use}

partial luminous flux of a halogen lamp falling within the cone used for calculating the halogen lamp's energy efficiency according Annex III, point 1.1 of COMMISSION REGULATION (EU) No 1194/2012

Note 1 to entry: Useful luminous flux is expressed in lumen (lm)

Note 2 to entry: The regulation specifies 90° or 120° cones according to the product characteristics

Note 3 to entry: Useful luminous flux is similar to partial luminous flux. It is determined with the cone axis coincident with the observed optical beam axis of the light source, the axis about which the luminous intensity is substantially symmetrical 

1.4 Lamp requirements

1.4.1 General

The tungsten halogen lamps for which compliance with this standard is claimed, shall comply with the requirements of the relevant safety standard IEC 60432-2 or IEC 60432-3.

A lamp shall be so designed that its performance is reliable in normal and accepted use. In general this can be achieved by satisfying the requirements of the following subclauses.

The requirements apply to 95 % of production.

For the purpose of this standard the voltage designations shown in table 1 are used:

Table 1 - Voltage designations

A2	Voltage designation	Range of supply voltage	
	A	< 50 V	
	B	≥ 50 V and ≤ 150 V	
	C	> 150 V and ≤ 250 V	A2

1.4.2 Caps and bases

The requirements for lamp caps and bases are given in IEC 60061-1.

1.4.3 Dimensions

1.4.3.Z1 General

Lamps and, if applicable, filament dimensions shall comply with the values specified on the relevant lamp data sheet.

Measurement of the lamp dimensions shall be done with a caliper at 20 °C to 30 °C.

C11 1.4.3.Z2 Relationship between some types and Table 6 of COMMISSION REGULATION (EU) No 1194/2012

The following types, as listed in Table 6 of COMMISSION REGULATION (EU) No 1194/2012, are considered to be related to data sheet as given in the following Table Z1.

Table Z1 - Relationship between some types and Table 6 of COMMISSION REGULATION (EU) No 1194/2012

Type (as in Table 6 of 1194/2012)	Data sheet covering the type	Designation covered by the sheet
Mains-voltage blown glass reflector types		
R50/NR50	60630-IEC-1510- ¹	R50 E14
R63/NR63	60630-IEC-1520- ¹ 60630-IEC-1530- ¹	R63 E27 R63 B22d
R80/NR80	60630-IEC-1540- ¹ 60630-IEC-1550- ¹	R80 E27 R80 B22d
R95/NR95	60630-IEC-1570- ¹ 60630-IEC-1580- ¹	R95 E27 R95 B22d
R125	60630-IEC-1590- ¹ 60630-IEC-1600- ¹	R125 E27 R125 B22d

¹ These data sheets refer to lamp maximum outline dimensions in EN 60630. These lamps are not otherwise specified in this standard. **C11**

Table Z1 - Relationship between some types and Table 6 of COMMISSION REGULATION (EU) No 1194/2012 (cont.)

Type (as in Table 6 of 1194/2012)	Data sheet covering the type	Designation covered by the sheet
Mains-voltage pressed glass reflector types		
PAR16	60357-IEC-1015-	PAR16 GU10 (also called PAR50 GU10)
PAR16	60630-IEC-1510- ¹	PAR50 E14 (also called PAR16)
PAR20	60357-IEC-1016-	PAR20 GU10 (also called PAR63 GU10)
PAR20	60630-IEC-1520- ¹	PAR63 E27 (also called PAR20)
PAR25	60630-IEC-1540- ¹	PAR80 E27 (also called PAR25)
PAR30S	60630-IEC-1610- ¹	PAR95S E27 (also called PAR30S)
PAR38	60630-IEC-1620- ¹	PAR121 E27 (also called PAR38)
Extra-low voltage reflector type		
MR11 GU4	60357-IEC-6310-	MR11
MR11 GU4	60357-IEC-6315-	MR11
MR16 GU 5.3	60357-IEC-6320-	MR16
MR16 GU 5.3	60357-IEC-6325-	MR16
AR111	60357-IEC-6450-	AR111

1.4.4 Wattage

The initial wattage at test voltage of a tungsten halogen lamp shall not exceed 108 % of the rated wattage, except when the relevant lamp data sheet specifies 112 %.

1.4.5 Photometric characteristics

1.4.5.1 General purpose and floodlight lamps

- The initial reading of the luminous flux of a tungsten halogen lamp (or useful luminous flux for directional lamps) (lm) shall be not less than 85 % of the rated value.
- The initial reading of the centre beam intensity of a tungsten halogen reflector lamp shall be not less than 75 % of the rated value.
- The initial beam angle of a tungsten halogen reflector lamp shall be within ± 25 % of the rated value for all beam angles.

Conditions and method of test are given in annex A.

1.4.5.2 Other lamps

Under consideration.

¹ These data sheets refer to lamp maximum outline dimensions in EN 60630. These lamps are not otherwise specified in this standard.

1.4.6 Lumen maintenance and centre beam intensity maintenance

1.4.6.1 General purpose and floodlight lamps

- a) The lumen maintenance of a tungsten halogen lamp, at 75 % of rated average life, shall be not less than 80 % of the rated lumen maintenance value.
- b) The centre beam intensity maintenance of a tungsten halogen reflector lamp, at 75 % of rated average life, shall be not less than 80 % of the rated centre beam intensity maintenance value.

NOTE In Japan the maintenance values are 90 % at 50 % of rated average life.

Conditions and method of test are given in annex A.

1.4.6.2 Other lamps

Under consideration.

1.4.7 Cautionary notices for lamps without outer envelope

Tungsten halogen lamps without outer envelope shall be supplied with an appropriate cautionary notice based on the wording:

"Do not touch lamp with bare fingers".

Alternatively the immediate lamp wrapping or container may be marked with the appropriate pair of symbols as shown in B.1.

NOTE In the USA a written cautionary notice is required.

1.4.Z1

The measurement of the spectral power distribution shall be made under the condition of Annex A and in accordance with CIE 63.

1.4.Z2

The Correlated colour temperature (CCT) shall be calculated in accordance with CIE 015:2004.

1.4.Z3

The test for starting and warm-up times shall be in accordance with EN 60969:201x², B.3.

Starting time is determined as the period from the start of the test to when the lamp has fully completed the starting sequence (lamp has started and remains alight).

Warm-up time is the time taken from the start of the test to when the lamp achieves the required percentage of its stable luminous flux.

Halogen lamps without integrated controlgear are deemed to fulfil the starting time requirement by their technology. Testing is not needed.

² In preparation 

1.4.Z4

The Colour rendering index (CRI) of an individual lamp shall be calculated from the spectral power distribution in accordance with CIE 13.3:1995.

1.4.Z5

The determination of the power factor shall be in accordance with IEC/TR 61000-1-7:2016.

Halogen lamps without integrated controlgear are deemed to fulfil the power factor requirement by their technology. Testing is not needed.

1.4.Z6

Lamps without integrated control gear are deemed to be dimmable without testing.

Testing of other types is under consideration.

1.4.Z7

For switching requirements the test conditions shall be as specified in A.3.1. The switching cycle used shall be 1 min on and 3 min off. 

1.5 Information for luminaire design

Refer to annex C.

1.6 General data sheets and lamp data sheets

1.6.1 Numbering system

The first number represents the number of this publication (60357), followed by the letters "IEC".

The second number represents the group and the general or lamp data sheet number within that group.

– General data sheets	1000-1999
– Projection lamps data sheets	2000-2999
– Photographic lamps data sheets	3000-3999
– Floodlight lamps data sheets	4000-4999
– Special purpose lamps data sheets	5000-5999
– General purpose lamps data sheets	6000-6999
– Stage lighting lamps data sheets	7000-7999

The third number represents the edition of the page of the general data sheet or the lamp data sheet. In the case where a sheet has more than one page it is possible for the pages to have different edition numbers while the sheet number remains the same.

1.6.2 General data sheets

Sheet number	Title
60357-IEC-1001-	Principle of dimensioning of tubular tungsten halogen lamps fitted with caps R7s and RX7s
60357-IEC-1002-	Principle of dimensioning of tubular tungsten halogen lamps fitted with Fa4 caps
60357-IEC-1003-	Centring principle for 50 mm integral mirror tungsten halogen lamps with base GZ6.35
60357-IEC-1004-	Centring principle for 2 in integral mirror tungsten halogen lamps
60357-IEC-1005-	External dimensions of tungsten halogen projection lamps having a 2 in integral reflector and a GX5.3 or GY5.3 base
60357-IEC-1006-	Holding systems for 2 in integral mirror tungsten halogen lamps with bases GX5.3 or GY5.3
60357-IEC-1007-	Principle of dimensioning of single-ended flat filament tungsten-halogen projection lamps with G6.35 or GY6.35 bases
60357-IEC-1008-	Centring principle for 42 mm integral mirror tungsten halogen lamps with base GX5.3 or GY5.3
60357-IEC-1009-	External dimensions of tungsten halogen projection lamps having a 42 mm integral reflector and a GX5.3 or GY5.3 base
60357-IEC-1010-	External dimensions of tungsten halogen lamps having a 35 mm integral mirror and either a GZ4 or GU4 base
60357-IEC-1011-	External dimensions of tungsten halogen general purpose lamps having a 35 mm integral mirror and front cover
60357-IEC-1012-	External dimensions of tungsten halogen general purpose lamps having a 51 mm (2 in) integral mirror and front cover
60357-IEC-1013-	External dimensions of tungsten halogen general purpose lamps having a 51 mm (2 in) integral mirror
60357-IEC-1014-	External dimensions of general purpose tungsten halogen lamps having a 51 mm diameter integral mirror and front cover with GU7 base
60357-IEC-1015-	External dimensions of general purpose tungsten halogen lamps having a 51 mm diameter integral reflector and front cover, and a GZ10 or GU10 base
60357-IEC-1016-	External dimensions of general purpose tungsten halogen lamps having a 64 mm diameter integral reflector and front cover, and a GZ10 or GU10 base
60357-IEC-1017-	External dimensions of general purpose tungsten halogen lamps having a 111 mm diameter integral reflector and front cover, and a GZ10 or GU10 base

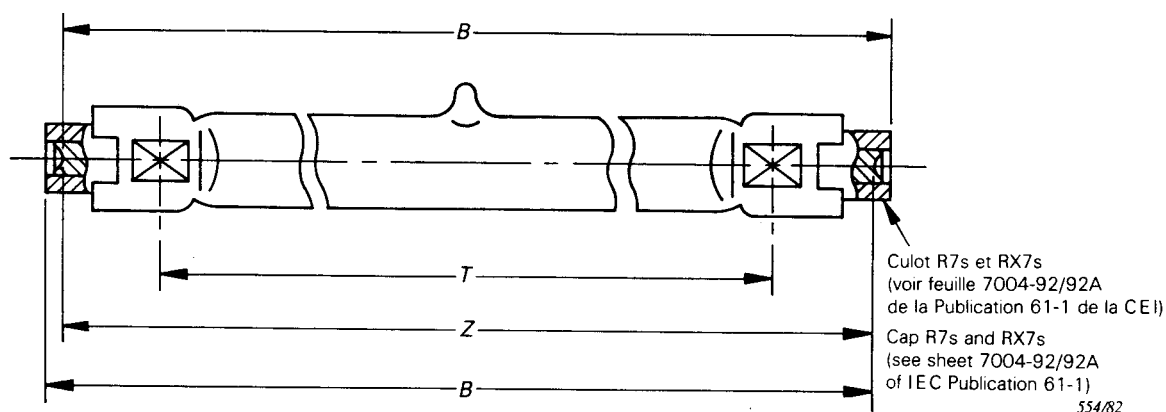
1.6.3 Lamp data sheets

The lamp data sheets according to lamp application are to be found in clauses 2 to 7. 

**PRINCIPE DE DIMENSIONNEMENT DES LAMPES
TUBULAIRES TUNGSTÈNE-HALOGÈNE MUNIES DES
CULOTS R7s ET RX7s**

**PRINCIPLE OF DIMENSIONING OF TUBULAR TUNGSTEN
HALOGEN LAMPS FITTED WITH CAPS R7s AND RX7s**

Dimensions en millimètres – Dimensions in millimetres



La dimension Z nom. est la distance entre les fonds des contacts, les valeurs B max. et T nom. sont indiquées sur la feuille de caractéristiques de la lampe correspondante.

Dimensions Z nom. the distance between the bottoms of the contacts, B max. and T nom. are shown on the relevant lamp data sheet.

$$\begin{aligned} Z \text{ min.} &= Z \text{ nom.} - 1,6 \text{ mm} \\ Z \text{ max.} &= Z \text{ nom.} + 1,6 \text{ mm} \\ B \text{ max.} &= Z \text{ nom.} + 3,4 \text{ mm} \\ T \text{ nom.} &= Z \text{ nom.} - 28,0 \text{ mm} \end{aligned}$$

L'axe de la lampe est par définition la droite passant par les centres des contacts.

The lamp axis is defined as the line through the centres of the contacts.

La dimension T qui est la distance entre les lignes médianes des surfaces planes prévues pour l'utilisation de refroidisseurs (voir feuille 7004-92 de la Publication 61-1 de la CEI) s'applique seulement aux lampes pour lesquelles cette dimension est spécifiée dans la feuille de caractéristiques de la lampe correspondante.

Dimension T , the distance between the centre-lines of the flat areas intended to accommodate heat sinks (see sheet 7004-92/92A of IEC Publication 61-1), is applicable only for those lamps for which this dimension is specified in the relevant lamp data sheet.

Il n'est pas nécessaire que ces surfaces soient positionnées symétriquement par rapport aux fonds des contacts.

It is not necessary for these areas to be positioned symmetrically with respect to the bottoms of the contacts.

Les refroidisseurs devront être ajustables et flexibles.

The heat sinks have to be adjustable and flexible.

Lorsque la dimension T s'applique, il n'est pas toujours possible d'utiliser complètement la tolérance sur la dimension S de la feuille 7004-92 de la Publication 61-1 de la CEI.

Where dimension T applies, advantage cannot always be taken of the full tolerance on dimension S of sheet 7004-92/92A of IEC Publication 61-1.

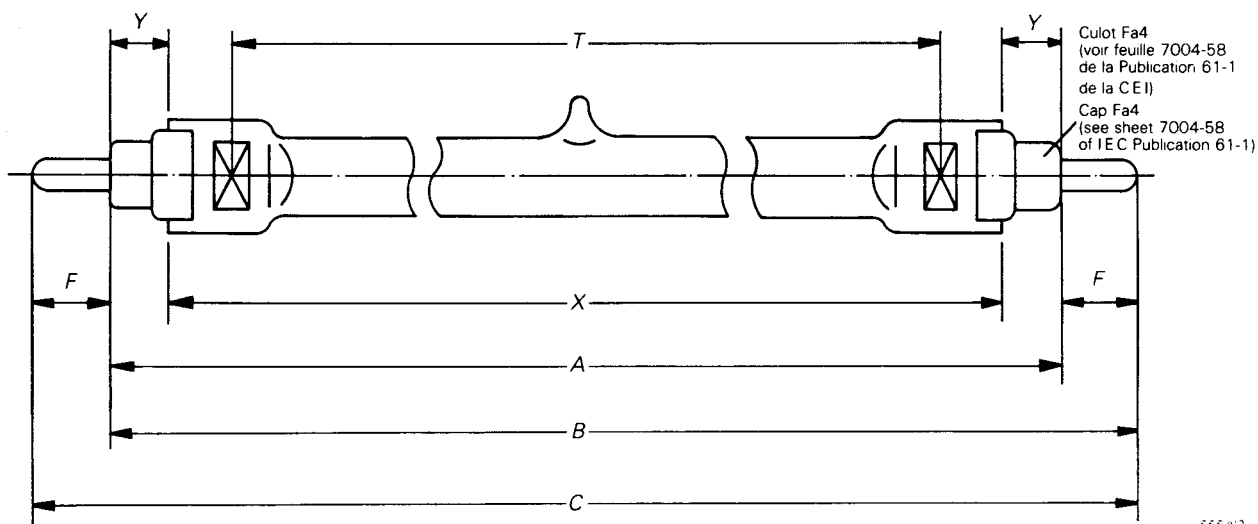
La dimension T , utile seulement à la conception des douilles, n'a pas à être vérifiée sur la lampe.

Dimension T is solely for lampholder design and is not to be gauged on the lamp.

**PRINCIPE DE DIMENSIONNEMENT DES LAMPES
TUBULAIRES TUNGSTÈNE-HALOGÈNE MUNIES DE
CULOTS Fa4**

**PRINCIPLE OF DIMENSIONING OF TUBULAR TUNGSTEN
HALOGEN LAMPS FITTED WITH Fa4 CAPS**

Dimensions en millimètres — Dimensions in millimetres



X est la valeur nominale de la longueur de l'ampoule tubulaire. La tolérance pour X est de $\pm 1,5$ mm. On admet pour Y une longueur de $7,5 \pm 0,15$ mm. X et Y sont seulement indiquées pour expliquer le système de dimensionnement de la lampe. Leurs valeurs ne doivent pas être contrôlées sur celle-ci.

X denotes the nominal length of the envelope. The tolerance on X is ± 1.5 mm. Dimension Y is taken as 7.5 ± 0.15 mm. Dimensions X and Y are indicated only to explain the principle of lamp dimensioning and are not to be checked on the lamp.

Les dimensions diverses sont déterminées comme suit:

The various dimensions are determined as follows:

$$A \text{ max.} = X \text{ max.} + 2 Y \text{ max.} = X + 16,8$$

$$B \text{ max.} = A \text{ max.} + F \text{ max.} = X + 27,1$$

$$B \text{ min.} = A \text{ max.} + F \text{ min.} - \text{Tol. sur } X - 2 \text{ Tol. sur } Y = X + 22,9$$

$$C \text{ max.} = A \text{ max.} + 2 F \text{ max.} = X + 37,4$$

$$* T \text{ nom.} = X - 21,0$$

* La dimension T est la distance entre les axes des surfaces planes prévues pour l'utilisation des refroidisseurs (voir la feuille 7004-58 de la Publication 61-1 de la CEI). Il n'est pas nécessaire que ces surfaces soient placées symétriquement par rapport aux extrémités des broches. (Cette dimension s'applique seulement à la douille et ne doit pas être vérifiée sur la lampe.)

* Dimension T is the distance between the centre-lines of the flat areas intended to accommodate the heat-sinks (see sheet 7004-58 of IEC Publication 61-1). It is not necessary for these areas to be positioned symmetrically with respect to the ends of the pins. (This dimension is solely for lampholder design and is not to be gauged on the lamp.)

Les dimensions $A \text{ max.}$, $B \text{ max.}$, $C \text{ max.}$ et $T \text{ nom.}$ sont indiquées sur la feuille relative à la lampe. La dimension $F \text{ max.}$ a une valeur de 10,3 mm (voir la feuille 7004-58 de la Publication 61-1 de la CEI).

Dimensions $A \text{ max.}$, $B \text{ max.}$, $C \text{ max.}$ and $T \text{ nom.}$ are shown on the appropriate lamp sheet. Dimension $F \text{ max.}$ has a value of 10.3 mm (see sheet 7004-58 of IEC Publication 61-1).

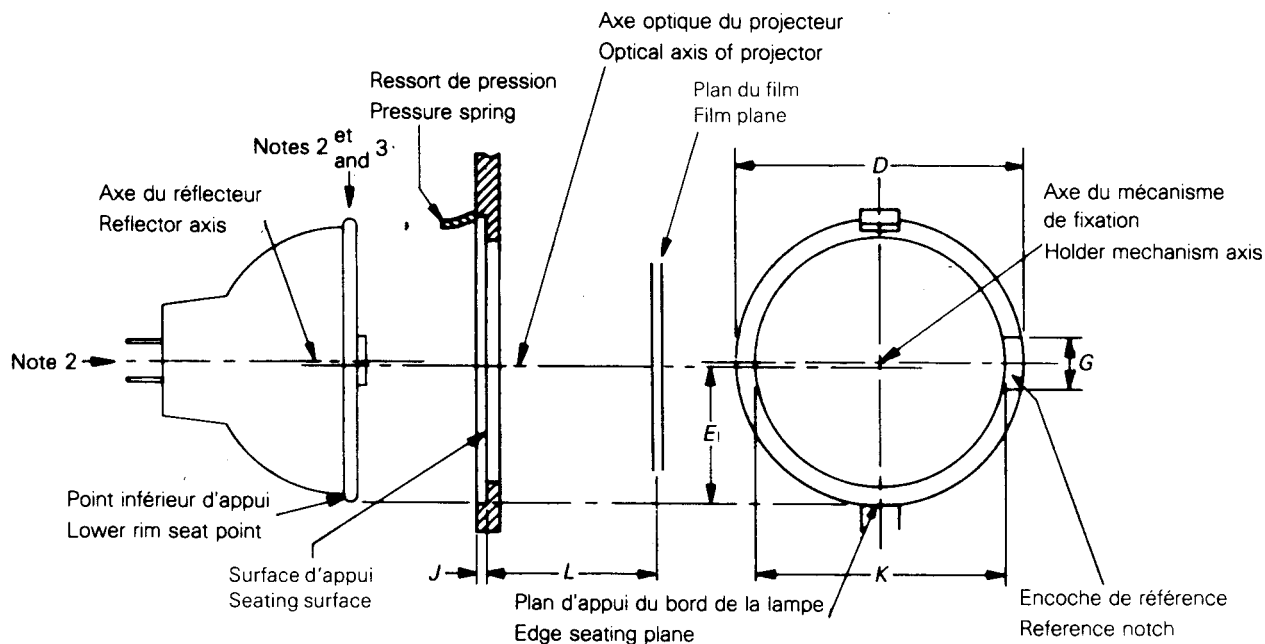
**PRINCIPE DE CENTRAGE
POUR LES LAMPES TUNGSTÈNE-HALOGENE
DE PROJECTION À MIROIR DICHROÏQUE INTÉGRÉ ET À
SOCLE GZ6.35**

Page 1

**CENTRING PRINCIPLE FOR 50 mm INTEGRAL
MIRROR TUNGSTEN HALOGEN LAMPS
WITH BASE GZ6.35**

Dimensions en millimètres — Dimensions in millimetres

Le dessin a uniquement pour but d'indiquer les dimensions qui doivent être contrôlées
The drawing is intended only to indicate the dimensions to be controlled



825/88

Référence Reference	Min.	Max.
D	50,05	50,20
E	24,85	
L	Note 1	
G	9,00	9,20
J	1,50	—
K	44,00	45,00

Pour obtenir le centrage le plus favorable par rapport au passe-film, du faisceau lumineux d'une lampe halogène à miroir dichroïque intégré, le principe figuré ci-dessus est recommandé.

For obtaining the most favourable centring of the light beam of an integral mirror reflector lamp to the film gate the centring principle illustrated in the above figure is recommended.

Notes 1. — La cote *L* définit la distance entre la surface d'appui de la lampe et le plan du film.

La valeur optimale de *L* est influencée par le type d'objectif utilisé.

Dimension *L* defines the distance between the seating surface and the film plane.

The optimum value of *L* is influenced by the type of objective lens used.

2. — Le mécanisme du ressort est tel que le bord du réflecteur, indépendamment de son épaisseur, soit pressé contre le plan d'appui et vers le bas.

Le réflecteur de la lampe est pressé contre un plan d'appui ou contre trois bossages d'appui. Une encoche de référence est prévue dans le support afin que dans le cas où la lampe possède un ergot de référence elle puisse être immobilisée en rotation en ayant son ergot de référence engagé dans l'encoche de référence du support.

The spring arrangement shall be such that the reflector rim, independent of its thickness, is pressed both downwards and against the seating surface.

The reflector of the lamp shall be pressed onto a seating surface or onto three seating bosses. A reference notch is provided in the holder so that in those cases where a lamp does have a reference lug, the lamp may be locked against turning by having the reference lug of the lamp enter the reference notch of the holder.

3. — Pour maintenir le minimum de décalage axial, il est nécessaire que le point inférieur d'appui soit pressé contre le plan d'appui du bord de la lampe. Ceci peut être obtenu en donnant au ressort supérieur une forme telle qu'il presse le réflecteur plus latéralement qu'en avant, permettant ainsi que le bord opposé du réflecteur se place contre le plan d'appui.

**PRINCIPE DE CENTRAGE
POUR LES LAMPES TUNGSTÈNE-HALOGÈNE
DE PROJECTION À MIROIR DICHROÏQUE INTÉGRÉ ET À
SOCLE GZ6.35**

Page 2

**CENTRING PRINCIPLE FOR 50 mm INTEGRAL
MIRROR TUNGSTEN HALOGEN LAMPS
WITH BASE GZ6.35**

La cote E , de l'espace entre le plan d'appui du bord de la lampe et l'axe optique du projecteur doit être considérée comme une valeur visée. (Voir page 1.)

To keep the axial misalignment to a minimum, it is necessary for the lower rim seat point to be pressed against the edge seating plane. This can be achieved by giving the upper spring such a shape as to press the reflector rim more laterally than forward, thereby ensuring that the opposite edge of the reflector rim locates on the seating surface.

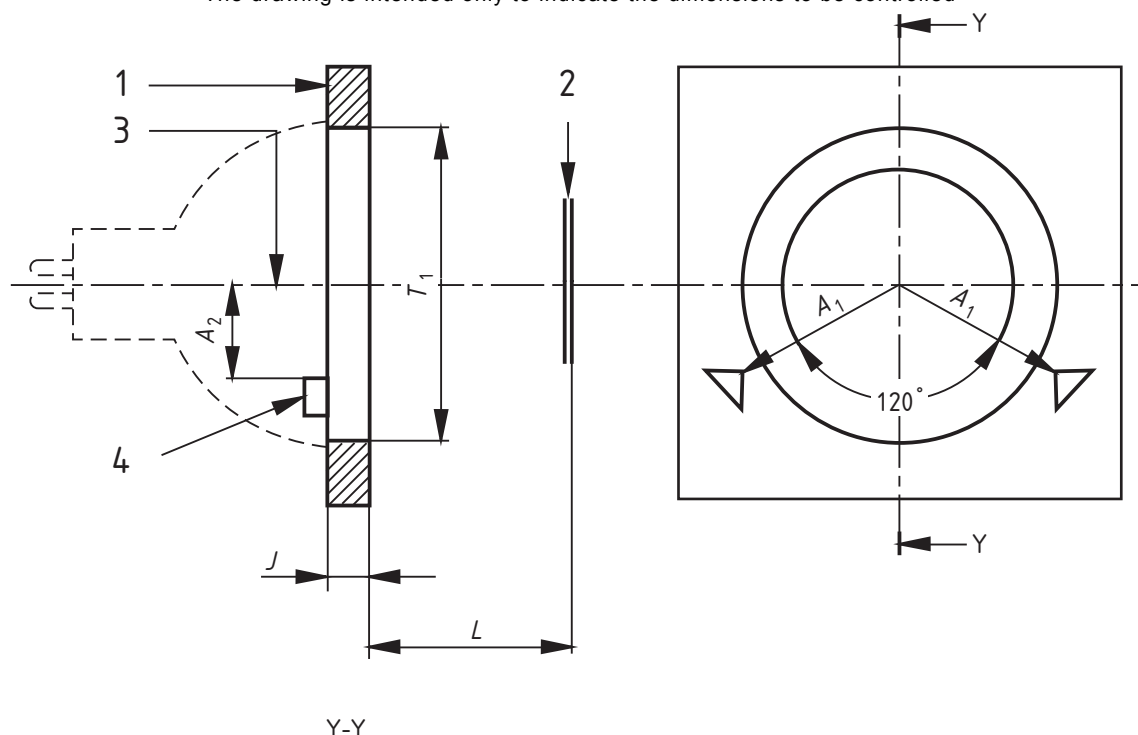
Dimension E , the spacing between the edge seating plane and the optical axis of the projector, shall be considered as an objective value. (See Page 1.)

**PRINCIPE DE CENTRAGE
POUR LES LAMPES TUNGSTÈNE-HALOGÈNE DE PROJECTION
À RÉFLECTEUR INTÉGRÉ DE 50,8 mm (2 pouces)
MÉTHODE 1 – MÉTHODE ORDINAIRE**

**CENTRING PRINCIPLE FOR 2 IN INTEGRAL MIRROR TUNGSTEN
HALOGEN LAMPS
METHOD 1 – COMMON METHOD**

Page 1

Dimensions en millimètres - Dimensions in millimetres
Le dessin a pour seul but d'indiquer les dimensions à contrôler
The drawing is intended only to indicate the dimensions to be controlled



Dimension	Max.	Min.
A_1	24,94	
A_2	12,47	
J	—	2,16
T_1	47,0	—
L	Note 2	

Légende

- 1 Surface d'appui x
2 Plan du film
3 Axe optique du projecteur
4 Ergots de référence

Key

- 1 Seating surface x
2 Film plane
3 Optical axis of projector
4 Reference lugs

NOTE 1 La figure ci-dessus décrit la méthode le plus souvent utilisée pour le centrage d'un faisceau lumineux sur l'axe optique du projecteur. Le réflecteur de la lampe doit être pressé fermement sur la surface d'appui x et latéralement sur les deux ergots de référence.

The above figure describes the most commonly used method of centring the light beam on the optical axis of the projector. The lamp reflector shall be pressed firmly onto the seating surface x and laterally onto the two reference lugs.

NOTE 2 La dimension L définit la distance entre la surface d'appui et le plan du film.

La valeur optimale de L est influencée par le type d'objectif utilisé et varie avec le type de lampe à moins que tous les types de lampes n'aient exactement le même profil de réflecteur.

Dimension L defines the distance between the seating surface and the film plane.

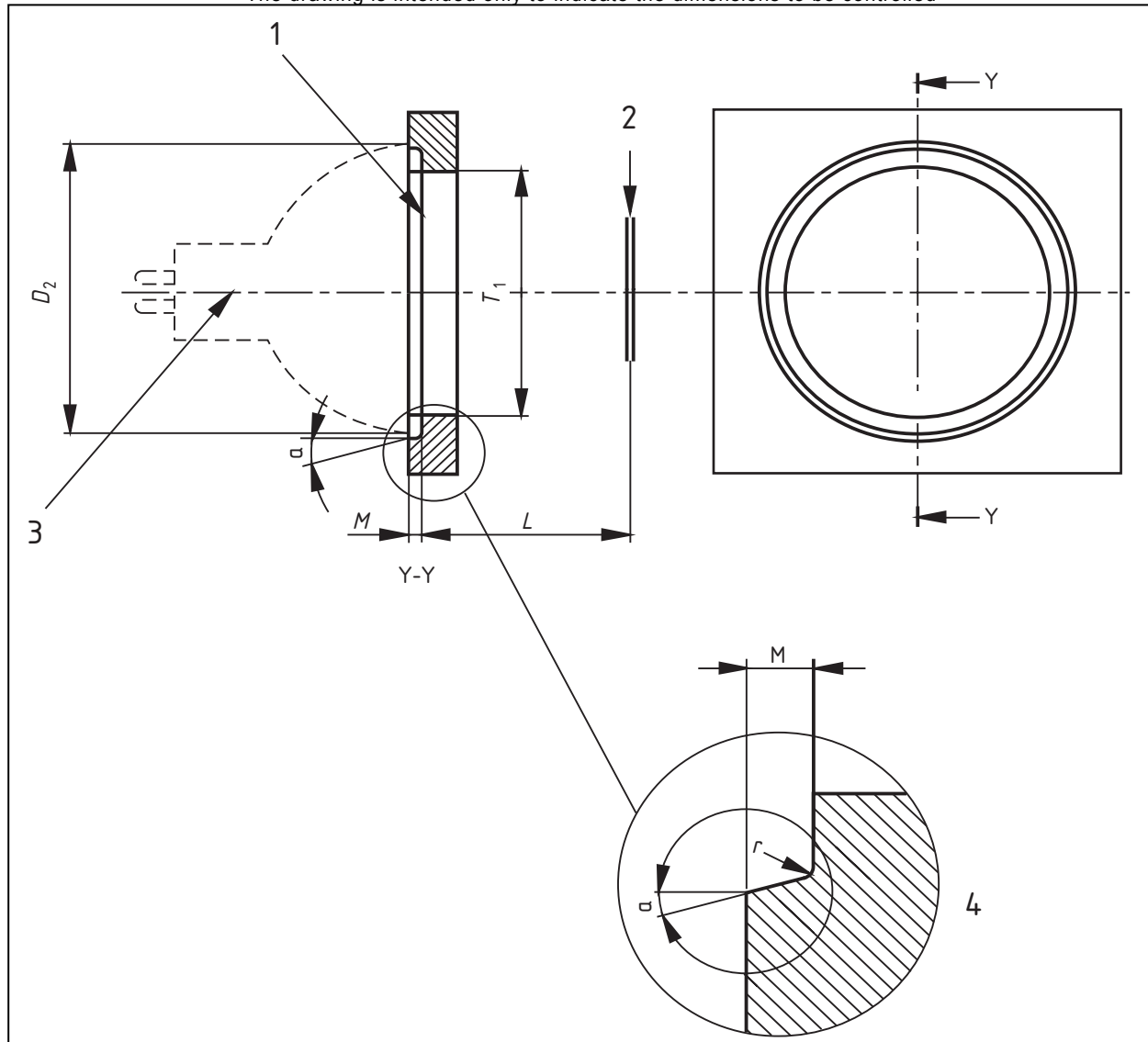
The optimum value of L is influenced by the type of objective lens used and will vary with the lamp type unless all lamp types have exactly the same reflector contour.

**PRINCIPE DE CENTRAGE
POUR LES LAMPES TUNGSTÈNE-HALOGENE DE PROJECTION
À RÉFLECTEUR INTÉGRÉ DE 50,8 mm (2 pouces)
MÉTHODE 2 – MÉTHODE PRÉCISE**

**CENTRING PRINCIPLE FOR 2 IN INTEGRAL MIRROR TUNGSTEN
HALOGEN LAMPS
METHOD 2 – PRECISE METHOD**

Page 2

Dimensions en millimètres - Dimensions in millimetres
Le dessin a pour seul but d'indiquer les dimensions à contrôler
The drawing is intended only to indicate the dimensions to be controlled



Dimension	Max.	Min.
D_2	—	49,98
M	0,84	0,69
T_1	47,0	—
L	Note 2	
r_1	0,25	—
α (degrees)	15° 30'	14° 30'

Légende

- 1 Surface d'appui x
2 Plan du film
3 Axe optique du projecteur
4 Vue agrandie de la section du support

Key

- 1 Seating surface x
2 Film plane
3 Optical axis of projector
4 Enlarged view of holder section

**PRINCIPE DE CENTRAGE
POUR LES LAMPES TUNGSTÈNE-HALOGÈNE DE PROJECTION
À RÉFLECTEUR INTÉGRÉ DE 50,8 mm (2 pouces)
MÉTHODE 2 – MÉTHODE PRÉCISE
CENTRING PRINCIPLE FOR 2 IN INTEGRAL MIRROR TUNGSTEN
HALOGEN LAMPS
METHOD 2 – PRECISE METHOD**

NOTE 1 Pour assembler la lampe et obtenir le centrage le plus précis du faisceau lumineux dans le projecteur, le principe esquissé dans la figure ci-dessus est recommandé. Le réflecteur de la lampe doit être pressé fermement sur la surface d'appui x . L'évidement défini par D_2 , M et x sert à restreindre le déplacement latéral de la lampe.

For lamp assembly purposes and for obtaining the most precise centring of the light beam in the projector, the principle outlined in the above figure is recommended. The lamp reflector shall be pressed firmly onto the seating surface x . The recess defined by D_2 , M and x serves to restrict the lamp's lateral displacement.

NOTE 2 La dimension L définit la distance entre la surface d'appui et le plan du film.

La valeur optimale de L est influencée par le type d'objectif utilisé et varie avec le type de lampe à moins que tous les types de lampes n'aient exactement le même profil de réflecteur.

Dimension L defines the distance between the seating surface and the film plane.

The optimum value of L is influenced by the type of objective lens used and will vary with the lamp type unless all lamp types have exactly the same reflector contour.

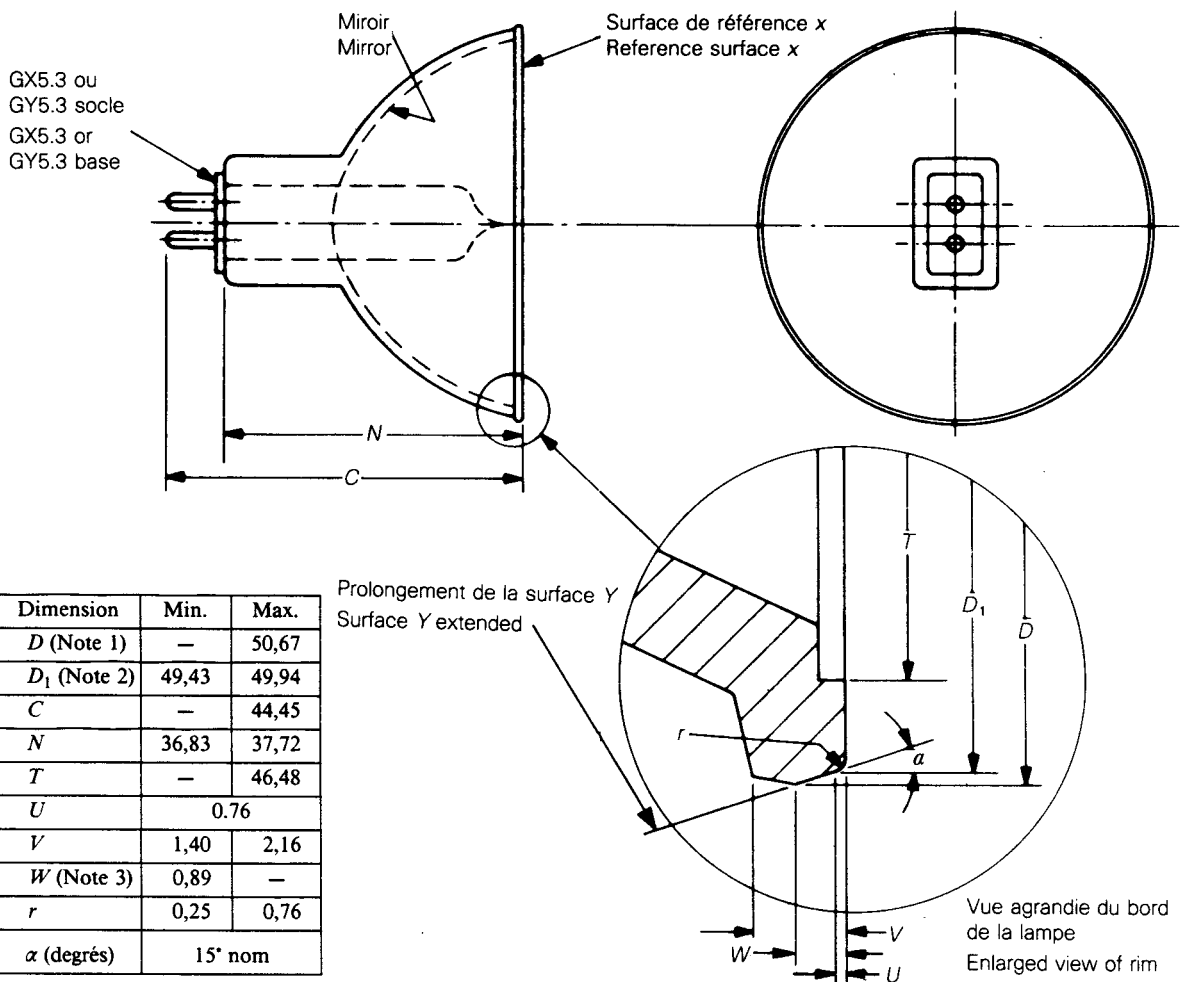
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**DIMENSIONS EXTERNES DES LAMPES
TUNGSTÈNE-HALOGÈNE DE PROJECTION À
RÉFLECTEUR INTÉGRÉ DE 50,8 mm (2 pouces)
ET À SOCLE GX5.3 OU GY5.3**

**EXTERNAL DIMENSIONS OF TUNGSTEN
HALOGEN PROJECTION LAMPS HAVING A 2 in
INTEGRAL REFLECTOR AND A GX5.3 OR GY5.3 BASE**

Dimensions en millimètres — Dimensions in millimetres

Le dessin a pour but d'indiquer les dimensions qui sont importantes pour le montage de la lampe dans son support
The drawing is intended only to indicate the dimensions which are important for the fit of the lamp in the lampholder



166/84

**DISPOSITIFS DE FIXATION POUR LES LAMPES
TUNGSTÈNE-HALOGÈNE DE 50,8 mm (2 pouces) À
RÉFLECTEUR INTÉGRÉ AVEC SOCLE GX5.3 OU GY5.3**

**HOLDING SYSTEMS FOR 2 in INTEGRAL MIRROR
TUNGSTEN HALOGEN LAMPS WITH BASES GX5.3 OR GY5.3**

Page 1

1. Types de dispositifs de fixation

a) Dispositif à connecteur à encliquetage:

La lampe, fixée uniquement du côté du réflecteur, est raccordée électriquement au moyen d'un connecteur souple.

b) Dispositif flexible à deux extrémités:

Dispositif en une pièce assurant la fixation des deux extrémités de la lampe.

1. Types of holding systems

a) Push-on connector system:

Lamp supported entirely at its reflector end and employing a flexible electrical connector.

b) Double-ended flexible system:

A unitized device providing support at both ends of the lamp.

2. Eléments des dispositifs

2.1 Dimensions des lampes

Les dimensions des lampes à réflecteur intégré de deux pouces sont spécifiées en détail dans 357-IEC-1005-. Des tolérances serrées pour certaines dimensions des lampes sont essentielles pour le fonctionnement satisfaisant des dispositifs de fixation flexibles à deux extrémités.

2.2 Dimensions des socles

Les exigences relatives aux dimensions des socles GX5.3 et GY5.3 se trouvent dans la Publication 61 de la CEI. Il est à remarquer que les problèmes d'insertion peuvent se présenter lorsqu'il s'agit de lampes dont les broches présentent des longueurs proches du maximum de 7,62 mm.

2.3 Dispositifs de centrage du réflecteur

Les deux méthodes de centrage du réflecteur sont décrites dans 357-IEC-1004-. Ces méthodes sont dénommées Méthode I — méthode ordinaire — et Méthode II — méthode de précision. Dans les deux cas, le dispositif de centrage du réflecteur assure au moins en partie la fixation de la lampe. Chacune des deux méthodes de centrage du réflecteur peut être utilisée dans les deux types de dispositifs de fixation.

2.4 Connecteurs et blocs de contacts

Les exigences relatives aux connecteurs et (ou) aux blocs de contacts utilisés dans ces dispositifs de fixation sont à l'étude.

2.5 Eléments de fixation auxiliaires

Ainsi qu'il est indiqué aux articles 3 et 4, certains modèles de dispositifs de fixation peuvent requérir des éléments auxiliaires pour assurer le support ou pour fournir la force nécessaire au ferme maintien du réflecteur contre la surface de référence du dispositif de centrage. Les détails de tels éléments ne sont pas spécifiés afin de ne pas entraver la liberté de conception, dans le cadre du respect des dimensions normalisées.

2. Elements of the systems

2.1 Lamp dimensions

Detailed lamp dimensions for the 2 inch integral reflector lamps are specified in 357-IEC-1005-. Close control over certain of these lamp dimensions is essential to the proper operation of the double-ended flexible holding system.

2.2 Base dimensions

The dimensional requirements for GX5.3 or GY5.3 bases are included in IEC Publication 61. It should be noted that when lamps are made with a base pin length near the maximum of 7.62 mm insertion problems may occur.

2.3 Rim-centring devices

The two methods of centring the reflector rim in the holding system are described in 357-IEC-1004-. These methods are identified as Method I, common method and Method II, precise method. In each case the rim-centring device provides at least part of the means of supporting the lamp. Either of the two rim-centring devices may be used with either of the holding systems.

2.4 Connectors and contact assemblies

The dimensional requirements for connectors and/or contact assemblies for use in these holding systems are under consideration.

**DISPOSITIFS DE FIXATION POUR LES LAMPES
TUNGSTÈNE-HALOGÈNE DE 50,8 mm (2 pouces) À
RÉFLECTEUR INTÉGRÉ AVEC SOCLE GX5.3 OU GY5.3**

Page 2

**HOLDING SYSTEMS FOR 2 in INTEGRAL MIRROR
TUNGSTEN HALOGEN LAMPS WITH BASES GX5.3 OR GY5.3**

2.5 Auxiliary support devices

As noted in Clauses 3 and 4, some versions of these holding systems may require auxiliary means of mechanical support or force to ensure that the reflector rim of a lamp is pressed firmly against the reference surface of the rim-centring device. Details of such devices are not defined in order to leave open design options, provided no interference occurs with standardized dimensions.

3. Dispositifs à connecteur à encliquetage

Le dispositif de centrage du réflecteur assure la mise en place et l'ajustement correct de la lampe, tandis que des ressorts ou éléments analogues pressent le bord de la lampe sur la surface de référence du dispositif de centrage. Le raccordement électrique s'effectue au moyen d'un connecteur relié à un câble souple. Ces dispositifs sont conçus de façon à ce que la lampe soit mise en place par un simple mouvement de coulissage jusqu'à ce que le bord du réflecteur s'appuie sur des butées et sur la surface de référence, après quoi le connecteur est poussé contre le socle de la lampe, ou vice versa.

3. Push-on connector system

The rim-centring device provides for the positioning and aiming of the lamp while springs or similar elements hold the rim of the lamp against the reference surface of the centring device. Electrical connection is made by means of a connector on a flexible cord. This system is designed for installation of a lamp by a single slide-in-motion to locate the reflector rim against mechanical stops and the reference surface, followed by the operation of pushing the connector on to the base of the lamp, or vice-versa.

4. Dispositifs de fixation flexibles à deux extrémités

Ces dispositifs à deux extrémités supportent la lampe tant du côté du réflecteur que du côté du socle. Du côté réflecteur, un dispositif de centrage fait fonction de support principal et de moyen de mise en place. Des ressorts auxiliaires ou des éléments analogues peuvent être nécessaires pour fournir une pression supplémentaire. Du côté socle, un bloc de contacts assure le raccordement électrique et aussi la fixation. Ces dispositifs sont conçus de façon à ce que la lampe soit mise en place en un seul mouvement simple qui fait reposer le bord du réflecteur sur des butées et sur la surface de référence, tandis que les broches du socle coulissent simultanément dans les rainures du bloc de contacts.

4. Double-ended flexible holding system

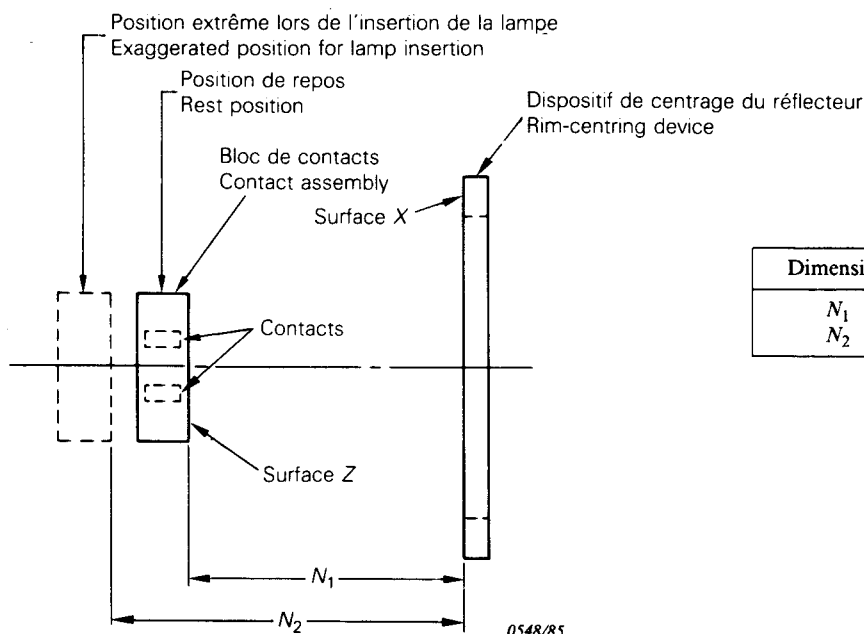
This double-ended system is a device that provides support at both the reflector and base ends of a lamp. A rim-centring device provides the primary support and location function at the reflector end. Auxiliary springs or similar elements may be required for additional holding force. At the base end a contact assembly provides both electrical connection and support functions. This system is designed for simple one-motion installation of a lamp, to locate the reflector rim against mechanical stops and the reference surface while the base pins simultaneously slide into the grooves in the contact assembly.

**DISPOSITIFS DE FIXATION POUR LES LAMPES
TUNGSTÈNE-HALOGÈNE DE 50,8 mm (2 pouces) À
RÉFLECTEUR INTÉGRÉ AVEC SOCLE GX5.3 OU GY5.3**

**HOLDING SYSTEMS FOR 2 in INTEGRAL MIRROR
TUNGSTEN HALOGEN LAMPS WITH BASES GX5.3 OR GY5.3**

Page 3

Dimensions en millimètres — Dimensions in millimetres



Dimension	Min.	Max.
N_1	—	36,33
N_2	37,82	—

Les dispositifs de fixation flexibles à deux extrémités nécessitent que le bloc de contacts puisse se déplacer légèrement dans le sens de l'axe de la lampe par rapport à la surface de référence du dispositif de centrage. Ce déplacement permet l'insertion de la lampe et l'adaptation aux écarts usuels de fabrication dans la longueur des lampes. Les dimensions N_1 et N_2 définissent les limites de ce déplacement.

The double-ended flexible holding system requires that the contact assembly be able to move slightly in the direction of the lamp axis with respect to the reference surface of the rim-centring device. This movement permits insertion of the lamp and accommodates normal manufacturing variations in lamp length. Dimensions N_1 and N_2 define the limits of this movement.

Le support du bloc de contacts peut être conçu pour fournir soit une force axiale supplémentaire, soit la force axiale totale nécessaire pour presser fermement le bord du réflecteur contre le dispositif de centrage du réflecteur. Des ressorts ou éléments analogues peuvent être employés pour contribuer à fournir cette force axiale. Les surfaces d'appui du bloc de contacts et du socle sont celles qui sont désignées «surface Z» pour chacun des éléments. Il est préférable que la surface Z du bloc de contacts ait un angle d'entrée sur le côté par lequel la surface Z du socle est introduite lors de l'insertion de la lampe.

The support for the contact assembly may be designed to provide either partial pressure or full longitudinal pressure to keep the reflector rim of the lamp pressed firmly against the rim-centring device. Springs or similar elements may be employed to assist in providing this longitudinal force. The bearing surfaces of the contact assembly and lamp base are those surfaces marked "surface Z" for each component. It is desirable that the surface Z of the holder contact assembly have a lead-in angle at the edge where the surface Z of the base would enter during lamp insertion.

Le bloc de contacts doit être situé à une hauteur convenable pour permettre l'insertion complète de la lampe jusqu'aux butées du dispositif de centrage du réflecteur, tout en assurant le contact avec les broches du socle. Le bloc de contacts, ou ses contacts, doivent pouvoir se déplacer légèrement dans un plan normal à l'axe de la lampe, pour pouvoir s'adapter à un certain défaut d'alignement des broches du socle par rapport au centre du dispositif de centrage du réflecteur.

The contact assembly shall be positioned at the proper elevation to permit complete entry of a lamp onto the rim-centring device stops and to provide contact with the base pins. The contact assembly or its contacts shall be able to move slightly in a plane perpendicular to the lamp axis to accommodate some misalignment in the location of the lamp base pins with respect to the centre of the rim centring device.

Le bloc de contacts peut être conçu de deux manières, en fonction de la tension nominale envisagée. Ces deux manières sont:

- les deux broches pénètrent simultanément dans deux rainures du bloc de contacts;
 - les deux broches pénètrent dans la même rainure, les deux contacts étant situés en position convenable l'un au-dessus de l'autre.
- Ces constructions sont montrées en détail dans la norme de douilles (à l'étude).

**DISPOSITIFS DE FIXATION POUR LES LAMPES
TUNGSTÈNE-HALOGÈNE DE 50,8 mm (2 pouces) À
RÉFLECTEUR INTÉGRÉ AVEC SOCLE GX5.3 OU GY5.3**

**HOLDING SYSTEMS FOR 2 in INTEGRAL MIRROR
TUNGSTEN HALOGEN LAMPS WITH BASES GX5.3 OR GY5.3**

Page 4

The holder contact assembly may be designed in two ways depending upon the intended voltage application. These methods are:

- a) The two pins simultaneously enter two corresponding slots in the contact assembly.
- b) The two base pins both enter the same slot and the two contacts are located one above the other at the appropriate points. Details of these designs are shown in the holder standard (under consideration).

5. Vérification par calibres

La possibilité d'employer des calibres pour vérifier ces types de douilles est à l'étude.

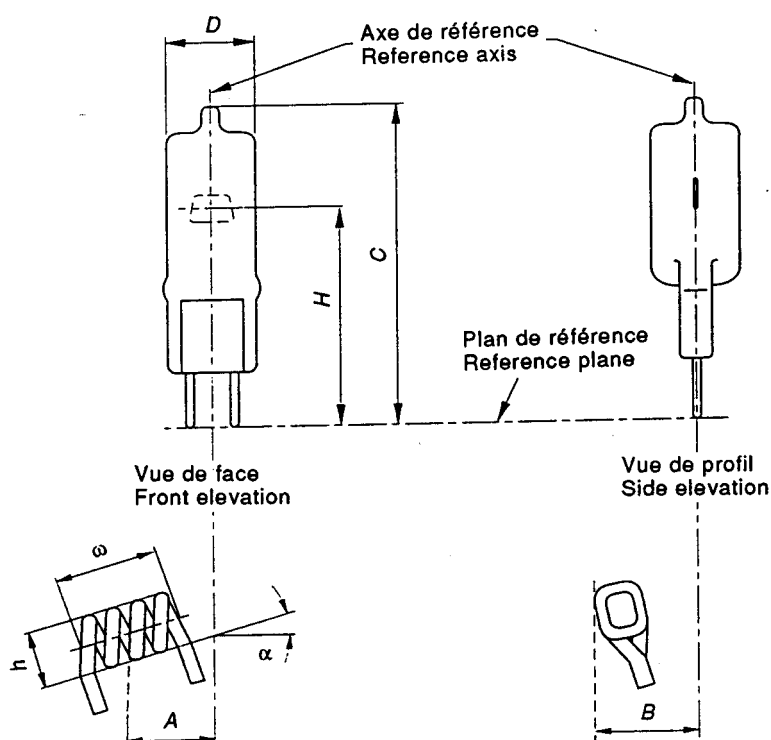
5. Gauging

The possible use of gauges for checking these types of holders is under consideration.

**PRINCIPE DE DIMENSIONNEMENT DES LAMPES DE PROJECTION
TUNGSTÈNE-HALOGÈNE À UNE SEULE EXTRÉMITÉ, À FILAMENT PLAT
ET MUNIES DE SOCLES G6.35 OU GY6.35**

**PRINCIPLE OF DIMENSIONING OF SINGLE-ENDED FLAT FILAMENT
TUNGSTEN-HALOGEN PROJECTION LAMPS
WITH G6.35 OR GY6.35 BASES**

Page 1



Diagrammes schématiques de la lampe et du filament
Schematic diagrams of lamp and filament

Pour certaines lampes, la dimension H est mesurée depuis le sommet du filament.

For certain lamps, dimension H is given to the top of the filament.

Les dimensions sont indiquées dans les feuilles de caractéristiques des lampes correspondantes

Dimensions are shown on the appropriate lamp data sheets.

Référence Reference	Détail Detail
A	Axialité vue de face Axiality front elevation
B	Axialité vue de profil Axiality side elevation
α	Inclinaison vue de face Tilt front elevation

Référence Reference	Détail Detail
D	Diamètre de l'ampoule Bulb diameter
C	Longueur hors tout Overall length
H	Longueur du centre lumineux Light centre length
h	Longueur du filament Filament height
ω	Largeur du filament Filament width

**PRINCIPE DE DIMENSIONNEMENT DES LAMPES
DE PROJECTION TUNGSTÈNE-HALOGÈNE
À UNE SEULE EXTRÉMITÉ, À FILAMENT PLAT
ET MUNIES DE SOCLES G6.35 OU GY6.35**

Page 2

**PRINCIPLE OF DIMENSIONING OF SINGLE-ENDED FLAT
FILAMENT TUNGSTEN HALOGEN PROJECTION LAMPS
WITH G6.35 OR GY6.35 BASES**

PRESCRIPTIONS POUR LES FILAMENTS

Définitions (voir page 1)

L'axe de référence de la lampe est la droite définie par le point à mi-chemin entre les axes des broches à leur sortie du pincement et par le point à mi-chemin entre les axes des broches à leur extrémité.

Le plan de référence de la lampe est le plan perpendiculaire à l'axe de référence de la lampe et en contact avec l'extrémité de la broche correspondant à la longueur hors tout de la lampe.

Dans la vue de face, le contour du filament a généralement la forme d'un trapèze. La hauteur du filament (h) est la distance entre les côtés parallèles du trapèze. La largeur du filament (ω) est la distance entre les côtés non parallèles du trapèze mesurée sur la droite équidistante des côtés parallèles.

La hauteur du centre lumineux (H) de la lampe est la distance entre le plan de référence et un plan parallèle qui passe par le centre du filament ou par son sommet.

L'axialité du filament vue de face (A) est la distance entre l'axe de référence et le centre du filament ou son sommet. L'axialité du filament vue de profil (B) est la distance entre l'axe de référence et le point du filament le plus éloigné.

L'inclinaison vue de face du filament (α) est l'angle entre les côtés parallèles du trapèze et le plan de référence.

Prescriptions

Les valeurs des dimensions du filament et sa position, indiquées dans la feuille de caractéristiques de la lampe correspondante, s'appliquent lorsque le filament est allumé sous la tension nominale.

Ces valeurs doivent être vérifiées à l'aide du système indiqué en page 3, appelé "box system". (Les dimensions réelles du filament sont indiquées dans les figures. A l'exception de l'angle α , ces valeurs peuvent être multipliées par un facteur approprié.)

L'image du filament doit être projetée sur les éléments fixes du "box system" en prenant soin que l'axe de référence et le plan de référence soient bien alignés.

Dans la vue de face, les rectangles concentriques mobiles d'encombrement doivent être déplacés jusqu'à ce que l'image du filament se trouve placée symétriquement à l'intérieur de ces rectangles. Alors, les exigences suivantes s'appliquent:

- l'image du filament ne doit pas être plus petite que le rectangle d'encombrement intérieur ni plus grande que le rectangle d'encombrement extérieur, à l'exception de la moitié inférieure de rectangle extérieur, où l'image peut dépasser les lignes verticales;
- le point central M des rectangles d'encombrement (ou le sommet T, si la dimension H est mesurée depuis le sommet du filament) doit se trouver, pour vue de face, à l'intérieur du rectangle fixe;
- l'inclinaison des rectangles d'encombrement ne doit pas être supérieure à l'inclinaison indiquée par les lignes fixes de la grille pour la vue de face.

Dans la vue de profil, l'image du filament doit se trouver entre les lignes parallèles fixes pour la vue de profil.

FILAMENT REQUIREMENTS

Definitions (see page 1)

The reference axis of the lamp is the line passing through the point mid-way between the axes of the pins at their emergence from the pinch seal and through the point mid-way between the axes of the pins at the extremity of the pins.

The reference plane of the lamp is the plane in contact with the end of the pin that corresponds to the overall lamp length and perpendicular to the reference axis.

In front elevation the line surrounding the filament in general forms a trapezium. The filament height (h) is the perpendicular distance between the parallel sides of the trapezium. The filament width (ω) is the distance between the intersections of the centre line of the parallel sides with the non-parallel sides of the trapezium.

The light centre length (H) of the lamp is the perpendicular distance between the reference plane and a parallel plane passing through either the centre point or the top point of the filament in front elevation.

The filament axiality in front elevation (A) is the perpendicular distance between the reference axis and either the centre point or the top point of the filament. The filament axiality in side elevation (B) is the perpendicular distance between the reference axis and the outermost part of the filament.

The filament tilt in front elevation (α) is the angle between the parallel sides of the trapezium and the reference plane.

Requirements

The values for the filament dimensions and position, as given on the appropriate lamp data sheets, apply when the filament is energized at rated voltage. They shall be checked by using the box system given on page 3. (In these figures the actual filament dimensions are indicated. Except for angle α these values can be multiplied by an appropriate factor.)

The image of the filament shall be projected on the fixed elements of the box system with proper alignment of the reference axis and plane.

In front elevation the concentric movable outline boxes shall be moved until the filament image lies in a symmetrical way within these boxes. Then the following shall apply:

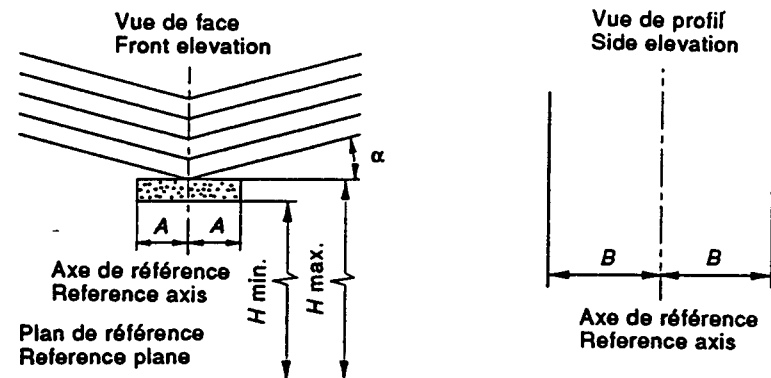
- the filament image shall be not smaller than the inner outline box and not bigger than the outer outline box, except for the lower half of the outer box where the image may transgress the vertical lines;
- the centre point M of the outline boxes (or top point T if dimension H is given to the top of the filament) shall be within the fixed box for front elevation;
- the tilt of the outline boxes shall be not more than the tilt given by the fixed grid lines for front elevation.

In side elevation the filament image shall lie between the fixed parallel lines for side elevation.

**PRINCIPE DE DIMENSIONNEMENT DES LAMPES
DE PROJECTION TUNGSTÈNE-HALOGÈNE
À UNE SEULE EXTRÉMITÉ, À FILAMENT PLAT
ET MUNIES DE SOCLE G6.35 OU GY6.35**

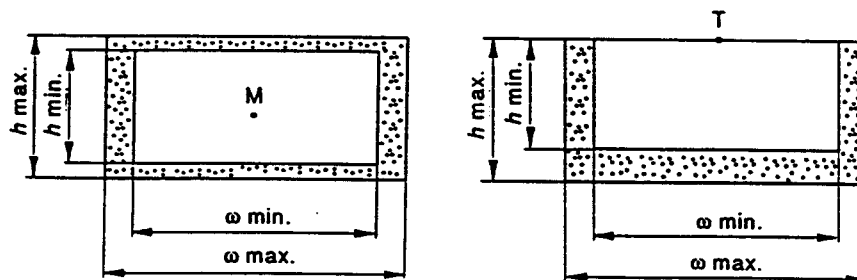
Page 3

**PRINCIPLE OF DIMENSIONING OF SINGLE-ENDED FLAT
FILAMENT TUNGSTEN HALOGEN PROJECTION LAMPS
WITH G6.35 OR GY6.35 BASES**



CEI-IEC 545/95

Éléments fixes du "box system" pour la vue de face et la vue de profil
Fixed box system elements for front and side elevation



CEI-IEC 546/95

Rectangles d'encombrement mobiles pour la vue de face
Movable outline boxes for front elevation

La dimension H est indiquée depuis le centre ou
depuis le sommet du filament

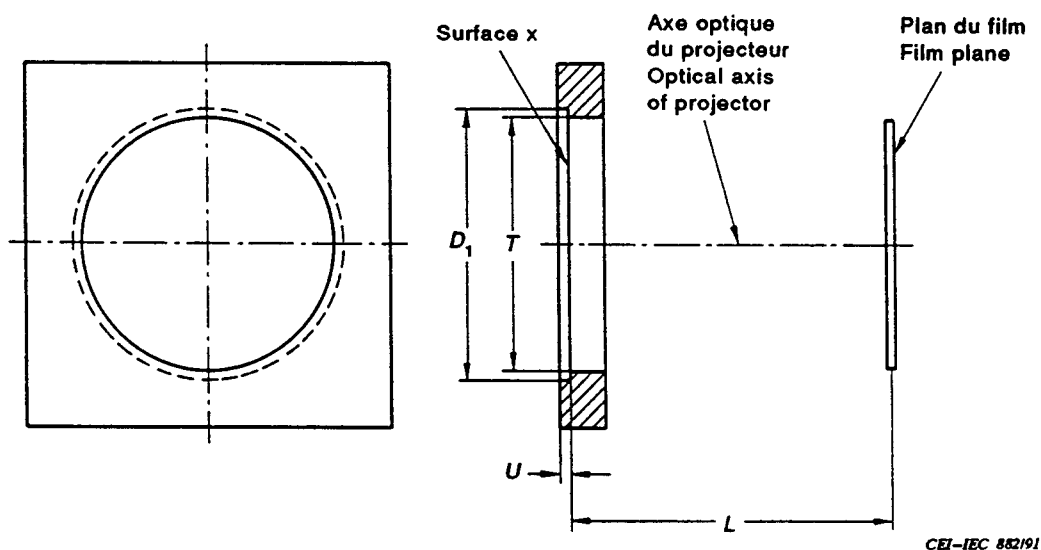
Dimension H is given to the centre point or to the top
point of the filament.

**PRINCIPE DE CENTRAGE
DES LAMPES TUNGSTÈNE-HALOGÈNE
À RÉFLECTEUR INCORPORÉ DE 42 mm
AVEC UN SOCLE GX5.3 OU GY5.3**

**CENTRING PRINCIPLE
FOR 42 mm INTEGRAL MIRROR
TUNGSTEN HALOGEN LAMPS
WITH BASE GX5.3 OR GY5.3**

Dimensions en millimètres – Dimensions in millimetres

Le plan n'est destiné qu'à indiquer les dimensions qui sont à contrôler
The drawing is intended only to indicate the dimensions to be controlled



CEI-IEC 882/91

Dispositif de centrage du bord du réflecteur de la lampe – Centring device for lamp reflector rim

Référence Reference	Min.	Nom.	Max.
D_1	42.27	–	42.32
T	–	–	39.75
U	1.40	–	1.65
L	Note 1		

Notes 1. – La cote L (distance de travail) est la distance de la surface d'appui (surface x) au plan du film. La valeur de L dépend de l'objectif utilisé et du contour du réflecteur de la lampe. Les valeurs spécifiques sont données dans les feuilles de caractéristiques des lampes.

Dimension L (working distance) is the distance from the seating surface (Surface x) to the film plane. This value of L is dependent upon the objective lens used and also on the contour of the lamp reflector. Specific values are given in the lamp data sheets.

2. – La forme du dispositif n'est pas limitée à celle qui est montrée. Les encastrements, ergots ou autres systèmes d'arrêt doivent être situés à l'emplacement spécifié.

Shape of device is not restricted to that shown. Recesses, studs or other stopping features shall be provided at the specified location.

3. – Le dispositif de centrage est destiné à l'utilisation avec un système de fixation de la lampe qui fournit une force axiale en vue d'assurer le contact entre la surface x du bord de la lampe et la surface x du dispositif. Celui-ci fournit à la lampe les fonctions principales de positionnement et de fixation.

The centring device is intended for use with a lamp holding system which provides an axial force to ensure contact of the rim surface x of the lamp with surface x of the device. This device provides the primary location and holding functions for the lamp.

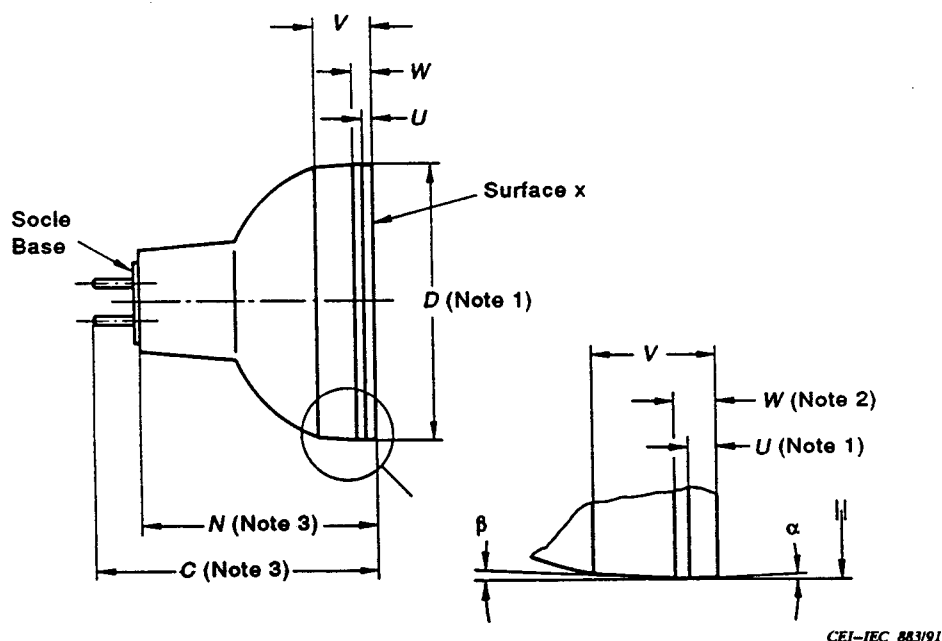
**DIMENSIONS EXTÉRIEURES
DES LAMPES TUNGSTÈNE-HALOGÈNE DE PROJECTION
AYANT UN RÉFLECTEUR INCORPORÉ DE 42 mm
ET UN SOCLE GX5.3 OU GY5.3**

Page 1

**EXTERNAL DIMENSIONS
OF TUNGSTEN HALOGEN PROJECTION LAMPS
HAVING A 42 mm INTEGRAL REFLECTOR
AND A GX5.3 OR GY5.3 BASE**

Dimensions en millimètres – Dimensions in millimetres

Le plan n'est destiné qu'à indiquer les dimensions importantes
pour l'ajustement de la lampe dans la douille et le système de fixation
The drawing is intended only to indicate the dimensions which are important
for the fit of the lamp in the lampholder



Socle: GX5.3 ou GY5.3 selon Publication 61 de la CEI – Base: GX5.3 or GY53 per IEC Publication 61.

Référence Reference	Min.	Nom.	Max.
<i>D</i>	41.71	–	42.22
<i>C</i>	–	–	44.45
<i>N</i> (Note 4)	36.83	–	37.72
<i>U</i>	–	1.52	–
<i>V</i>	–	9.27	–
<i>W</i>	–	3.20	–
α	–	1°	–
β	–	2°	–

Notes 1. – Le centre commun des angles α et β est situé à la distance *U* de la surface d'appui *x*. Le diamètre *D* est mesuré à la distance *V* de la surface *x*.

The common centre for angles α and β is located distance *U* from the seating surface *x*. Diameter *D* is measured at distance *V* from surface *x*.

2. – La dimension *W* définit la distance le long de laquelle sont à considérer les deux surfaces obliques.
Dimension *W* defines the distance over which the two angled surfaces apply.

3. – Les dimensions *C* et *N* ne sont pas à utiliser pour le calcul de la longueur des broches du socle. Voir Publication 61-1 de la CEI, feuille 7004-73A et B.

Dimensions *C* and *N* are not to be used to calculate the base pin length. See IEC Publication 61-1, Sheet 7004-73 A and B.

**DIMENSIONS EXTÉRIEURES
DES LAMPES TUNGSTÈNE-HALOGÈNE DE PROJECTION
AYANT UN RÉFLECTEUR INCORPORÉ DE 42 mm
ET UN SOCLE GX5.3 OU GY5.3**

Page 2

**EXTERNAL DIMENSIONS
OF TUNGSTEN HALOGEN PROJECTION LAMPS
HAVING A 42 mm INTEGRAL REFLECTOR
AND A GX5.3 OR GY5.3 BASE**

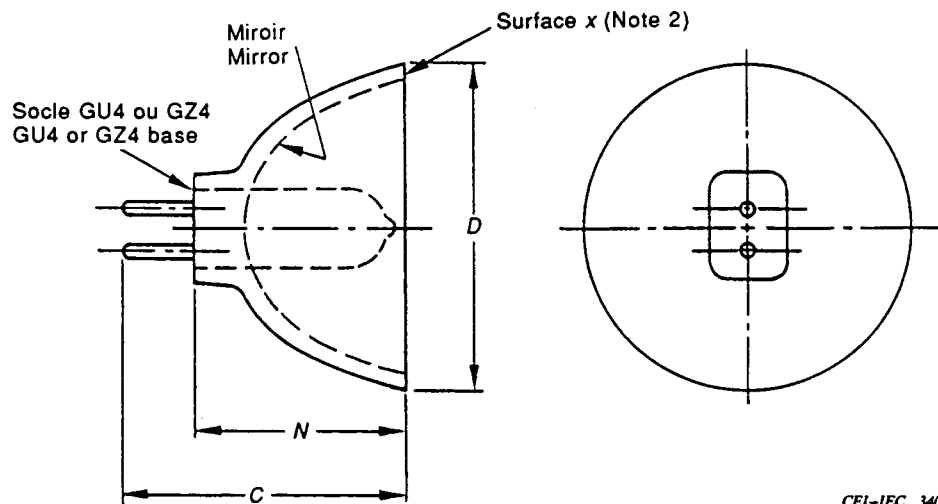
Notes (suite) – Notes (continued)

4. – Le contrôle de la cote *N* est nécessaire pour les applications dans les systèmes de fixation pour lampes à deux pincements.
Control of dimension *N* is necessary for applications in double-ended holding systems.
5. – La forme donnée au réflecteur et la surface du col ne sont pas destinées à spécifier ou à restreindre le contour de la surface extérieure de la lampe. Certaines restrictions sont imposées par la norme aux pincements et aux douilles. Voir Publication 61 de la CEI.
The shape shown for the reflector and neck areas is not intended to specify or restrict the outer surface contour of the lamp. Certain restrictions are imposed by the standard for the bases and holders. See IEC Publication 61.
6. – La surface *x* de la lampe doit adhérer fermement à la surface *x* du dispositif de centrage de la lampe, selon la feuille 1008- , pour obtenir un alignement convenable de l'axe optique.
Surface *x* of the lamp must mate firmly with surface *x* of the lamp centring device, as per Sheet 1008- , to obtain proper optical axis alignment.

**DIMENSIONS EXTÉRIEURES
DES LAMPES TUNGSTÈNE-HALOGÈNE
À RÉFLECTEUR INTÉGRÉ DE 35 mm
ET À SOCLE GZ4 OU GU4**

**EXTERNAL DIMENSIONS OF TUNGSTEN HALOGEN LAMPS
HAVING A 35 mm INTEGRAL MIRROR
AND EITHER A GZ4 OR GU4 BASE**

Dimensions en millimètres – Dimensions in millimetres



CEI-IEC 340/94

Dimension	Min.	Max.
<i>D</i> (Note 1)	34,3	35,3
<i>C</i>	—	40,0
<i>N</i>	25,0	30,0

NOTES

1 Le diamètre maximal autorisé comprend les bavures de moulage et d'ovalisation.
Allowable maximum diameter includes mould flash and out-of-roundness.

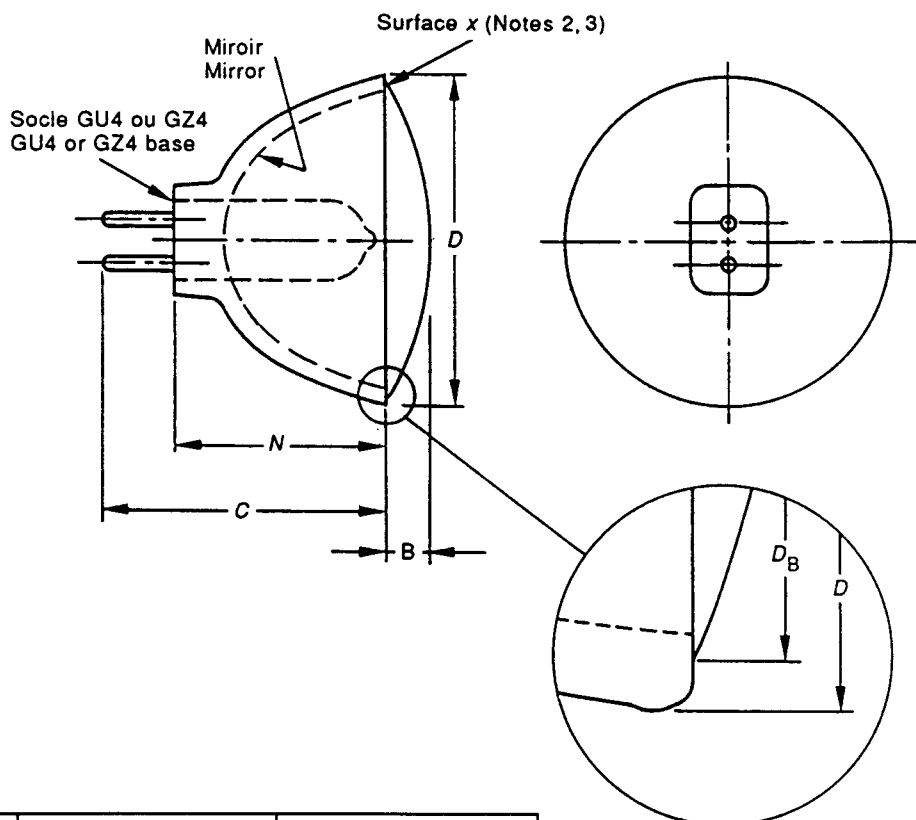
2 La surface *x* peut être utilisée pour positionner la lampe; dans ce cas, elle doit s'emboîter fermement dans tout dispositif de centrage quelconque du rebord, afin d'obtenir un alignement optique adéquat. Dans le cas des lampes GZ4, le dispositif de centrage du rebord remplit une fonction essentielle de rétention de la lampe. Surface *x* can be used to position the lamp and when so used should mate firmly with any rim-centring device to obtain proper optical alignment. A rim-centring device performs an essential lamp retention function for GZ4 based lamps.

**DIMENSIONS EXTÉRIEURES
DES LAMPES TUNGSTÈNE-HALOGÈNE
D'USAGE GÉNÉRAL DE DIAMÈTRE 35 mm
AVEC RÉFLECTEUR ET GLACE AVANT INTÉGRÉE**

**EXTERNAL DIMENSIONS OF TUNGSTEN HALOGEN
GENERAL PURPOSE LAMPS
HAVING A 35 mm INTEGRAL MIRROR AND FRONT COVER**

Dimensions en millimètres – Dimensions in millimetres

Le dessin a pour but d'indiquer les dimensions qui sont importantes pour le montage de la lampe et de son support.
The drawing is intended only to indicate the dimensions which are important for the fit of the lamp in the lampholder.



Vue agrandie du rebord
Enlarged view of rim

CEI-IEC 341/94

Dimension	Min.	Max.
D (Note 1)	34,30	35,30
C	—	40,00
B	—	5,00
D_B	—	33,5
N	25,0	30,0

NOTES

1 Le diamètre maximal autorisé comprend les bavures de moulage et d'ovalisation.
Allowable maximum diameter includes mould flash and out-of-roundness.

2 La surface x peut être utilisée pour positionner la lampe; dans ce cas, elle doit s'emboîter fermement dans tout dispositif de centrage quelconque du rebord, afin d'obtenir un alignement optique adéquat. Dans le cas des lampes GZ4, le dispositif de centrage du rebord remplit une fonction essentielle de rétention de la lampe.
Surface x can be used to position the lamp and when so used should mate firmly with any rim-centring device to obtain proper optical alignment. A rim-centring device performs an essential lamp retention function for GZ4 based lamps.

3 La surface x doit être définie par l'anneau formé par la différence entre les diamètres D et D_B .
Surface x is to be defined by the annulus formed by the difference between diameters D and D_B .

