IEC 60929

Edition 4.0 2015-10

INTERNATIONAL STANDARD

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AMENDMENT 1
AMENDEMENT 1

AC and/or DC-supplied electronic control gear for tubular fluorescent lamps – Performance requirements

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Appareillages électroniques alimentés en courant alternatif et/ou continu pour lampes tubulaires à fluorescence – Exigences de performances

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IEC 60929:2011-05/AMD1:2015-10(en-fr)

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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:

CDV	Report on voting
34C/1114/CDV	34C/1157/RVC

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- withdrawn,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

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CONTENTS

Replace the titles of 8.3.1 and 8.4 as follows:

Add the titles of the new Annexes F and G, the new figures and the new tables as follows:

1 Scope

Add after NOTE 2 the following NOTE 3:

NOTE 3 Requirements for the digital addressable lighting interface of electronic control gear are given in IEC 62386.

2 Normative references

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Add the following new reference at the end of the list:

IEC TR 62750:2012, *Unified fluorescent lamp dimming standard calculations*

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8.3 Requirements for dimming

Replace the entire subclause with the following new subclause:

8.3 Requirements for dimming

8.3.1 Heating of the lamp cathodes

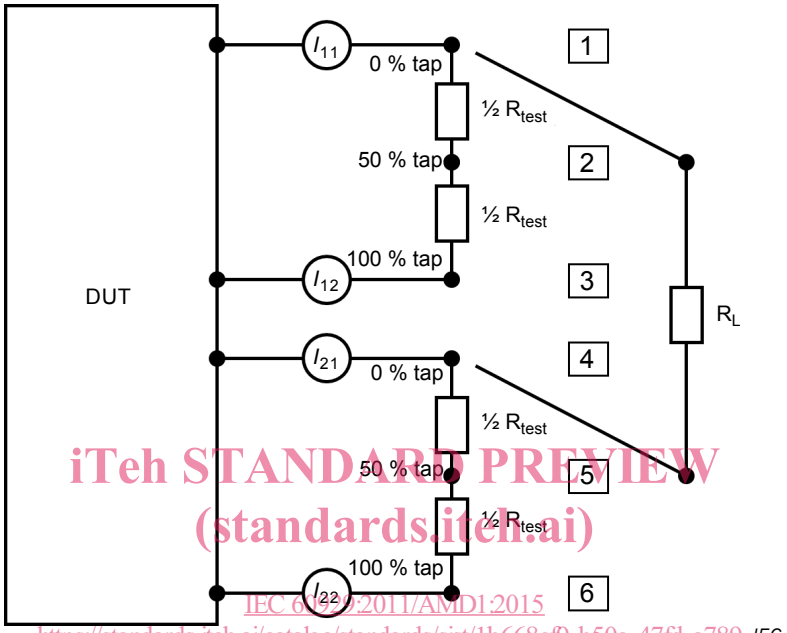
8.3.1.1 General

Fluorescent lamps operated in dimming mode (to reduce luminous flux by reducing discharge current) need their cathodes adequately heated by the electronic control gear. It has been found that measuring the currents through the two lead-in wires to the cathode and calculating the sum of the squares (SoS) of these two currents as a function of the discharge current can estimate the cathode heating. Alternatively, it has also been found that it is possible to estimate cathode heating by measuring the voltage applied across the cathode (CV) while dimming. The heating requirements are described in IEC TR 62750:2012.

The control gear is tested at lamp discharge currents (dim levels) of I_{Dmin}, I_{D30} and I_{D60}. The measurements are conducted with substitution resistors for the cathodes (R_{test}) and for the discharge, the latter dependent on the dim level (R_L, having nominal values of R_{L10Max} and R_{L10Min} as well as R_{L30} and R_{L60}). The lamp substitution resistor values shall be taken from the IEC lamp data sheets. Take care that the substitution resistors are capable of carrying the current, voltage and power occurring in the circuit.

All positions that on control gear that would be connected to a lamp shall instead be connected to substitution resistors. Wherever in this procedure a reference is made to “lamp”, it is intended to mean a set of substitution resistors that represent a lamp.

The hot spot location may vary on the lamp cathode during operation. This effect is simulated in the test by connecting the cathode substitution resistors in different circuit configurations. For this purpose, taps in the middle and at the ends of the cathode substitution resistor networks are equipped with switches (0 – 50 – 100 method), which allow all possible combinations of connection to be realized. The fundamental test set-up is shown in Figure 3.



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Key

DUT control gear device under test

R_L lamp substitution resistor

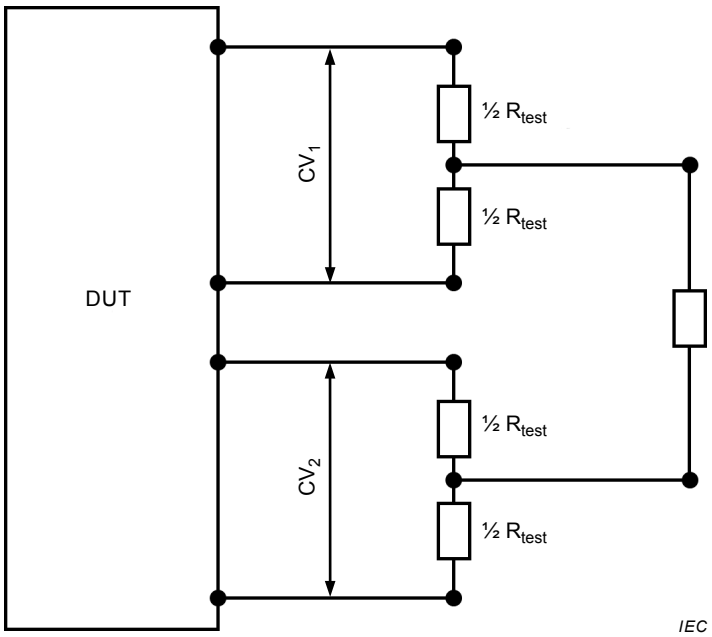
I_{nn} measured current

1…6 switch positions

Figure 3 – Fundamental test set-up for the SoS-test

In cases where the discharge current is much smaller than the auxiliary heating current, i.e. for the upper and lower heating limits at very low discharge current values (= 10 % of the test current), the cathode lead wire currents are found to be nearly equal.

Thus, for the CV-test, only the centre tap position is required for testing. The CV-test setup shown in Figure 4 is a simplified version of the SoS-test circuit.



Key

DUT	control gear device under test
R_L	lamp substitution resistor
CV_1 and CV_2	measured cathode voltages

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Figure 4 – Fundamental test set-up for the CV-test

8.3.1.2 Basic test conditions

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Due to the lamps being operated at high frequency, the test set-up with substitution resistors should be comparable to the set-up of the real luminaire. Relevant examples are given in Annex F.

Check the suitability of the lamp and cathode substitution resistor set-up at high frequencies for the frequency range used by the control gear.

Maintain the maximum contact resistances, parasitic inductances and coupling capacitances of the cathode circuits in test with the lamp dummy inserted (see Table 2).

Table 2 – Maximum permitted parasitic inductances, capacitances and contact resistances of a test circuit set-up according to Figures 3 and 4

Parameter	Maximum value
L (for each heating circuit)	2 μH
R (contact resistances for each heating circuit)	100 nΩ
C_1 (from heating circuit to heating circuit)	20 pF
C_2 (heating circuit to earth)	150 pF

The values of *L*, *R*, C_1, and C_2 are measured at the lamp wires next to the electronic control gear's lamp terminals. For this purpose, instead of a lamp, the cathode substitution resistors R_{test} are inserted in the test set-up.

Output circuits of electronic control gears, designed for multi-lamp operation, are each tested separately. The output circuits not involved in the test shall be connected to the substitution

resistors with equal value to the output circuit which is under test. The variations of the cathode terminal switch take place only with the output circuit under test. For the other circuit(s), the switch is connected to the middle position (positions 2 and 5 in Figure 3).

Lamp substitution circuits, supplied from multi-lamp electronic control gears (i.e. gears which operate more than one lamp simultaneously), shall each be wired separately when connected with the DUT (device under test). This means that each electrode substitution resistor is equipped with 2 cables, leading to the terminal of the electronic control gear and having an immediate connection according to the electrical circuit design. Each pair of one electrode substitution resistor's cables shall be installed together.

For wiring of the test set-up, H05V-U cables (or equivalent) shall be used. When designing the wiring layout, the values of the parasitic losses shall be in the same order for all lamp circuits. This can be achieved only if the wiring of the lamp circuits is comparable in distances, lengths, etc. and each pair of lamp circuits is located symmetrical to the axis of the device.

Check the suitability of the instruments, i.e. the tolerance at the range of expected frequency and amplitude.

For the r.m.s. current measurement, the measurement period shall be an integer multiple of the mains half wave period.

If the electronic control gear allows operation of different lamps with varying operating parameters, then safeguard with suitable means so that during operation at the lamp dummy the correct choice of parameters for that lamp(s) has been made.

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Compliance with the cathode heating conditions shall be tested with each alternative lamp type.

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To ensure that control gear reaches the operating state (to "start" the substitution resistors), the procedure may be modified and/or a special prepared control gear may be used, provided the cathode heating would be the same as a production control gear.

8.3.1.3 General test sequence

Table 3 gives an overview of the values for the different dimming levels which shall be measured and controlled. If an electronic control gear is designed for more than one lamp, then the same measurements and tests shall be conducted as for Lamp 1. Table 3 includes also the switching position for the simulation of the arc spot and the correlation to the test method (CV or SoS).

Table 3 – Dimming levels and measured values

Subclause	Discharge current	Lamp substitution resistor	Cathode substitution value	Arc spot simulation switch position	Values to be checked
8.3.1.4.2.2	I_{10}	R_{L10min}	R_{test3}	2-5	$CV_1 \geq CV_{min}$, etc
8.3.1.4.2.3	I_{10}	R_{L10min}	R_{test2}	2-5	$CV_1 \leq CV_{max}$, $I_{11} \leq I_{LHmax}$, etc
8.3.1.4.2.4	I_{10}	R_{L10max}	R_{test3}	2-5	$CV_1 \geq CV_{min}$, etc
8.3.1.4.2.5	I_{10}	R_{L10max}	R_{test2}	2-5	$CV_1 \leq CV_{max}$, $I_{11} \leq I_{LHmax}$, etc
8.3.1.4.3.2	I_{30}	R_{L30}	R_{test1}	2-5	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc
8.3.1.4.3.3	I_{30}	R_{L30}	R_{test2}	2-5	$CV_1 \leq CV_{max}$, $I_{11} \leq I_{LHmax}$, etc
8.3.1.4.4.2	I_{60}	R_{L60}	R_{test1}	2-5	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc
8.3.1.4.4.3	I_{60}	R_{L60}	R_{test2}	2-5	$CV_1 \leq CV_{max}$, $I_{11} \leq I_{LHmax}$, etc
8.3.1.5.2	I_{30}	R_{L30}	R_{test1}	1-4	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc
8.3.1.5.3	I_{30}	R_{L30}	R_{test1}	3-6	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc
8.3.1.5.4	I_{30}	R_{L30}	R_{test1}	1-6	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc
8.3.1.5.5	I_{30}	R_{L30}	R_{test1}	3-4	$I_{11}^2 + I_{21}^2 \geq SoS_{30}$, etc

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8.3.1.4 Test sequence “arc attachment – middle”

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8.3.1.4.1 General

All tests in 8.3.1.4 are performed with cathode tap 50 % – Figure 3 (equivalent switch positions 2 and 5) or Figure 4.

Values of the lamp and cathode substitution resistors, test current and limit values shall be those from the relevant IEC lamp data sheets.

8.3.1.4.2 Dim level I_{Dmin}

8.3.1.4.2.1 General

The control terminal of the electronic control gear is used to adjust the lamp discharge current I_D (current through the lamp substitution resistors) to I_{Dmin} as indicated on the relevant IEC lamp datasheet.

8.3.1.4.2.2 Minimum heating for minimum lamp substitution resistor R_{L10min}

This test shall be carried out with a lamp substitution resistor value R_{L10min} and filament substitution resistor value R_{test3}.

Measure CV_1 and CV_2, and then compare the achieved values with the limit values according to the formulas:

$$CV_1 \geq CV_{min} \text{ and } CV_2 \geq CV_{min}$$

Electronic control gear, operating more than one lamp:

Repeat the measurement procedure of CV_1 and CV_2 for each other lamp of multi lamp control gear.

8.3.1.4.2.3 Maximum heating for minimum lamp substitution resistor R_{L10min}

This test shall be carried out with a lamp substitution resistor value R_{L10min} and filament substitution resistor value R_{test2}.

Measure CV_1, CV_2, I_{11}, I_{12}, I_{21}, and I_{22} then compare the achieved values with the limit values according to the formulas:

$$CV_1 \leq CV_{max} \text{ and } CV_2 \leq CV_{max} \text{ and } I_{11} \leq I_{LHmax} \text{ and } I_{12} \leq I_{LHmax} \text{ and } I_{21} \leq I_{LHmax} \text{ and } I_{22} \leq I_{LHmax}$$

Electronic control gear, operating more than one lamp:

Repeat the measurement procedure of CV_1, CV_2, I_{11}, I_{12}, I_{21}, and I_{22} for each other lamp of multi lamp control gear.

8.3.1.4.2.4 Minimum heating for maximum lamp substitution resistor R_{L10max}

This test shall be carried out with a lamp substitution resistor value R_{L10max} and filament substitution resistor value R_{test3}.

Measure CV_1 and CV_2, and then compare the achieved values with the limit values according to the formulas:

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$$CV_1 \geq CV_{min} \text{ and } CV_2 \geq CV_{min}$$

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Electronic control gear, operating more than one lamp:

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For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.2.2).

8.3.1.4.2.5 Maximum heating for maximum lamp substitution resistor R_{L10max}

This test shall be carried out with a lamp substitution resistor value R_{L10max} and filament substitution resistor value R_{test2}.

Measure CV_1, CV_2, I_{11}, I_{12}, I_{21}, and I_{22}, then compare the achieved values with the limit values according to the formulas:

$$CV_1 \leq CV_{max} \text{ and } CV_2 \leq CV_{max} \text{ and } I_{11} \leq I_{LHmax} \text{ and } I_{12} \leq I_{LHmax} \text{ and } I_{21} \leq I_{LHmax} \text{ and } I_{22} \leq I_{LHmax}.$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.2.3).

8.3.1.4.3 Dim level I_{D30}

8.3.1.4.3.1 General

The control terminal of the electronic control gear is used to adjust the lamp discharge current I_D to I_{D30} as indicated on the relevant IEC lamp datasheet.

8.3.1.4.3.2 Minimum heating for lamp substitution resistor R_{L30}

This test shall be carried out with a lamp substitution resistor value R_{L30} and filament substitution resistor value R_{test1}.

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq SoS_{30} \text{ and } I_{21}^2 + I_{22}^2 \geq SoS_{30}$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1.

Lamp 2:

Measure I_{31}, I_{32}, I_{41} and I_{42}, and then compare the achieved values with the limit values according to the formulas:

$$I_{31}^2 + I_{32}^2 \geq SoS_{30} \text{ and } I_{41}^2 + I_{42}^2 \geq SoS_{30}$$

Lamp 3:

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Measure I_{51}, I_{52}, I_{61} and I_{62}, and then compare the achieved values with the limit values according to the formulas:

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$$I_{51}^2 + I_{52}^2 \geq SoS_{30} \text{ and } I_{61}^2 + I_{62}^2 \geq SoS_{30}$$

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Lamp 4:

Measure I_{71}, I_{72}, I_{81} and I_{82}, and then compare the achieved values with the limit values according to the formulas:

$$I_{71}^2 + I_{72}^2 \geq SoS_{30} \text{ and } I_{81}^2 + I_{82}^2 \geq SoS_{30}$$

8.3.1.4.3.3 Maximum heating for lamp substitution resistor R_{L30}

This test shall be carried out with a lamp substitution resistor value R_{L30} and filament substitution resistor value R_{test2}.

Measure CV_1, CV_2, I_{11}, I_{12}, I_{21}, and I_{22}, then compare the achieved values with the limit values according to the formulas:

$$CV_1 \leq CV_{max} \text{ and } CV_2 \leq CV_{max} \text{ and } I_{11} \leq I_{LHmax} \text{ and } I_{12} \leq I_{LHmax} \text{ and } I_{21} \leq I_{LHmax} \text{ and } I_{22} \leq I_{LHmax}.$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.2.3.).

8.3.1.4.4 Dim level I_{D60}

8.3.1.4.4.1 General

The control terminal of the electronic control gear is used to adjust the lamp discharge current I_D to I_{D60} as indicated on the relevant IEC lamp datasheet.

8.3.1.4.4.2 Minimum heating for lamp substitution resistor R_{L60}

This test shall be carried out with a lamp substitution resistor value R_{L60} and filament substitution resistor value R_{test1}.

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq SoS_{60} \text{ and } I_{21}^2 + I_{22}^2 \geq SoS_{60}$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1.

Lamp 2:

Measure I_{31}, I_{32}, I_{41} and I_{42}, and then compare the achieved values with the limit values according to the formulas:

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$$I_{31}^2 + I_{32}^2 \geq SoS_{60} \text{ and } I_{41}^2 + I_{42}^2 \geq SoS_{60}$$

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Lamp 3:

Measure I_{51}, I_{52}, I_{61} and I_{62}, and then compare the achieved values with the limit values according to the formulas:

$$I_{51}^2 + I_{52}^2 \geq SoS_{60} \text{ and } I_{61}^2 + I_{62}^2 \geq SoS_{60}$$

Lamp 4:

Measure I_{71}, I_{72}, I_{81} and I_{82}, and then compare the achieved values with the limit values according to the formulas:

$$I_{71}^2 + I_{72}^2 \geq SoS_{60} \text{ and } I_{81}^2 + I_{82}^2 \geq SoS_{60}$$

8.3.1.4.4.3 Maximum heating for lamp substitution resistor R_{L60}

This test shall be carried out with a lamp substitution resistor value R_{L60} and filament substitution resistor value R_{test2}.

Measure CV_1, CV_2, I_{11}, I_{12}, I_{21}, and I_{22} then compare the achieved values with the limit values according to the formulas:

$$CV_1 \leq CV_{max} \text{ and } CV_2 \leq CV_{max} \text{ and } I_{11} \leq I_{LHmax} \text{ and } I_{12} \leq I_{LHmax} \text{ and } I_{21} \leq I_{LHmax} \text{ and } I_{22} \leq I_{LHmax}.$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.2.3).

8.3.1.5 Test sequence "arc attachment – variable" – dim level I_{30}

8.3.1.5.1 General

The control terminal of the electronic control gear is used to adjust the lamp discharge current I_D (current through the lamp substitution resistors) to I_{D30} as indicated on the relevant IEC lamp datasheet.

This test shall be carried out with a lamp substitution resistor of nominal value, R_{L30}. The cathodes are substituted with a resistor having the value of R_{test1}.

8.3.1.5.2 Arc attachment – Figure 3, switch positions 1 and 4 – (cathode tap 0 and 0)

Electronic control gear, operating one lamp:

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq \text{SoS}_{30} \text{ and } I_{21}^2 + I_{22}^2 \geq \text{SoS}_{30}$$

Electronic control gear, operating more than one lamp:

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For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.2.3).

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https://standards.iteh.ai/catalog/standards/sist/0000c0b-650a-47fd-a789-38480ad960cf/iec-60929-2011-amd1-2015

8.3.1.5.3 Arc attachment – Figure 3, switch positions 3 and 6 – (cathode tap 100 and 100)

Electronic control gear, operating one lamp:

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq \text{SoS}_{30} \text{ and } I_{21}^2 + I_{22}^2 \geq \text{SoS}_{30}$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.3.2).

8.3.1.5.4 Arc attachment – Figure 3, switch positions 1 and 6 – (cathode tap 0 and 100)

Electronic control gear, operating one lamp:

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq \text{SoS}_{30} \text{ and } I_{21}^2 + I_{22}^2 \geq \text{SoS}_{30}$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.3.2).

8.3.1.5.5 Arc attachment – Figure 3, switch positions 3 and 4 – (cathode tap 100 and 0)

Electronic control gear, operating one lamp:

Measure I_{11}, I_{12}, I_{21} and I_{22}, and then compare the achieved values with the limit values according to the formulas:

$$I_{11}^2 + I_{12}^2 \geq \mathrm{SoS}_{30} \text{ and } I_{21}^2 + I_{22}^2 \geq \mathrm{SoS}_{30}$$

Electronic control gear, operating more than one lamp:

For further lamps, the same measurements and tests shall be conducted as for Lamp 1 (See 8.3.1.4.3.2).

8.3.1.6 Test sequence for control gear which cannot obtain I_{Dmin}, I_{D30} and I_{D60}

8.3.1.6.1 General

Some control gear cannot dim to the specified test conditions (e.g. continuous dimming control gear with minimum level above I_{Dmin}, or certain step-dimming control gear). For such control gear, the tests below shall be performed at the values of discharge current as close as possible to I_{D10}, I_{D30}, and I_{D60}. The value of the lamp arc substitution resistor shall be within 20 % of the value calculated according to linear interpolation lamp-specific parameters specified in IEC lamp datasheets.

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$$R_L = \frac{R_{L60} - R_{L30}}{I_{D60} - I_{D30}} \cdot (I_D - I_{D30}) + R_{L30} \qquad \text{for } I_{D30} < I_D < I_{D60}$$

$$R_{Lmin} = \frac{R_{L10min} - R_{L30}}{I_{Dmin} - I_{D30}} \cdot (I_D - I_{D30}) + R_{L30} \qquad \text{for } I_{Dmin} < I_D < I_{D30}$$

$$R_{Lmax} = \frac{R_{L10max} - R_{L30}}{I_{Dmin} - I_{D30}} \cdot (I_D - I_{D30}) + R_{L30} \qquad \text{for } I_{Dmin} < I_D < I_{D30}$$

8.3.1.6.2 Dim level $I_{Dmin} \leq I_D \leq (I_{Dmin} + I_{D30})/2$

For the range of discharge currents between I_{Dmin} and $(I_{Dmin} + I_{D30})/2$, the tests of filament heat shall be performed using values of minimum and maximum arc substitution resistors R_{Lmin} and R_{Lmax} and according to the procedures given in 8.3.1.4.2.2, 8.3.1.4.2.3, 8.3.1.4.2.4 and 8.3.1.4.2.5.

8.3.1.6.3 Dim level $(I_{Dmin} + I_{D30})/2 \leq I_D \leq I_{D30}$

For the range of discharge currents between $(I_{Dmin} + I_{D30})/2$ and I_{D30}, the tests of filament heat shall be performed using values of arc substitution resistors R_{Lmin} and R_{Lmax} as calculated in 8.3.1.6.1 and according to the procedures given in 8.3.1.4.2.3, 8.3.1.4.2.5, 8.3.1.4.3.2, 8.3.1.5.2, 8.3.1.5.3, 8.3.1.5.4 and 8.3.1.5.5.

The value of minimum SoS for compliance shall be calculated according to $\mathrm{SoS}_{min} = X_1 - Y_1 \times I_d$, where I_d is the minimum value of lamp current delivered by the control gear, and X_1 and Y_1 are the lamp-specific cathode coefficients specified in IEC lamp datasheets.

8.3.1.6.4 Dim level $I_{D30} \leq I_D \leq (I_{D30} + I_{D60})/2$

For the range of discharge currents between I_{D30} and $(I_{D30} + I_{D60})/2$, the tests of filament heat shall be performed using values of arc substitution resistors R_L as calculated in 8.3.1.6.1 and according to the procedures given in 8.3.1.4.3.2, 8.3.1.4.3.3, 8.3.1.5.2, 8.3.1.5.3, 8.3.1.5.4 and 8.3.1.5.5.

The value of minimum SoS for compliance shall be calculated according to $SoS_{min} = X_1 – Y_1 \times I_d$, where I_d is the minimum value of lamp current delivered by the control gear, and X_1 and Y_1 are the lamp-specific cathode coefficients specified in IEC lamp datasheets.

8.3.1.6.5 Dim level $(I_{D30} + I_{D60})/2 \leq I_D \leq I_{Dtrans}$

For the range of discharge currents between $(I_{D30} + I_{D60})/2$ and I_{Dtrans}, the tests of filament heat shall be performed using values of arc substitution resistor R_L as calculated above, and according to the procedures given in 8.3.1.4.4.2 and 8.3.1.4.4.3.

The value of minimum SoS for compliance shall be calculated according to $SoS_{min} = X_1 – Y_1 \times I_d$, where I_d is the minimum value of lamp current delivered by the control gear, and X_1 and Y_1 are the lamp-specific cathode coefficients specified in IEC lamp datasheets.

8.3.1.7 Compliance

The electronic control gear shall meet all maximum and minimum cathode heat limit values of 8.3.1.3 to 8.3.1.6. An example for test results recording is given in Annex G.

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8.3.2 Control interfaces

The requirements of Annex E apply. For digital interfaces, the requirements of IEC 62386 apply together with the mandatory information of the manufacturer of the electronic control gear.

IEC 60929:2011/AMD1:2015
https://standards.iteh.ai/catalog/standards/sist/1b668c19-b50a-47fd-a789-38480ad960cf/iec-60929-2011-amd1-2015

At present, there are also other non-standardized interfaces, which can lead to problems of interchangeability between interfaces. Test these interfaces according to the manufacturer's specifications.

8.4 Current limitation

Replace subclause 8.4 with the following new subclause:

8.4 Limitation of the lamp current

Unless otherwise specified on the relevant lamp data sheet, the control gear operated at rated voltage shall limit the current delivered to a reference lamp to a value not exceeding 115 % of that delivered to the same lamp when it is operated with a reference control gear.

15 Endurance

Replace the entire clause (15.1, 15.2 and 15.3) with the following new clause:

15 Endurance

15.1 General

The control gear shall be operated at rated supply voltage with an appropriate lamp(s) installed outside the temperature chamber. All the earthing connections of the control gear shall be connected to the earth. If the electronic control gear is marked for a range of supply