

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Auxiliaries for lamps – Starting devices (other than glow starters) – Performance requirements

Appareils auxiliaires pour lampes – Dispositifs d'amorçage (autres que starters à lueur) – Exigences de performance

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**AUXILIARIES FOR LAMPS –
STARTING DEVICES (OTHER THAN GLOW STARTERS) –
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IEC 60927 edition 3.1 contains the third edition (2007) [documents 34C/783/FDIS and 34C/797/RVD] and its amendment 1 (2013) [documents 34C/951/CDV and 34C/977/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. Additions and deletions are displayed in red, with deletions being struck through. A separate Final version with all changes accepted is available in this publication.

International standard IEC 60927 has been prepared by subcommittee 34C: Auxiliaries for lamps, of IEC technical committee 34: Lamps and related equipment.

This standard is to be used in conjunction with IEC 61347-1 and IEC 61347-2-1. It was established on the basis of the second (2007) edition of IEC 61347-1 and on the basis of the first (2000) edition and Amendment 1 (2005) of IEC 61347-2-1.

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

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AUXILIARIES FOR LAMPS – STARTING DEVICES (OTHER THAN GLOW STARTERS) – PERFORMANCE REQUIREMENTS

1 Scope

This International Standard specifies performance requirements for starting devices (starters and ignitors) for tubular fluorescent and other discharge lamps for use on a.c. supplies up to 1 000 V at 50 Hz or 60 Hz, which produce starting pulses not greater than 5 kV.

This standard is used in conjunction with IEC 61347-1 and IEC 61347-2-1.

NOTE 1 All glow starters for fluorescent and other discharge lamps including thermal relay/cut-outs will be included in IEC 60155.

NOTE 2 There are regional standards regarding the regulation of EMC requirements for end-products like luminaires and independent control gear. In a luminaire, the control gear is dominant in this respect. Control gear, together with other components, should comply with these standards.

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 60081, *Double-capped fluorescent lamps – Performance specifications*

IEC 60192, *Low-pressure sodium vapour lamps – Performance specifications*

IEC 60598-1:2003, *Luminaires – Part 1: General requirements and tests*¹⁾
Amendment 1 (2006)

IEC 60662, *High-pressure sodium vapour lamps*

IEC 60901, *Single-capped fluorescent lamps – Performance specifications*

IEC 60921, *Ballasts for tubular fluorescent lamps – Performance requirements*

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

IEC 61167, *Metal halide lamps*

IEC 61347-1, *Lamp controlgear - General and safety requirements*

IEC 61347-2-1, *Lamp controlgear – Particular requirements for starting devices (other than glow starters)*

¹⁾ A consolidated edition 6.1 exists, including IEC 60598-1 (2003) and its Amendment 1 (2006).

IEC 61347-2-9, *Lamp controlgear – Particular requirements for ballasts for discharge lamps (excluding fluorescent lamps)*

IEC 61547, *Equipment for general lighting purposes – EMC immunity requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61347-2-1 together with the following apply.

3.1

starter with mechanical switching element

starter which provides cathode pre-heating current and lamp-starting pulse(s) by mechanical means (e.g. thermal or magnetic)

3.2

starter with electronic switching element

starter which provides cathode pre-heating current and lamp-starting voltage(s) or pulse(s) by electronic means and contains no moving parts

3.3

deactivated lamp

lamp in which one or both cathodes are deprived of emitting material but neither of which is broken

3.4

non-re-operating level

reduced level of voltage and/or current at which a starting device must not re-operate after the completion of the starting cycle, and the lamp is operating normally

3.5

maximum abnormal current

value of continuous r.m.s. current through the ballast which shall not be exceeded at the end of the starting cycle when the circuit is in an abnormal condition (e.g. deactivated lamp, or lamp that has been removed)

3.6

starting aid

means to facilitate the starting of a lamp, which can be either a conductive strip affixed to the outer surface of a lamp or a conductive plate which is placed within an appropriate distance from a lamp

NOTE A starting aid can only be effective when it has an adequate potential difference from one end of the lamp.

~~3.7~~

~~maximum case temperature ($t_c + X$) under abnormal conditions~~

~~maximum allowable case temperature of the ignitor under abnormal conditions with metal halide lamps~~

~~The value of ($t_c + X$) is declared by the manufacturer~~

4 General requirements for tests

4.1 Ambient conditions, test quantity and sequence of tests

Only requirements for type tests are included.

Unless otherwise specified, the tests shall be made at an ambient temperature between 10 °C and 30 °C.

The tests shall be carried out in the order of the clauses of this standard.

The following numbers of samples shall be submitted:

- six samples of starters as defined in 3.1 and 3.2;
- four samples of ignitors (where appropriate, together with those circuit components which are necessary to carry out the tests).

4.2 Supply voltage

The total harmonic content of the supply voltage shall not exceed 3 %, the harmonic content being defined as the root-mean-square (r.m.s.) summation of the individual harmonic components, using the fundamental as 100 %.

Care shall be taken that this applies under all conditions that occur during the measurement.

NOTE This implies that the source of supply will have sufficient power and that the supply circuit has sufficiently low impedance at supply frequency and impulse frequency compared with the ballast impedance. The correct impedance at impulse frequency can be obtained by connecting a 2 µF (approximately) capacitor in parallel with the source.

4.3 Corresponding safety requirements

All starting devices specified in this standard shall meet the requirements of IEC 61347-2-1.

4.4 Immunity

All starting devices specified in this standard shall meet the requirements of IEC 61547.

NOTE The requirements for starting devices are under consideration in IEC 61547.

4.5 Relation to lamp standards

Attention is drawn to lamp performance standards which contain “Information for ignitor design”. This information should be followed for proper lamp operation. However, this standard does not require the testing of lamp performance as part of the type test approval for ignitors.

5 Marking

The marking requirements of IEC 61347-2-1 shall apply, together with the following, to be either clearly marked on the starting device or made available in the manufacturer's catalogue, or the like.

- a) The manufacturer shall declare the type of switching element as defined in 3.1 and 3.2.
- b) The manufacturer shall declare the maximum load capacitance for satisfactory operation of the ignitor.
- ~~c) The manufacturer shall declare the allowable maximum case temperature under abnormal conditions ($t_c + X$) of the ignitor.~~

6 Performance requirements for starters (other than glow starters) for fluorescent lamps

This clause specifies performance requirements for starters other than glow starters, used with tubular fluorescent lamps with pre-heated cathodes, and their associated ballasts (see IEC 60081 and IEC 60921, where appropriate).

6.1 Starting test

6.1.1 Starting test quantity

The starting test quantity consists of six new starters which have not been subjected to the tests specified in IEC 61347-2-1.

6.1.2 Conditions of acceptance

The type is considered as satisfying the requirements of this subclause if all six starters comply with the appropriate tests specified in 6.1.4 to 6.1.8. If one failure occurs, a further six starters shall be selected and tested and all these shall comply. If more than one failure occurs the starter is deemed not to satisfy the requirements of this clause.

6.1.3 Conditions of test

6.1.3.1 Circuit

The starter is tested in the circuit declared by the manufacturer.

A starting aid complying with the requirements of Table 1 shall be used unless otherwise indicated on the starter or in the manufacturer's literature.

In case of doubt a choice shall be made by mutual agreement between the testing authority and the manufacturer.

Table 1 – Starting aid requirements

Lamp diameter mm	Starting aid width mm	Spacing from lamp Mm	Length
15	25	7	Not less than lamp length
25	40	12	
38	40	20	
15/25/38	1,5 ^a	0 ^a	
NOTE A starting aid spaced from the lamp can only be effective if the outer surface of the lamp is treated to be non-wetting.			
^a Strip affixed to lamp surface.			

6.1.3.2 Ballast

The ballast used shall meet the requirements of IEC 60921, where appropriate. It shall have a rated voltage equal to the supply voltage, or equal to the lowest value of the supply voltage range for which the starter is designed.

The rated wattage of the ballast shall be chosen to give the most onerous starting conditions of the range of lamp types for which the starter is designed. In case of doubt the rated wattage of the ballast shall correspond to the main lamp type for which the starter is designed.

Where a starter is designed to operate with different ballast types (e.g. capacitive or inductive), the tests are made with both types of ballast.

6.1.3.3 Lamps

The lamp shall be of the pre-heated cathode type and, where appropriate, meet the requirements of IEC 60081. The rated wattage of the lamp shall be equal to the rated wattage of the ballast used.

For starters of the mechanical type defined in 3.1 the lamp shall normally be of the "with starter" type. For starters of the electronic type defined in 3.2 the lamp shall normally be of the "starterless type". Where a choice of lamp of "with starter" or "starterless" type is declared by the manufacturer, the "with starter" type shall be used.

6.1.4 Starters having a mechanical switching element

6.1.4.1 Speed of operation

a) *Current operated starters*

A current equal to the minimum pre-heating current prescribed on the relevant lamp data sheet in IEC 60081 shall be passed through the circuit.

For starters which incorporate a cut-out, the starter shall operate at least once during the test period of 30 s. For continuously operating starters, the starter shall operate at least twice during the test period of 30 s.

The test is made with a deactivated lamp or with an equivalent resistance of both cathodes in series as prescribed on the relevant lamp data sheet in IEC 60081.

b) *Voltage operated starters*

A voltage of 0,92 times the rated voltage of the ballast shall be applied to the circuit.

For starters which incorporate a cut-out, the starter shall operate at least once during the test period of 30 s.

For continuously operating starters, the starter shall operate at least twice during the test period of 30 s.

The test is made with a deactivated lamp or with an equivalent resistance of both cathodes in series as prescribed on the relevant lamp data sheet in IEC 60081.