NATIONAL FORUM ON MALAYSIAN STANDARDS ON LIGHT EMITTING DIODES (LEDs)

MALAYSIAN STANDARDS FOR LED CONTROLGEARS

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NATIONAL FORUM
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Paper 5: Malaysian Standards for LED Controlgears

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- MS IEC 61347-1:2012 (P), Lamp controlgear - Part 1:General and safety requirements

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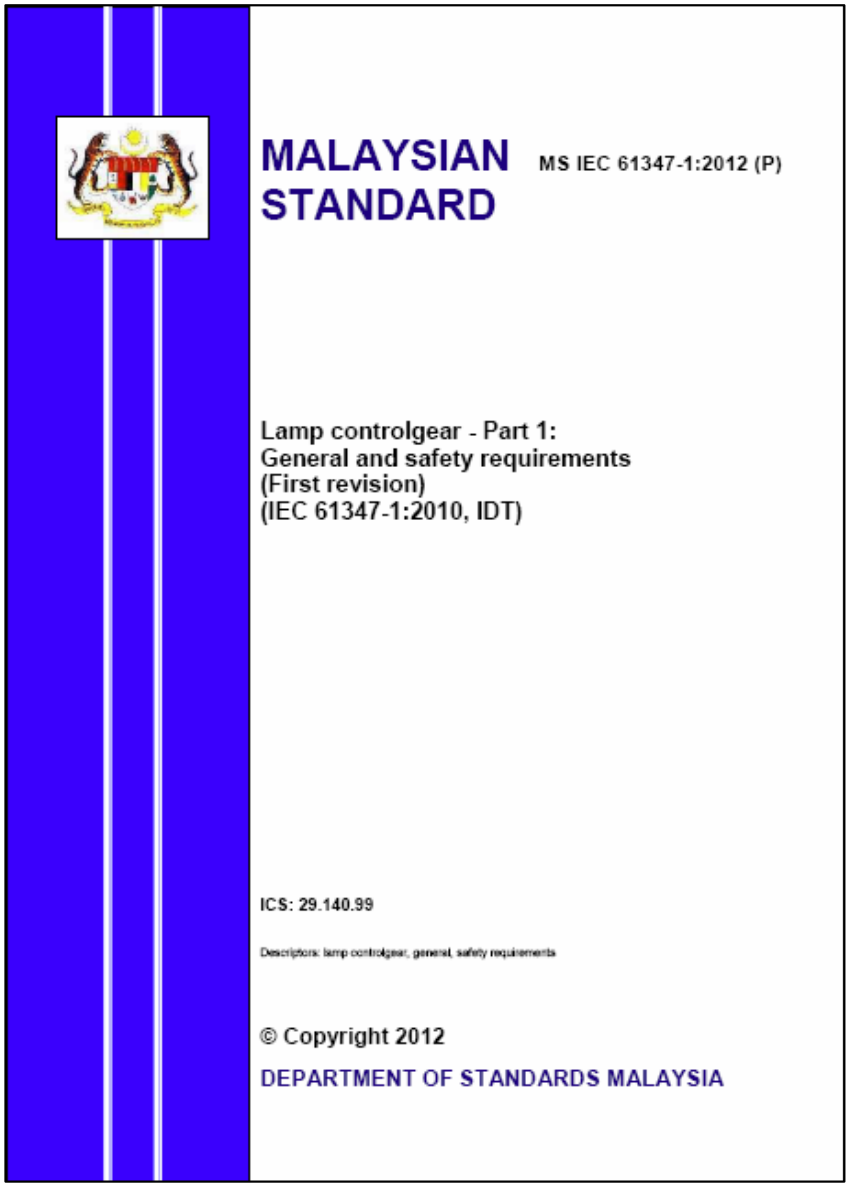
- MS IEC 62384:2012 (P), DC or AC supplied electronic controlgear for LED modules –Performance requirements

Some points to note

- ALL 3 standards are fully adopted from published IEC standards
- These are standards NOT specifications
- These are standards for the PRODUCTS itself, NOT for the application
- The main objective of these standards are :
  - To ensure compliance in fulfilling a minimum safety and performance criteria
  - To ensure inter-operability of the products across the globe (benchmark for acceptance and comparison- speak the same language)

MS IEC 61347-1:2012 (P)
Lamp controlgear - Part 1:General and safety requirements



MALAYSIAN STANDARD MS IEC 61347-1:2012 (P)

Lamp controlgear - Part 1:
General and safety requirements
(First revision)
(IEC 61347-1:2010, IDT)

ICS: 29.140.99

Descriptors: lamp controlgear, general, safety requirements

DEPARTMENT OF STANDARDS MALAYSIA

- Scope :
  - General and safety requirements for lamp controlgear for use on d.c supplies up to 250V and/or a.c supplies up to 1000V at 50Hz or 60Hz
- Fully adopted from :
  - IEC 61347-1:2010, Lamp controlgear – Part 1: General and safety requirements
  - Consolidated version of IEC 61347-1, consists of the second edition (2007) and its amendment 1 (2010).
- Technical content is identical to the base edition.

Key Points

- Clause 1 : Scope
  - Note :
    - It can be expected that the lamp control gear which comply with this standard **will not compromise safety between 90% and 110% of their rated supply voltage** in independent use and when operated in luminaires complying with the safety standard IEC60598-1 and the relevant part IEC 60598-s-xx and with lamps complying with the relevant lamp standards. Performance requirements may require tighter limits.

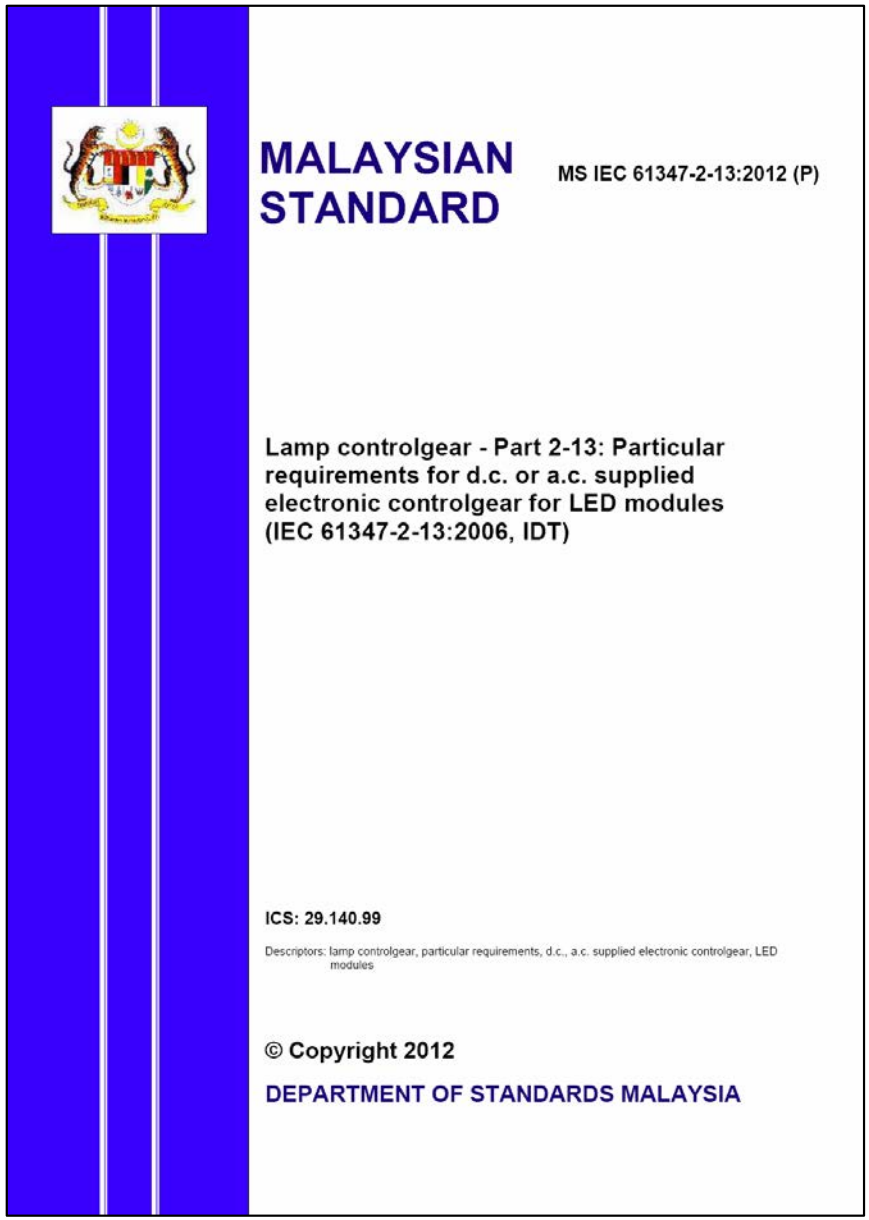
- Clause 9 : Provisions for protective earthing
  - Paragraph 8
    - The voltage drop between the earthing terminal or earthing contact and the accessible metal part shall be measured and resistance calculated from the current and the voltage drop. **In no case shall the resistance exceed 0.5Ω**.
- Clause 11 : Moisture resistance and insulation
  - Paragraph 8
    - Insulation resistance shall not be less than 2MΩ for basic insulation and **4MΩ for reinforced insulation** between live parts and the body.

- 14.5
  - The **tests shall be carried out on three samples** for each fault condition, consisting of one or more items submitted for the purpose of the type test. **If one of the samples fails, the test shall be repeated with three new samples none of which shall fail**.
  - The test shall be **continued until stable conditions** are obtained. The lamp **controlgear case temperature shall then be measured**.

14.5 (cont.)

- After the tests, when the lamp controlgear has returned to ambient temperature, the **insulation resistance measured at approximately 500V d.c shall not be less than 1MΩ**.
- To check whether gases liberated from component parts are flammable or not, a **test with a high-frequency spark generator shall be made**
- To check whether emission of flames or molten material might present a safety hazard, the **test specimen shall be wrapped with a tissue paper**, as defined in 4.187 of ISO 4046-4, and the latter shall not ignite.

MS IEC 61347 – 2 – 13 : 2012 (P)
Lamp controlgear – Part 2-13 : Particular requirements for d.c and a.c supplies electronic controlgear for LED modules



- Scope :
  - Specifies safety requirements for **electronic controlgear use on d.c. supplies up to 250V and a.c. supplies up to 1000V** at 50Hz or 60Hz and at an output frequency which can deviate from the supply frequency
  - Controlgear for LED modules specified in this standard are designed to provide constant current or constant voltage at SELV or SELV equivalent or at higher voltages. Deviation from the pure voltage and current types **DO NOT exclude the gear from this standard.**
  - The annexes of 61347-1 which are applicable and using the word **'lamp' is understood to be also comprise LED Modules.**
- Fully adopted from IEC 61347-2-13 : 2006

Key Points

- **Clause 4 General requirements**
  - Independent ELV controlgear **shall comply with Annex I**
  - Controlgear which are not pure voltage and current types are tested according to the requirements of either a voltage source or a current source
- **Clause 5 General notes on tests**
  - The following number of specimens shall be submitted for testing:
    - **One unit** for tests of Clauses 6 to12 and 15 to 21
    - One unit for tests of Clause 14 (additional units, where necessary may be required)

- **Clause 6 Classification**
  - Classified as per IEC 61347-1 and according to **protection against electric shock**
    - SELV equivalent or isolating controlgear
    - Auto-wound controlgear
    - Independent SELV controlgear
- **Clause 7 Marking**
  - 7.1 Mandatory marking
    - As per 7.1 and 7.2 of IEC 61347-1
      - For constant current type : **rated output current and maximum voltage**
      - For constant voltage type : **rated output voltage**
      - If applicable : indication that the control gear is **suitable for operation with LED modules**
  - 7.2 Information to be provided if applicable
    - On controlgear or catalogue
    - As per 7.1 of IEC 61347-1 and :
      - Mention whether **controlgear has mains connected windings**
      - Mention that **they are SELV-equivalent controlgear**, if applicable

- **Clause 8 Protection against accidental contact with life parts**
  - 8.2 Output circuits of SELV or SELV –equivalent controlgear **may have exposed terminals if** :
    - The rated output voltage for constant voltage control gear or maximum output voltage for constant current type **under load DOES NOT exceed 25 V r.m.s**
    - The **no load** output voltage for constant voltage type or the maixmum output voltage for constant current type controlgear **DOES NOT exceed 33 V** r.m.s and the peak does not exceed 33 $\sqrt{2}$
    - Controlgears with **rated output voltage above 25V shall have insulated terminals**.

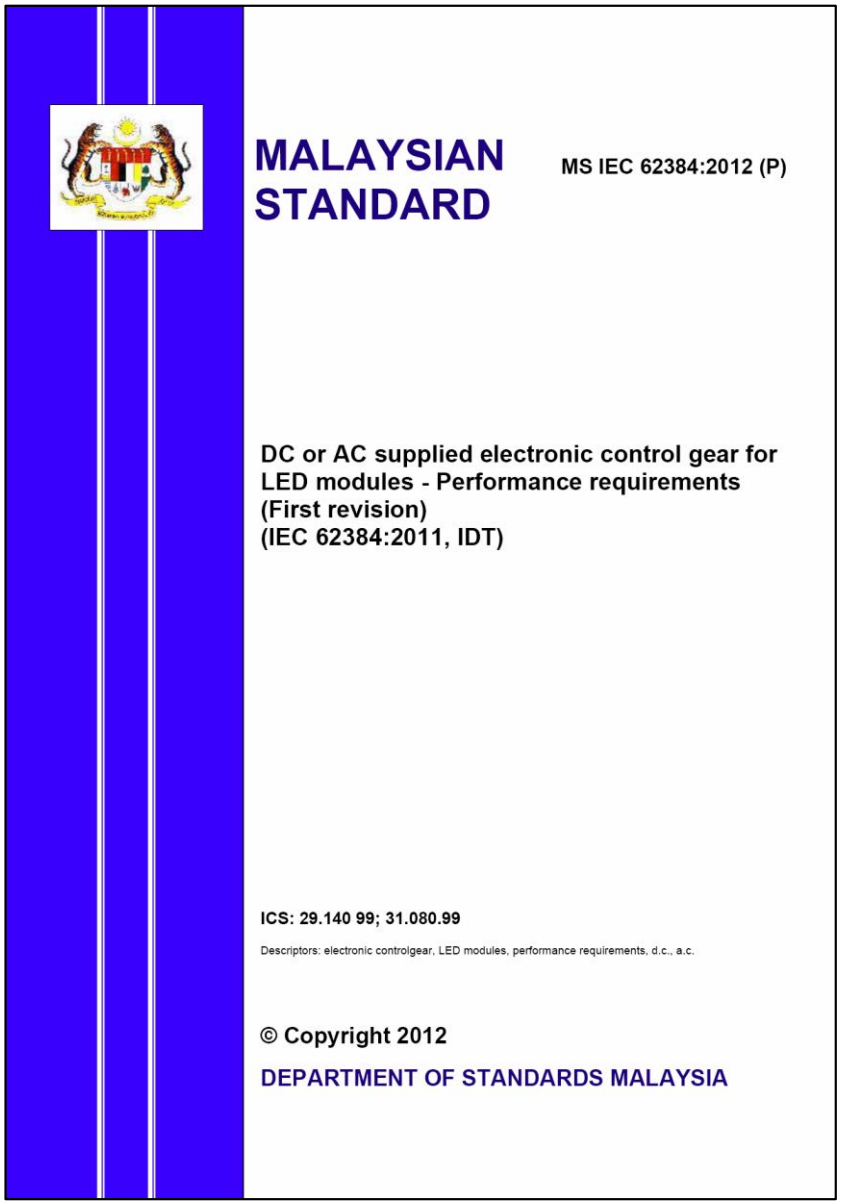
- **Clause 16 Abnormal conditions**
  - Controlgear **shall not impair safety** when operated under abnormal conditions.
  - Short circuit test in 16.1 and 16.2 **shall be done with the output cable of both 20 cm and 200 cm**
  - 16.1 Controlgear which are of the constant voltage output type
    - Test at **any voltage between 90% to 110%** of the rated supply voltage
    - Each test shall be done with the control gear operating **according to the manufacturer's instruction for 1 hour**
    - Tests
      - With **NO LED** modules inserted
      - With **double the LED** modules or equivalent load
      - **Short circuited** output terminals
  - 16.2 Controlgear which are of the constant current output type
    - Tests as per 16.1
    - Maximum **output voltage shall not be exceeded**.
  - At the end of the tests, the controlgear **shall show no defect impairing safety**, nor should **smoke or flammable gases be produced**

- **I.5 Protection against electric shock**
  - There shall be **no connection between the output circuit and the enclosure** or the protective earthing circuit, unless allowed.
    - Compliance is check by inspection
  - **Input and output circuits** shall be such that there is **no possibility of any connection**.
    - Compliance is checked by inspection based on I.5.2.1 up to and including I.5.2.5
- **I.6 Heating**
  - I.6.1 Controlgear and their supports shall **not attain excessive temperature** in normal use
    - Compliance is checked by the test in I.6.2. Requirements I.6.1.1 to I.6.1.4 apply.

- I.6.3 Tests
  - When applicable, the active parts of the controlgear are subjected to the following **cycling tests, each cycle consisting of a heat run, a moisture treatment and a vibration test**. Measurements are made after each test.

- **I.7 Short circuit and overload protection**
  - I.7.1 Controlgears should not be come unsafe due to short circuits and overloads which may occur in normal use.
    - Compliance is checked **by inspection and tests I.7.2 to I.7.5** (where applicable) which are **made immediately after the tests according to I.6.2** without the position of the control gear being changed, at 1.06 times rated supply voltage or for non-inherently short-circuit proof controlgear, at any value of the supply voltage between 0.94 and 1.06 times the rated supply voltage.

MS IEC 62384 : 2012 (P)
DC or AC supplied elctronic controlgear for LED modules – Performance requirements



MALAYSIAN STANDARD

MS IEC 62384:2012 (P)

DC or AC supplied electronic control gear for LED modules - Performance requirements (First revision) (IEC 62384:2011, IDT)

ICS: 29.140 99; 31.080.99

Descriptors: electronic controlgear, LED modules, performance requirements, d.c., a.c.

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- **Scope**
  - Specifies performance requirements for electronic control gear for use on d.c. supplies up to 250V and a.c. supplies up to 1000V at 50 Hz or 60 Hz with an output frequency which can deviate from the supply frequency.
  - Control gear for LED modules specified in the standard are to provide constant voltage or current.
- Fully adopted from IEC 62384 : 2011

Key Points

- **Clause 4 General notes on tests**
  - 4.2 For tests carried out with a LED module or modules, the wattage when measured at its rated voltage or current **shall not differ from the rated wattage by more than +6%, -0%**
  - 4.3 The tests shall be carried **out in order of the clauses** unless specified
  - 4.4 **One specimen** shall be subjected **to all the tests**
  - 4.6 Since the data of LED modules are not published in an IEC standard, it shall be **made available by the LED module manufacturer**
  - 4.7 All control gear covered by this standard **shall comply** with the requirements of **IEC 61347-2-13**

- **Clause 5 Classification**
  - 5.1 Classification **according to the load**
    a) Single value load control gear
    b) Multiple value load control gear

  - 5.2 Classification according to the **output voltage**
    a) Control gear having a stabilised output voltage
    b) Control gear without a stablised output voltage

  - 5.3 Classification according to the **output current**
    a) Control gear having a stabilised output current
    b) Control gear without a stabilised output current

- **Clause 6 Marking**
  - **6.1 Mandatory marking**
    - 6.1.1 **Circuit power factor** should be clearly marked on the control gear. If the **power factor is less than 0.95** leading, it shall be **followed by the letter 'C',** e.g λ = 0.9 C
    - 6.1.2 The following information should be made available on the control gear or the catalogue (if applicable) :
      - Limits of the permissible temperature range
      - Indication that the control gear has a **stabilised output voltage**
      - Indication that the control gear has a **stabilised output current**
      - Indication that the control gear is **suitable for operation** with a **mains supply dimmer**
      - Indication of **operation mode**, e.g. phase control
  - **6.2 Optional marking**
    - Given on the control gear or catalogue
      - Total **circuit power**
      - If applicable the symbol Ƶ which indicates the control gear is **designed to comply with conditions for audio-frequency** impedance
      - If applicable, a symbol that indicates the control gear is a **short-circuit proof type**

- **Clause 7 Output voltage and current**
  - **7.1 Starting and connecting requirements**
    - After starting or connecting a LED module, the output should **not be more than 110% of its rated value within 2 s**. Maximum voltage or maximum current shall not exceed the values given by the manufacturer
  - **7.2 Voltage and current during operation**
    - For control gear having a **non stabilised output** voltage or current, when supplied with the rated voltage, the output voltage or current shall **not differ by more than ±10%** from the rated values
    - For control gear having a **stablised output** voltage or current, when supplied at any **supply voltage between 92% to 106%** of the rated supply voltage, the output shall **not differ more than ±10%** from the rated values

- **Clause 8 Total circuit power**
  - Shall **not be more than 110% of the declared value** when the control gear operated at its rated voltage
- **Clause 9 Circuit power factor**
  - The measured circuit power factor **shall not be less than the marked value by more 0.05** when the control gear is operated on its rated wattage with LED module(s) and the whole combination is supplied with rated voltage and frequency
- **Clause 10 Supply current**
  - At the rated voltage, the **supply current shall not differ by more than +10% from the value marked** on the control gear or declared by the manufacturer when the control gear is operated on its rated wattage with LED module(s)

- **Clause 11 Impedance at audio-frequencies**
  - For every signal frequency between **400 Hz and 2000 Hz**, the **impedance of the control gear** when operated with the rated LED module load and rated voltage and frequency **shall be inductive** in characteristic

- **Clause 12 Operational tests for abnormal conditions**
  - The control gear **shall not be damaged** under following conditions
    a) Test **without LED** module(s) inserted – 1 hour
    b) Test for **reduced LED** module resistance – Under consideration
    c) Test for **short-circuit** proof control gear – for 1 hour or untill a protection device operates
  - **After these tests** and restoration of a possible protecting device, the control gear **shall function normally**

- **Clause 13 Endurance**
  - 13.1 The control gear shall be **subjected to a temperature cycling shock test and a voltage switching test** as follows :
    - Temperature cycling test
      - Non-energised control gear **shall be stored at -10 °C** or if marked with a lower, at that value for 1 hour. The control gear is then **moved to a cabinet having a temperature of t_c** and stored for 1 hour. **Five such cycles** shall be done.
    - Supply voltage switching test
      - At rated supply voltage the control gear **shall be switched on and off for 30s**. The cycling shall be **repeated 200 times with no load and 800 times with maximum load** conditions.
    - After these tests, the control gear **shall operate an appropriate LED module correctly for 15 mins.**

  - 13.2 The control is operated with an appropriate LED module at rated supply voltage and at **ambient temperature that produces t_c until a test period of 200 hours**. At the end of the test, after cooling down to room temperature, the **control gear shall operate an appropriate LED module correctly for 15 mins**. During the test, the **LED module(s) will be placed outside the test enclosure** in an ambient temperature of 25± 5 °C

Thank You

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