IEC 61347-2-7

Edition 3.0 2017-10

INTERNATIONAL STANDARD

NORME INTERNATIONALE

AMENDMENT 1
AMENDEMENT 1

Lamp controlgear –
Part 2-7: Particular requirements for battery supplied electronic controlgear for emergency lighting (self-contained)

Appareillages de lampes –
Partie 2-7: Règles particulières relatives aux appareillages électroniques alimentés par batterie pour l'éclairage de secours (autonome)

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FOREWORD

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

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

FDIS	Report on voting
34C/1354/FDIS	34C/1359/RVD

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

The committee has decided that the contents of this amendment and the base publication will remain unchanged until the stability date indicated on the IEC website 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- withdrawn,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 to Amendment 1

EBLF is the ratio of the light output of a light source in emergency mode to the rated light output under normal conditions. EBLF is controlled by the output characteristics (current, voltage, power) of the controlgear with which the light source is operated.

For conventional lamps like fluorescent lamps, the EBLF is defined by the light output ratio of the lamp operated at 100 % and in emergency mode.

$$EBLF = \Phi_{emergency} / \Phi_{100\ \%}$$

For this measurement no special lamp is required, it is expected that all lamps of the same type show a very similar light output ratio independent of its manufacturer. The measurement is done at an ambient temperature of 25 °C. Due to the same dimensions and the identical cooling system (free air) the thermal conditions are identical for all lamps. The result is fully reproducible without any additional condition.

Special requirements for LED light sources

The light output of LED light sources depends also on the temperature at which they are operated. Typically the temperature is controlled by a heat sink on which it is mounted (e.g. luminaire surface).

This amendment describes a test method to evaluate the EBLF via an output factor (EOF_X) taking into account that the ratio of the forward current of the LED controlgear is directly proportional to the LED light output. Any non-linearity due to the increased efficacy at lower operation temperature leads to an increased tolerance of the light output in the emergency mode but always positive.

Controlgear, which operates the LED light source in normal operation as well as in emergency operation can be marked directly with the output factor. Controlgear, operating the LED module in emergency mode only needs to be marked with the output value, for example the forward current $I_{emergency}$.

1 Scope

In the last paragraph, delete the first two sentences and in the third sentence, replace the first word "it" with "This standard".

3 Terms and definitions

3.4

Replace, in the definition, “ballast” with “controlgear”.

3.15

Delete, in the definition, the words "an automatic testing".

Add, at the end of Clause 3, the following new terminological entries:

3.16
emergency output factor
EOF_X
ratio of the electrical output parameter when the controlgear under test is operated in emergency mode to the electrical output parameter when the controlgear is operated under normal lighting conditions

EXAMPLE: $I_{emergency}$ compared with I_{rated} according to IEC 61347-2-13.

Note 1 to entry: The electrical output parameter can be current (EOF_I), voltage (EOF_U) or power (EOF_P) at the output(s) of the controlgear (depending on the module it could be constant current, constant voltage or constant power).

Note 2 to entry: The emergency output factor is the minimum value measured at the appropriate time after failure of the normal supply and continuously for the duration of the emergency operation.

Note 3 to entry: The EOF_X of LED controlgear used for emergency operation only, is not indicated on the emergency controlgear as it depends directly also on the controlgear used for the normal operation mode. For example for EOF_I it can be calculated in the final application from $I_{emergency}$ and $I_{normal\ mode}$.

Note 4 to entry: The use of EOF_I higher than 1 is not suitable for direct calculation of the luminous flux of the luminaire in emergency mode.

3.17
emergency output current
$I_{emergency}$
forward current supplied to the LED light source measured at the output of the controlgear in emergency mode

3.18
$I_{normal\ mode}$
rated output current delivered from constant current controlgear to the LED light source in normal operating mode

7.2 Information to be provided

Replace, in the first paragraph, "ballast" with "controlgear".

Replace, in the second, third and tenth dashed list items, "ballast" with "controlgear".

Replace the sixth dashed list item with the following four new dashed list items:

– declaration of the emergency ballast lumen factor (EBLF) for controlgear for fluorescent lamp; for multi lamp controlgear the EBLF for each lamp-ballast combination;

– declaration of emergency output factor (EOF_X) for LED controlgear supplying light source in both normal and emergency operation. In case of settable electrical output parameter, a range shall be provided or alternatively the value of the electrical parameter (e.g. $I_{normal\ mode}$ and $I_{emergency}$ from constant current controlgear) shall be provided for the calculation of EOF.

– marking of the relevant output parameter (e.g. $I_{emergency}$ from constant current controlgear or output current range) for LED controlgear used for emergency operation only, since the EOF_I is not applicable. In the case of controlgear providing different parameters from constant values (e.g. a combination of constant power for some load range and constant current for other load ranges) it shall be marked with the maximum $I_{emergency}$ and details for the parameters delivered shall be provided in the manufacturer's catalogue or similar.

– for LED controlgear providing constant current the minimum and the maximum output voltage load shall be provided. In addition, for settable controlgear the output voltage range shall be given for the whole range of currents in the manufacturer catalogue or similar (e.g. table or operating area diagram).

13 Thermal endurance test for windings of ballasts

Replace, in the title of Clause 13, "ballasts" with "controlgear".

15 Starting conditions

Replace, in the first, fifth and last paragraphs "ballast" with "controlgear".

16 Lamp current

Replace, in the last paragraph, "ballasts" with "controlgear".

17 Supply current

Replace, in the first and second paragraphs, "ballast" with "controlgear".

19 Lamp operating current waveforms

Replace, in the second paragraph, "Ballasts" with "Controlgear" and in the third paragraph "ballast" with "controlgear".

20 Functional safety (EBLF)

Replace the existing Clause 20 including its title with the following new Clause 20 and new title:

20 Functional safety (EBLF, EOF_X)

20.1 Requirements for fluorescent lamp controlgear

The requirements of 20.1 only apply to fluorescent lamps. Measurements shall be made using a new lamp which has been aged according to the appropriate lamp standard for initial luminous flux measurements.

The appropriate lamp associated to the controlgear shall provide the necessary light output after changeover to the emergency mode. This is verified if the declared emergency ballast lumen factor (EBLF) is achieved during emergency operation at 25 °C.

Compliance is checked by the following test:

Electronic controlgear provided with or without batteries:

For measurement of EBLF, voltages representative of a fully charged battery and the battery voltage present just before lamp extinguishing are used as follows:

V_1 – *Full charge battery voltage per cell dependant on battery type as follows:*

NiCd – *1,35 V per cell;*

NiMh – *1,35 V per cell;*

Pb – *2,10 V per cell.*

V_{min} – *End of capacity battery voltage per cell dependant on battery type as follows:*

NiCd – *1,10 V;*

NiMh – *1,10 V;*

Pb – *1,80 V.*

Where the controlgear cut off voltage is above these voltages, the cut off voltage becomes V_{min}.

Measurement of EBLF shall be made at 25 °C, using a lamp of the appropriate type and having not been lit for 24 h. The first measurements are made at V_1 *at 5 s and 60 s after the application of the d.c. voltage, and then in steady conditions at* V_{min}.

The lowest value of the values measured at 60 s and V_1 *or in steady conditions at* V_{min} *shall be retained and shall reach at least the declared EBLF.*

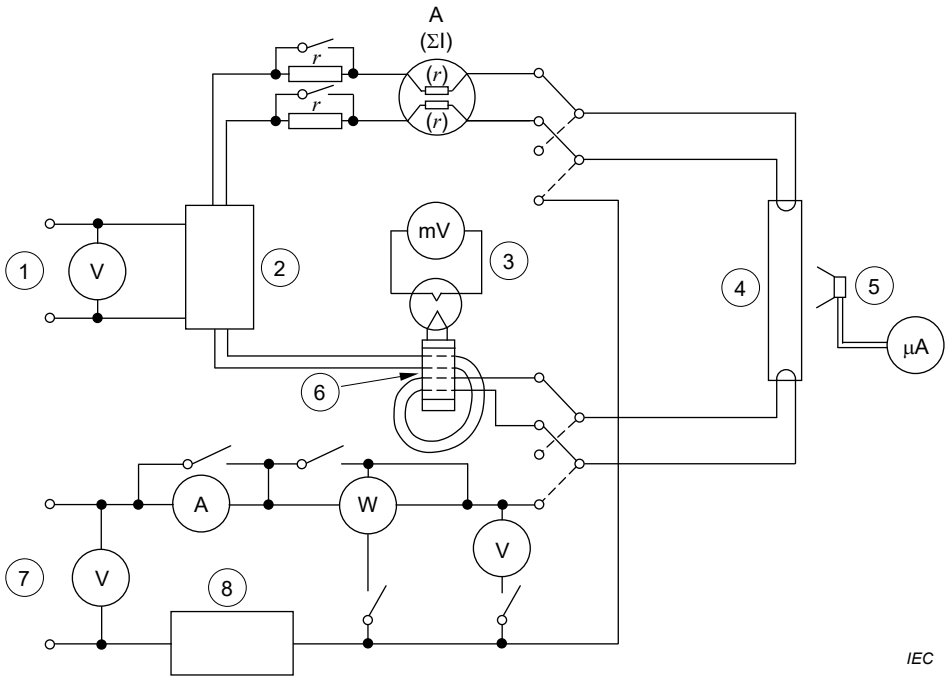
The value measured at 5 s and V_1 *shall reach at least 50 % of declared EBLF.*

Replace 60 s by 0,5 s for controlgear declared for use in luminaires for high-risk task area lighting.

As declared, EBLF shall be reached after 0,5 s, measurements at 5 s are not considered.

NOTE 1 Any test circuit corresponding to that of Figure 1 can be used to make the measurement of EBLF. The luminous flux of a lamp is usually measured with an integrating photometer. For ratio measurements of luminous fluxes, a suitable illuminance meter is sufficient as there is a close relationship between luminous flux and illumination at a fixed point.

NOTE 2 Other methods may apply for determining EBLF, in particular methods which permanently record the luminous flux of the lamp associated to the controlgear under test.



Key

1 Supply
2 Controlgear under test
3 Thermocouple
4 Reference lamp
5 Photocell
6 Current transformer
7 Supply
8 Reference ballast

Figure 1 – Suitable circuit for the measurement of lamp current and luminous flux

20.2 Requirements for LED lamp controlgear

20.2.1 Constant current LED controlgear: EOF_I and $I_{emergency}$

LED light sources show a direct relation between forward current and light output with only a slight deviation due to an improved efficacy when operated at lower temperatures.

The emergency output factor of the forward current, EOF_I, is the ratio of the average current measured in emergency mode ($I_{emergency}$) and the average forward current measured at rated conditions ($I_{normal\ mode}$).

Compliance is checked by the following test set up:

For compliance measurements of EOF_I the controlgear shall be operated with a load producing the maximum and the minimum of the output voltage range (or power).

Electronic controlgear provided with or without batteries:

For the measurement of $I_{emergency}$ and EOF_I of the controlgear it is operated at a supply voltage which represents V_1 and V_{min} according to the following table:

V_1 – Full charge battery voltage per cell dependent on battery type as follows:

NiCd – 1,35 V per cell;

NiMh – 1,35 V per cell;

Pb – 2,10 V per cell.

V_{min} – End of capacity battery voltage per cell dependent on battery type as follows:

NiCd – 1,10 V;

NiMh – 1,10 V;

Pb – 1,80 V.

Where the controlgear cut off voltage is above these voltages, the cut off voltage becomes V_{min}.

Measurement of $I_{emergency}$ shall be made at an ambient temperature of 25 °C. The first measurement of the output current is made at V_1 at 5 s and at 60 s after the application of the d.c. voltage.

The second measurement of the output current is made at V_{min}.

The lower of the current measured at 60 s and V_1 or V_{min} shall be retained as $I_{emergency}$ and shall reach at least the declared value for $I_{emergency}$ and EOF_I when compared with the output current ($I_{normal\ mode}$) of the controlgear measured under normal conditions with the same load.

The value measured at 5 s and V_1 shall reach at least 50 % of the current $I_{emergency}$.

$$EOF_I = \frac{I_{\text{emergency}}}{I_{\text{normal mode}}}$$

For LED controlgear declared for use in luminaires for high-risk task area lighting the measurements at V_1 are carried out after 0,5 s.

20.2.2 Constant voltage and constant power LED controlgear

Tests to check constant voltage and constant power LED controlgear are under consideration.

NOTE Voltage and/or power controlled LED controlgear are designed to operate LED light sources with an integrated current control unit. The light output ratio of the LED light source therefore depends directly on the characteristic of the LED module and on the heat sink (luminaire). Marking voltage and/or power controlled LED controlgear with EBLF or EOF_X is therefore outside the scope of this standard.

20.3 Requirements for other light source controlgear

Requirements for other light sources are under consideration.

21 Changeover operation

Replace, in the second and third paragraphs all occurrences of “ballast” with “controlgear”.

Replace, in the first sentence of the fourth paragraph, "ballasts" with "controlgear" and in the second sentence of the fourth paragraph, "ballast" with "controlgear".

22.1

Replace, in the fourth paragraph, “ballast” with “controlgear”.

22.2

Replace, in the third paragraph, “ballast” with “controlgear”.

22.5

Replace, in the second paragraph, “ballast” with “controlgear”.

24 Indicator

Replace “ballast” with “controlgear”.

26 Temperature cycling test and endurance test

Replace, in the third paragraph, “ballast” with “controlgear”.

27 Polarity reversal

Replace, in the first and second paragraphs, “ballast” with “the controlgear”.

29.1.2

Replace “ballast” with “controlgear”.

34.2

Replace, in the second and penultimate paragraphs “ballast” and "ballasts" with “controlgear”.

Replace, in the penultimate paragraph "the circuit shown in Figure 2a is used." with "the circuits shown in Figure 2a and Figure 2b are used."

Replace the existing Figure 2 with the following new Figure 2: