



**NSAI**  
Standards

Irish Standard  
I.S. EN 61167:2011

# Metal halide lamps - Performance specification (IEC 61167:2011 (EQV))

## I.S. EN 61167:2011

*Incorporating amendments/corrigenda issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard – national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation - recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

<p><i>This document replaces:</i>                  EN 61167:1994                  EN 61167:1994/A1:1995                  EN 61167:1994/A2:1997                  EN 61167:1994/A3:1998</p>	<p><i>This document is based on:</i>                  EN 61167:2011                  EN 61167:1994</p>	<p><i>Published:</i>                  13 May, 2011                  16 August, 1994</p>
<p>This document was published under the authority of the NSAI and comes into effect on:</p> <p>7 March, 2012</p>		<p>ICS number:                  29.140.30</p>
<p><b>NSAI</b>                  1 Swift Square,                  Northwood, Santry                  Dublin 9</p>	<p>T +353 1 807 3800                  F +353 1 807 3838                  E standards@nsai.ie                    W NSAI.ie</p>	<p><b>Sales:</b>                  T +353 1 857 6730                  F +353 1 857 6729                  W standards.ie</p>
<p>Údarás um Chaighdeáin Náisiúnta na hÉireann</p>		

EUROPEAN STANDARD

**EN 61167**

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2011

ICS 29.140.30

Supersedes EN 61167:1994 + A1:1995 + A2:1997 + A3:1998

English version

**Metal halide lamps -  
Performance specification  
(IEC 61167:2011)**

Lampes aux halogénures métalliques -  
Spécifications de performance  
(CEI 61167:2011)

Halogen-Metaldampf lampen -  
Anforderungen an die Arbeitsweise  
(IEC 61167:2011)

This European Standard was approved by CENELEC on 2011-05-04. 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, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

**CENELEC**

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

**Management Centre: Avenue Marnix 17, B - 1000 Brussels**

**I.S. EN 61167:2011**

EN 61167:2011

- 2 -

**Foreword**

The text of document 34A/1442/FDIS, future edition 2 of IEC 61167, 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 61167 on 2011-05-04.

This European Standard supersedes EN 61167:1994 + A1:1995 + A2:1997 + A3:1998.

Compared to EN 61167:1994, measurement methods for electrical and photometric parameters are included and safety related requirements are deleted as far as they are now covered by EN 62035. Modern kind of ignition (e.g. aggregated pulse widths) and operation (low frequency square wave) is added with extensive description of methods of calculation for peak current ratio. At the same time, a review was made on lamps in the market which are fit for standardising, leading to a big number of new lamp data sheets in the range of 20 W up to 250 W lamp power.

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 EN has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2012-02-04
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 2014-05-04

NOTE In this standard, the following print types are used:

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Explanatory matter: in smaller roman type.

Annex ZA has been added by CENELEC.

---

**Endorsement notice**

The text of the International Standard IEC 61167:2011 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60081:1997	NOTE Harmonized as EN 60081:1998 (not modified).
A1:2000	A1:2002 (modified)
A2:2003	A2:2003 (not modified)
IEC 60188	NOTE Harmonized as EN 60188.
IEC 60357:2002	NOTE Harmonized as EN 60357:2003 (modified).
IEC 60682	NOTE Harmonized as EN 60682.
IEC 61231	NOTE Harmonized as EN 61231.

---

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

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.

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

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	EN 60061-1	-
IEC 60598-1	-	Luminaires - Part 1: General requirements and tests	EN 60598-1	-
IEC 60923	-	Auxiliaries for lamps - Ballasts for discharge lamps (excluding tubular fluorescent lamps) - Performance requirements	EN 60923	-
IEC 60927	-	Auxiliaries for lamps - Starting devices (other than glow starters) - Performance requirements	EN 60927	-
IEC/TR 61341	-	Method of measurement of centre beam intensity and beam angle(s) of reflector lamps	FprEN 61341 <sup>1)</sup>	-
IEC 62035	-	Discharge lamps (excluding fluorescent lamps) - Safety specifications	EN 62035	-
IEC 62471	-	Photobiological safety of lamps and lamp systems	EN 62471	--
CIE 84	-	The measurement of luminous flux	-	-

---

<sup>1)</sup> At draft stage.

*This page is intentionally left BLANK.*

## CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references.....	7
3 Terms and definitions.....	8
4 Lamp requirements.....	10
4.1 General.....	10
4.2 Marking.....	10
4.3 Dimensions.....	10
4.4 Caps.....	10
4.5 Starting and warm-up characteristics.....	10
4.5.1 Lamps that may operate on electromagnetic ballasts.....	10
4.5.2 Lamps suitable for low frequency square wave ballasts only.....	11
4.6 Electrical characteristics.....	11
4.7 Photometric characteristics.....	11
4.8 Colour characteristics.....	11
4.8.1 Lamps with non-standardised chromaticity co-ordinates.....	11
4.8.2 Lamps with standardised chromaticity co-ordinates.....	11
4.8.3 Colour rendering index.....	11
4.8.4 Requirements and test conditions.....	11
4.9 Lumen maintenance and life.....	11
5 Information for ballast, ignitor and luminaire design.....	12
6 Data sheets.....	12
6.1 General principles of numbering sheets.....	12
6.2 Lists of data sheets.....	12
6.2.1 List of diagrammatic lamp data sheets.....	12
6.2.2 List of lamp data sheets.....	24
6.3 List of maximum lamp outline sheets ( <i>construction according to IEC 61126</i> ).....	134
Annex A (normative) Method of measuring lamp starting and warm-up characteristics.....	137
Annex B (normative) Method of measuring electrical and photometrical characteristics (lamps for operation on 50 Hz or 60 Hz supply frequencies).....	139
Annex C (normative) Method of test for lumen maintenance and life.....	143
Annex D (informative) Information for luminaire design.....	144
Annex E (normative) Method of measuring electrical and photometrical characteristics on low frequency square wave reference ballast.....	145
Annex F (normative) Spectral analysis of power ripple: calculation procedure for amplitude spectrum ratio and guidance.....	147
Annex G (informative) Low frequency square wave operation.....	150
Annex H (informative) Information for ballast design.....	156
Bibliography.....	158

Figure A.1 – Circuit diagram for measurement of lamp starting and warm-up characteristics .....	138
Figure B.1 – Circuit diagram for measurement of lamp characteristics .....	141
Figure B.2 – Luminaire simulator for use with double-capped lamps .....	142
Figure E.1 – Circuit for lamp measurement under reference conditions .....	146
Figure G.1 – DC current component.....	153
Figure G.2 – HF ripple and fast Fourier transformation (power curve) .....	154
Figure G.3 – Measurement of PCR during run-up and steady state .....	154
Figure G.4 – Example of a measurement circuit of lamp potential against earth .....	155
Figure G.5 – Commutation time, deviating waveform .....	155
Figure H.1 – Example 1 to ignition scheme according to option (1) (see Annex G and lamp data sheets) .....	156
Figure H.2 – Example 2 to ignition scheme according to option (1) (see Annex G and lamp data sheets) .....	156
Figure H.3 – Example to ignition scheme according to option (2) (see Annex G and lamp data sheets) .....	157
Table 1 – List of diagrammatic lamp data sheets.....	12
Table 2 – List of lamp data sheets .....	24
Table 3 – List of maximum lamp outline sheets .....	134
Table B.1 – Correlated colour temperature and chromaticity co-ordinates x and y.....	140
Table E.1 – Characteristics of the reference ballast .....	145
Table F.1 – Settings of the analysing scope.....	148
Table G.1 – Requirements for square wave operation .....	150



## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

### METAL HALIDE LAMPS – PERFORMANCE SPECIFICATION

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as “IEC Publication(s)”). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.

International Standard IEC 61167 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

This second edition replaces the first edition published in 1992 and its Amendments 1 (1995), 2 (1997) and 3 (1998). This second edition constitutes a technical revision.

Compared to the 1<sup>st</sup> edition, measurement methods for electrical and photometric parameters are included and safety related requirements are deleted as far as they are now covered by IEC 62035. Modern kind of ignition (e.g. aggregated pulse widths) and operation (low frequency square wave) is added with extensive description of methods of calculation for peak current ratio. At the same time, a review was made on lamps in the market which are fit for standardising, leading to a big number of new lamp data sheets in the range of 20 W up to 250 W lamp power.

The text of this standard is based on the following documents:

FDIS	Report on voting
34A/1442/FDIS	34A/1458/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

NOTE In this standard, the following print types are used:

- Requirements proper: in roman type.
- *Test specifications: in italic type.*
- Explanatory matter: in smaller roman type.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

## INTRODUCTION

Since IEC 62035 *Discharge lamps (excluding fluorescent lamps) – Safety specifications* was published in 1999, the related lamp specific performance standards like IEC 61167 needed to be reviewed in an editorial action, splitting performance and safety requirements, but also to include all items in abeyance, stored for this occasion. The separation has already been carried out with other HID lamps. So, in some instances, the “pilot” text of IEC 60188 has been used. Moreover, the measurement part has been introduced with the assistance of IEC 60188 and IEC 60081.

It may also be noted that the colour coordinates for CCT 3000 K and 4200 K were adjusted to a point two units below Planck in order to take account of the life time shift to higher  $y$ -values.

Apart from these basic changes which were needed for long time, the new technique of low frequency square wave (LFSW) operation was implemented. This has led to additional pages to the existing lamp data sheets and several annexes describing and specifying the requirements. Further, detailed requirements and measurement methods for the ignition (break down/take-over/run-up) were introduced. Intense discussions took place on measurement and specification of the peak-current ratio during ignition and steady state. Workshops were held in order to come to a broad worldwide acceptance of the concepts. The Workshops were open for experts from lamp and control gear side in order to accommodate the interface between control gear and lamp to these requirements.

IEC SC34A MT PRESCO took the opportunity to add further lamp types which were considered of having market relevance and needing normative support.

The International Electrotechnical Commission (IEC) draws attention to the fact that it is claimed that compliance with this document may involve the use of patents concerning the lamp given in standard sheets 1039-1, 1041-1, 1080-1 and 1082-1.

IEC takes no position concerning the evidence, validity and scope of this patent right.

The holder of this patent has assured the IEC that he is willing to negotiate licences under reasonable and non-discriminatory terms and conditions with applicants throughout the world. In this respect, the statement of the holder of these patents is registered with the IEC. Information may be obtained from:

*Panasonic Corporation  
1-1 Saiwai-cho,  
Takatsuki City,  
Osaka 569-1193,  
Japan*

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights other than those identified above. IEC shall not be held responsible for identifying any or all such patent rights.

ISO ([www.iso.org/patents](http://www.iso.org/patents)) and IEC ([http://www.iec.ch/tctools/patent\\_decl.htm](http://www.iec.ch/tctools/patent_decl.htm)) maintain on-line data bases of patents relevant to their standards. Users are encouraged to consult the data bases for the most up to date information concerning patents.

## METAL HALIDE LAMPS – PERFORMANCE SPECIFICATION

### 1 Scope

This International Standard specifies the performance requirements for metal halide lamps for general lighting purposes.

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.

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 product 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.

### 2 Normative references

The following reference 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 reference document (including any amendments) applies.

IEC 60050-845:1987, *International Electrotechnical Vocabulary – 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 60598-1, *Luminaires – General requirements and tests*

IEC 60923, *Auxiliaries for lamps – Ballasts for discharge lamps (excluding tubular fluorescent lamps) – Performance requirements*

IEC 60927, *Auxiliaries for lamps – Starting devices (other than glow starters) – Performance requirements*

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

IEC 62035, *Discharge lamps (excluding fluorescent lamps) – Safety specifications*

IEC 62471, *Photobiological safety of lamp and lamp systems*

CIE 84, *The measurement of luminous flux*

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-