

In the event of any doubt or misunderstanding arising from this translation, the standard in Thai will be held for authoritative
Unofficial Translation
TIS 183-2547 (2004)

Thai Industrial Standard for

GLOW-STARTERS FOR FLUORESCENT LAMPS

1. Scope

This standard specifies interchangeable glow-starters hereafter called "starters" used with pre-heat type fluorescent lamps hereafter call "lamps", and starters used with fluorescent luminaire class II specified in appendix B.

NOTE Starters are generally designed to operate with a range of lamps, depending on supply voltage, single lamp or series pair operation, maximum lamp voltage and lamp starting requirements.

2. Definitions

For the purpose of this standard the following definitions apply :

- 2.1 **starter:** A device, other than a main switch, which closes or opens the pre-heating circuit of a lamp for the purpose of starting the lamp.
- 2.2 **glow-starter:** A starter which depends for its operation on a glow discharge in a gaseous atmosphere.
- 2.3 **non-reclosure voltage:** A reduced voltage at which the starter contacts must not reclose after operation at the test voltage specified for testing the speed of operation.
- 2.4 **deactivated lamp:** A lamp in which one or both filaments are deprived of emitting material, but neither of which is broken.
- 2.5 **glow-starters with operating time limitation:** A glow-starter which prevents prolonged attempts to start lamps which refuse to start, e.g. lamps with deactivated electrodes.

- 2.6 **glow-starters with operating time limitation:** A glow-starter which does not prevent prolonged attempts to start lamps which refuse to start, e.g. lamps with deactivated electrodes.

3. Classification

3.1 Starter can be classified as follow

3.1 Class I : Starter starts with operating time limitation.

3.2 Class II : Starter starts without operating time limitation which can be distinguished as the following types:

3.2.1 starters which are non-resettable (one shot);

3.2.2 starters with a manual reset;

3.2.3 starters with an automatic reset, by actuating the main switch or other intended actions.

4. General requirements

Starters shall be so designed and constructed that in normal use their operation is without danger to the user or surroundings. In general, compliance is checked by carrying out all the tests specified.

5. General requirements for tests

5.1 Requirements for type tests only are included.

5.2 Unless otherwise specified, the tests shall be made at an ambient temperature of $25\text{ °C} \pm 5\text{ °C}$.

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

6. Marking

6.1 Starters shall be provided with durable and legible marking as follows:

- a) manufacturer's or responsible vendor's name, or trade mark;
- b) type or catalogue reference;
- c) lamp(s) for which the starter is intended.

If this requirement is marked in the form of a lamp wattage range, the marking shall:

- i) either Include all the standardized wattages within that range In TIS.236 or TIS.1714
 - ii) Indicate departures from that range either on the packaging material or In catalogues published by the manufacturer:
 - d) temperature range for which the starter Is Intended to be used, If applicable.
- 6.2 Other useful Indications, for example the circuit for which the starter Is Intended and. In some cases, the rated voltage of the starter, shall either be marked on the starter, or be referred to in the manufacturer's publications.
- If applicable, the Information shall be given that the starter Is equipped with means of operating time limitation.
- 6.3 Marking shall be Indelible and easily legible. It shall comply with the requirements of 7.11.

7. Requirements and tests for safety

7.1 Type test quantity

The type test quantity shall consist of 5 starters to be submitted to the tests specified In 7.3 to 7.11 and 7.12.1, and 10 capacitors to be submitted to the test specified In 7.12.2 and 7.12.3. In addition, for starters with operating time limitations, 5 starters shall be submitted to the test specified In 7.13.

7.2 Conditions of acceptance

The type shall be considered as satisfying the requirements of this subclause If all 5 starters comply with the tests specified in 7.3 to 7.11 and In 7.12.1 and if applicable, 7.13, and If all 10 capacitors comply with the tests specified In 7.12.2 and 7.12.3.

If any failures occur during a test, that test and the preceding ones, which may have influenced the results of that test, are repeated on a further 5 starters, all of which shall then comply with the repeated tests.

All 10 starter capacitors submitted to the tests specified In 7.12.2 and 7.12.3 shall pass the tests. If any failure occurs during these tests, they shall be repeated on a further 10 starter capacitors, all of which shall comply with the repeated tests.

7.3 Protection against accidental electric shocks

Enclosures for Interchangeable starters shall ensure protection against electric shocks. Protection may be ensured either by an insulating enclosure, by an appropriate nonmetallic lining, or other means which prevent accidental contact between live parts and the enclosure.

Compliance is checked by inspection.

7.4 *Insulation resistance under humidity conditions*

Immediately after a humidity treatment of 48 h in an atmosphere of 91 % to 95 % relative humidity, and an ambient temperature between 20 °C and 27 °C maintained within limits of ± 1 °C, the insulation resistance between live parts and the metal canister of the starter shall be not less than 2 M Ω measured after 1 min at 500 V d.c. In the case of canisters of insulating material, they shall be covered by tinfoil and the preceding requirements shall be satisfied, the test being carried out between the foil and live parts.

Before starting the humidity treatment, the starters shall be kept in an ambient temperature which does not differ from the temperature within the humidity test enclosure by more than ${}^{+4}_{0}$ °C, for at least 4 h.

7.5 *Dielectric strength*

Immediately after the insulation resistance test, the starter shall be subjected to and satisfactorily withstand for 1 min without breakdown a sinusoidal a.c. voltage of 1 500 V r.m.s. applied between the same parts as those referred to in clause 7.4

7.6 *Dimensions*

7.6.1 The dimensions shall comply with the requirements of figure 1. Compliance shall be checked by the gauges of figures 6, 7 and 8.

7.6.2 The external creepage distance and clearance shall be not less than 3 mm between live parts of different polarity, or between live parts and accessible metal parts.

The internal creepage distance between live parts and accessible metal parts shall be not less than 2 mm.

7.7 *Torsion test*

The starter shall withstand a torque of 0.6 Nm about the axis and applied at the top of the canister by holding the pins in a fixed support. The torque

shall not be applied suddenly but increased gradually from zero to the value specified.

7.8 *Mechanical strength*

The starter shall withstand without damage affecting safety, 20 falls of 500 mm onto a 3 mm thick steel plate in a tumbling barrel turning at 5 rev/min (that is 10 falls per minute). Suitable equipment for this test is shown in figure 2.

7.9 *Connections*

Electrical connections shall be so designed that the contact pressure is not transmitted through insulating material other than ceramic material.

Compliance is checked by inspection.

This requirement does not apply to contacts between detachable parts, such as starters and their holders, for which adequate spring action is required.

7.10 *Resistance to heat and fire*

7.10.1 Enclosures and other external parts of insulating material shall be sufficiently resistant to heat.

Compliance is checked by the following tests.

Five samples are tested in a heating cabinet at a temperature of 125 °C during 168 h.

During the test. the samples shall not undergo any change impairing their safety.

especially in the following respects:

- reduction of the protection against electric shock;
- loosening of electrical contacts;
- cracks, swelling or shrinking.

At the end of the test. the dimensions shall comply with the requirements of 7.6.1.

7.10.2 Enclosures and other external parts of insulating material shall be subjected to a ball-pressure test by means of the apparatus shown in figure 10.

The surface of the part under test is placed in the horizontal position and a steel ball of 5 mm diameter is pressed against this surface by a force of 20 N. If the surface under test bends, the part where the ball presses should be supported.

The test shall be made in a heating cabinet at a temperature of 125 °C ± 5 °C.

After 1 h the ball shall be removed and the diameter of the impression measured. This diameter shall not exceed 2 mm.

The test shall not be made on parts of ceramic, urea or alkyd plastics. For enclosures made from these materials, a test is under consideration.

- 7.10.3 Enclosures and other external parts of insulating material shall be resistant to abnormal heat and fire.

Compliance is checked by the following test.

Parts are subjected to a test using a nickel-chromium glow-wire heated to 650 °C. The test apparatus shall be that described in IEC 695-2-1.

The sample to be tested is mounted vertically on the carriage and pressed against the glow-wire tip with a force of 1 N, preferably 15 mm, or more, from the upper edge of the sample. The penetration of the glow-wire into the sample is mechanically limited to 7 mm. After 30 s. the sample is withdrawn from contact with the glow-wire tip.

Any flame or glowing of the sample shall extinguish within 30 s of withdrawing the glow-wire, and any burning or molten drop shall not ignite a piece of tissue paper(as clause 6.86 of ISO 4046), consisting of five layers, spread out horizontally 200 mm ± 5 mm below the sample.

The glow-wire temperature and heating current shall be constant for 1 min prior to commencing the test. Care shall be taken to ensure that heat radiation does not influence the sample during this period. The glow-wire tip temperature is measured by means of a sheathed fine-wire thermocouple constructed and calibrated as described in IEC 695-2-1.

Precautions shall be taken to safeguard the health of personnel conducting tests against:

- risks of explosion or fire;
- inhalation of smoke and/or toxic products;
- toxic residues.

7.11 *Quality of marking*

Compliance with the requirements shall be checked by inspection after rubbing the marking lightly for 15 s with a piece of cloth soaked with water.

The test shall be repeated using a further piece of cloth soaked with petroleum spirit.

7.12 *Radio interference suppression capacitors*

7.12.1 The starter shall incorporate a radio interference suppression capacitor value between 0,005 μF and 0,02 μF . unless otherwise indicated on the appropriate lamp data sheet of TIS.236 or TIS.1713. Compliance shall be checked by inspection.

7.12.2 The capacitor shall be resistant to moisture. Compliance shall be checked by the following test.

Before the humidity treatment, the capacitors shall be kept at an ambient temperature which does not differ from the temperature within the humidity test enclosure by more than ${}^{\text{+4}}_0$ °C for at least 4 h.

Immediately after the humidity treatment of 48 h in an atmosphere of 91% to 95% relative humidity and an ambient temperature between 20 °C and 30 °C maintained within limits of ± 1 °C, the capacitor shall be subjected to and satisfactorily withstand for 1 min without breakdown a d.c. voltage of 2 000 V.

The test voltage shall be applied across the terminations of the capacitor, and initially shall not be more than half the prescribed voltage. It shall then be raised gradually to the specified full value.

7.12.3 The capacitor shall be resistant to flame and ignition.

Compliance shall be checked by the following test. The capacitors are each subjected to a gradually increasing a.c. voltage until breakdown occurs. The voltage source used to this effect should have a short-circuit power of approximately 1 kVA.

Thereafter, each capacitor shall be completely wrapped with tissue paper as specified in clause 6.86 of ISO 4046 and shall be connected in series with a 40 W inductive ballast complying with the requirements of annex A and operated for 5 min at the rated voltage of the ballast.

During this test. the capacitor shall not inflame the tissue paper.

7.13 Heating of starters with operating time limitation

The enclosure of starters with operating time limitation shall not deform during normal and abnormal operation, so that safety is not impaired.

Compliance is checked by the following test.

Starters are connected as in normal use and associated with a deactivated lamp of the highest wattage rating marked on the starter and a corresponding inductive ballast, except for 100 W and 125 W lamps where a capacitive ballast shall be used.

The ballast shall comply with the requirements of annex A. The test voltage shall be equal to 110 % of the rated voltage of the ballast.

Starters are tested at the highest value of the marked temperature. Only the starter is subject to this temperature. The ballast and the lamp shall remain at room temperature.

The duration of the test shall be 168 h.

NOTE Starters for which the operating time limitation is performed by means of a mechanical cut-out which fully interrupts the starting current need not be tested according to this subclause.

8. Starting test

8.1 Starting test quantity

The starting test quantity shall consist of 5 new starters which have not been subjected to the tests specified in clause 7.

8.2 Conditions of acceptance

The type shall be considered as satisfying the requirements of this subclause of all 5 starters comply with the tests specified in 8.4 to 8.7. If 1 failure occurs, a further 5 starters shall be selected and tested and all these shall comply.

If more than 1 failure occurs in the first sample, the starters are deemed not to satisfy the requirements of this clause.

8.3 *Conditions of test*

- 8.3.1 For the duration of the test, the starter shall be in complete darkness, and shall have been kept in complete darkness for at least 15 h immediately prior to the test.

This condition will be satisfied if the starter is enclosed in an opaque container.

- 8.3.2 The starter shall be tested in the circuit shown in figure 3.

- 8.3.3 The ballast used shall meet the requirements of TIS.23. It shall have a rated voltage equal to the mains voltage, or falling within the mains voltage range for which the starter is designed. It shall have a rated wattage suitable for the main type of lamp for which the starter is designed. If this rated wattage is 22 W or below, the ballast shall be of an inductive type, and a capacitive type in case this wattage is above 22 W.

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

NOTE Generally, the rated voltage shall be the same as the voltage rating of the ballast prescribed in TIS.236 or in TIS.1713 for the lamp starting test.

- 8.3.4 The lamp used shall meet the requirements of TIS.236 or in TIS.1713 for switch-starter operated lamps, and shall have the same rated wattage as the ballast used.

- 8.3.5 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 shall have sufficient power, and that the supply circuit has a sufficiently low impedance compared with the ballast impedance.

8.4 *Speed of operation*

With the exception of 20 W lamps as specified in TIS.236 for which the voltage shall be 103.5 V, a voltage equal to the test voltage of the lamp starting test for the relevant lamp specified in TIS.236 or in TIS.1713 shall be applied to the circuit for 25 s.

During this time, the contacts shall open not less than seven times.

8.5 *Closed time*

During the period of 25 s referred to in 8.4, the starter contacts shall be closed for a minimum total period of 10 s.

8.6 *Non-reclosure voltage*

The voltage shall quickly and continuously be reduced from the value used in 8.4 to the non-reclosure voltage specified under "Information for starter design" in the relevant lamp data sheet of TIS.236 or of TIS.1713, without breaking the supply circuit. In case the starter is designed for a range of lamps, care should be taken that the highest maximum voltage value of all lamps within that range is taken.

The switch contacts shall not reclose within 1 min, at the reduced voltage.

8.7 *Pulse voltage*

The circuit for measuring pulse voltage shall be as shown in figure 9, in combination with the circuit of figure 3. The same voltage as specified in 8.4 shall be applied to the test circuit for 25 s. On at least one occasion during this period, the highest pulse voltage (indicated by either of the two voltmeters) shall be not less than the minimum peak voltage under "Information for starter design" in the relevant lamp data sheet of TIS.236 or TIS.1713.

In case the starter is designed for a range of lamps, care should be taken that the highest maximum voltage value of all lamps within that range is taken.

NOTE As an alternative to the electrostatic voltmeter prescribed in figure 9, a memory oscilloscope may be used in the circuit together with a high voltage probe having the following properties:

- input resistance $\geq 100 \Omega$
- input capacitance $\leq 15 \text{ pF}$
- cut-off frequency $\geq 1 \text{ MHz}$

In case of dispute, the measurement with the electrostatic voltmeter is the reference method.

9. Endurance test

9.1 *Test quantity*

The test quantity shall consist of 5 starters which have passed the starting tests, but which have not been subjected to any additional tests.

9.2 *Conditions of acceptance*

The type shall be considered as satisfying the requirements of this subclause if all the 5 starters pass the tests specified in 8.4 to 8.7 inclusive, after having been subjected to the endurance test specified in 9.3.

In the event of 1 starter failing to comply, another 5 starters shall be tested, all of which shall comply. If more than one failure occurs, the starters are deemed not to satisfy the requirements of this clause.

9.3 *Conditions of test*

Starters for lamp ratings up to and including 80 W shall be tested in the circuit shown in figure 4.

A lamp of the highest rating for which the starter is intended, and a corresponding ballast of the inductive type shall be used.

Starters for 100 W and 125 W lamps shall be tested in the circuit shown in figure 5. A 25 W lamp and a 125 W ballast of the capacitive type shall be used.

The ballast shall comply with the requirements of annex A.

The test voltage shall be equal to the rated voltage of the ballast.

In the event of a lamp failing during this test, arrangements shall be made for its immediate replacement.

The test voltage shall be applied to the circuit for 6 000 test cycles, each of 1 min. During each cycle, the voltage shall be applied for 20 s to 30 s.

10. Deactivated lamp test

10.1 *Test quantity*

The test quantity shall consist of 5 starters which have passed the starting tests, but which have not been subjected to any additional tests.

10.2 *Conditions of acceptance of starters without operating time limitation*

The type shall be considered as satisfying the requirements of this subclause if all 5 starters pass the tests specified in 8.4 to 8.7 inclusive, after having been subjected to the deactivated lamp test specified in 10.3.

In the event of 1 starter failing to comply, another 5 starters shall be tested, all of which shall comply. If more than 1 failure occurs, the starters are deemed not to satisfy the requirements of this clause.

10.3 *Conditions of test*

Starters for lamp ratings up to and including 80 W shall be tested in the circuit shown in figure 4, and starters for 125 W lamps shall be tested in the circuit shown in figure 5. The lamps used shall be deactivated.

The duration of the test is 3 h.

For practical reasons, a more stringent test without a lamp in the circuit may be used. In case of doubt, the lamp test according to figure 4 and figure 5 shall, however, be decisive.

A lamp of the highest rating for which the starter is intended, and an appropriate inductive ballast shall be used. A 125 W lamp and a 125 W ballast of the capacitive type shall be used for testing 100 W and 125 W starters.

The ballast shall comply with the requirements of annex A. The test voltage shall be equal to the rated voltage of the ballast.

In the event of a lamp failing during this test. arrangements shall be made for its immediate replacement.

10.4 *Conditions of acceptance for starters with operating time limitation*

The type shall be considered as satisfying the requirements of this subclause if 5 starters pass the test specified in 10.5. After this test, resettable starters shall pass the tests specified in 8.4 to 8.7 inclusive.

In the event of 1 starter failing to comply, another 5 starters shall be tested, all of which shall comply. If more than 1 failure occurs, the starters are deemed not to satisfy the requirements of this subclause.

10.5 *Operating time limitation test*

Within 5 min after switching-on of the supply voltage, the means for preventing to start attempts shall become operative. Self-resetting shall not take place.

Compliance is checked by observation of lamp starting attempts, or by other means indicated by the manufacturer.

In this test the starters are connected as in normal use and associated with a deactivated lamp of the lowest wattage rating marked on the starter and a corresponding ballast. If this rated wattage is 22 W or below, the ballast shall be of an inductive type, and a capacitive type if the wattage is above 22 W.

The ballast shall comply with the requirements of annex A.

The test voltage shall be the rated voltage of the ballast.

Starters are tested at the lowest value of the marked temperature range. Only the starter is subject to this temperature, the lamp and the ballast shall remain at room temperature.

Starters with a manual reset shall be subjected to 25 test cycles of 5 min "ON", and minimum 10 min "OFF".

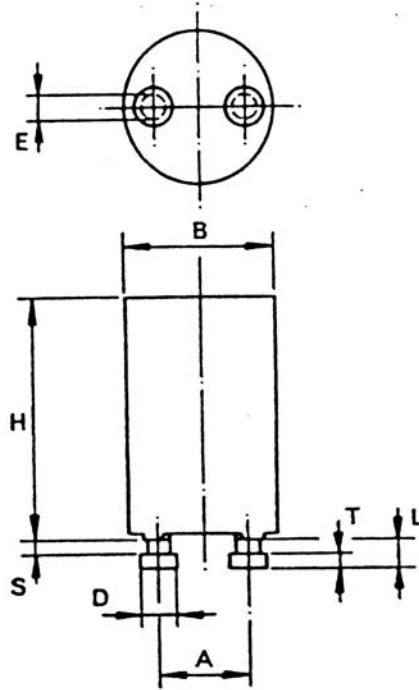
Starters with an automatic reset shall be subjected to 500 of the above test cycles.

The means for preventing starting attempts shall become operative during every "ON" period.

11. Information for luminaire design

See appendix C

The drawing is intended only to indicate the dimensions to be checked.

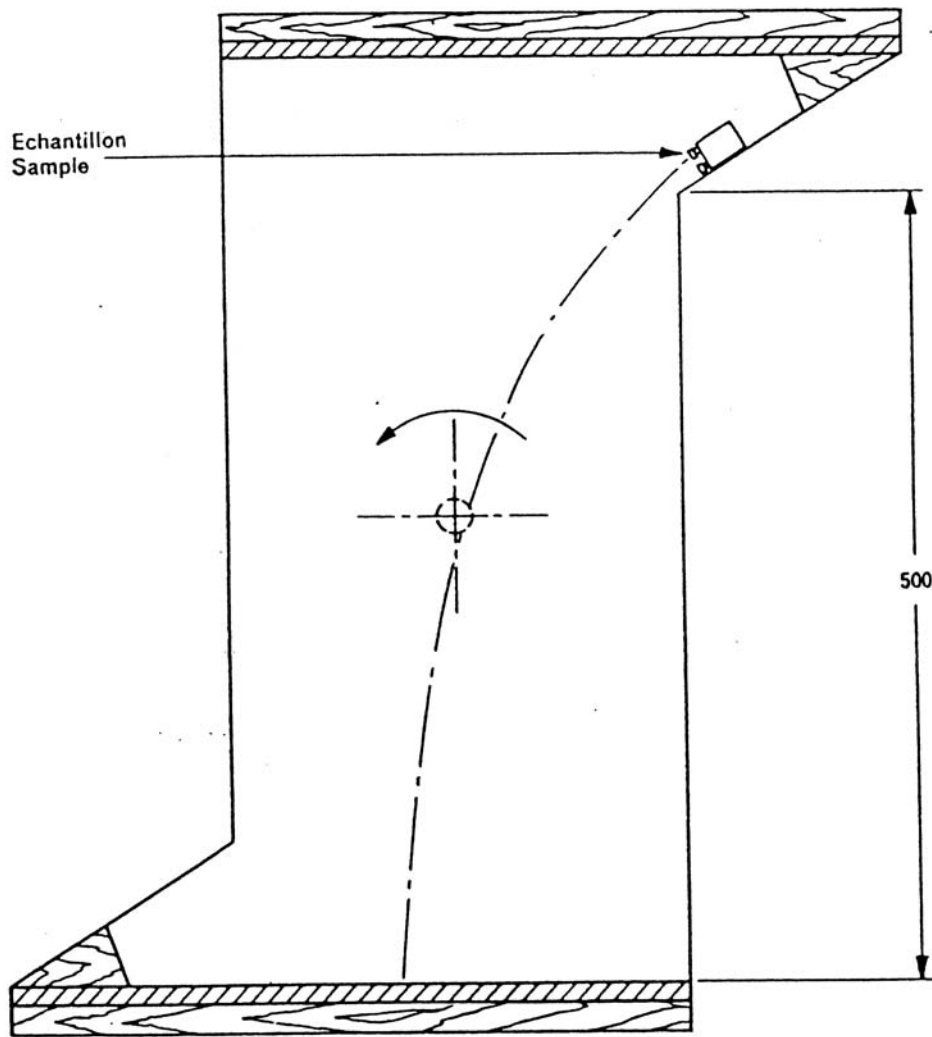


Dimensions in millimeters

Dimension	Min.	Max.
A	12.5	12.9
B	-	21.5
D	4.7	5.0
E	2.8	3.2
H	33.0	36.0
L	-	4.3
S	1.7	-
T	1.9	2.2

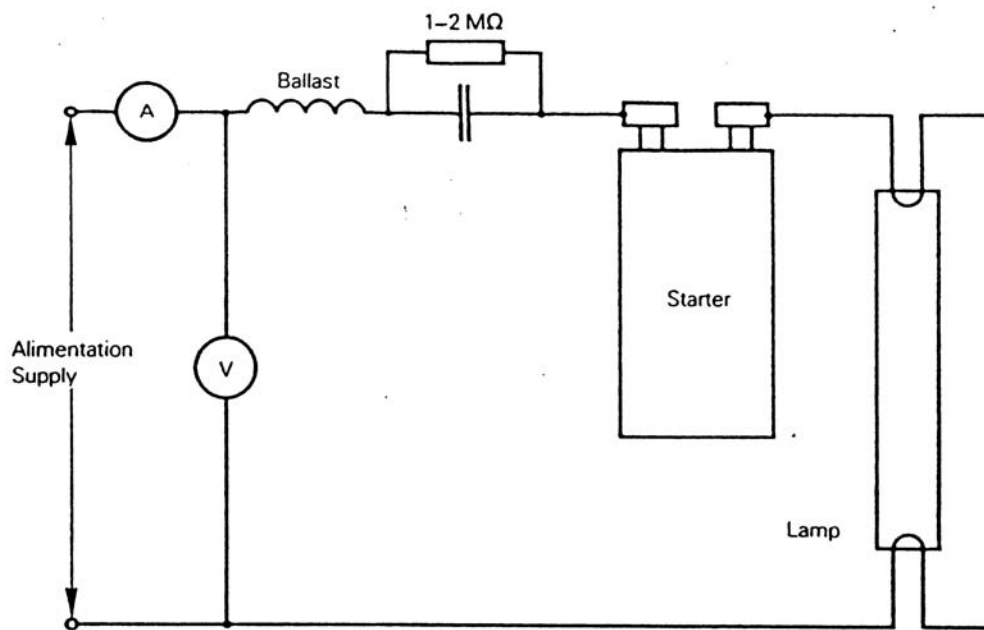
The starters are checked with the gauges shown in figures 6, 7 and 8.

**Figure 1 - Dimensions of starters
(clause 7.6.1)**

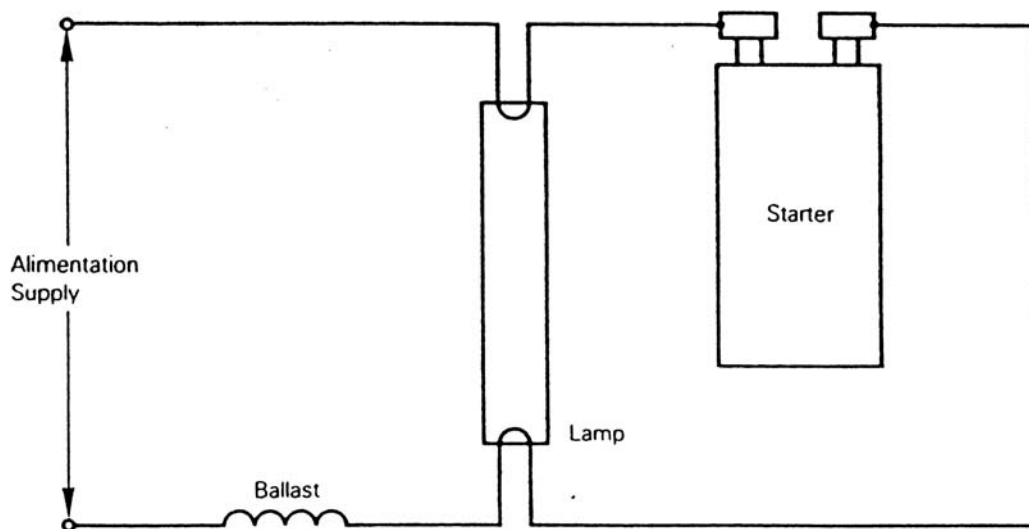


Dimensions in millimeters

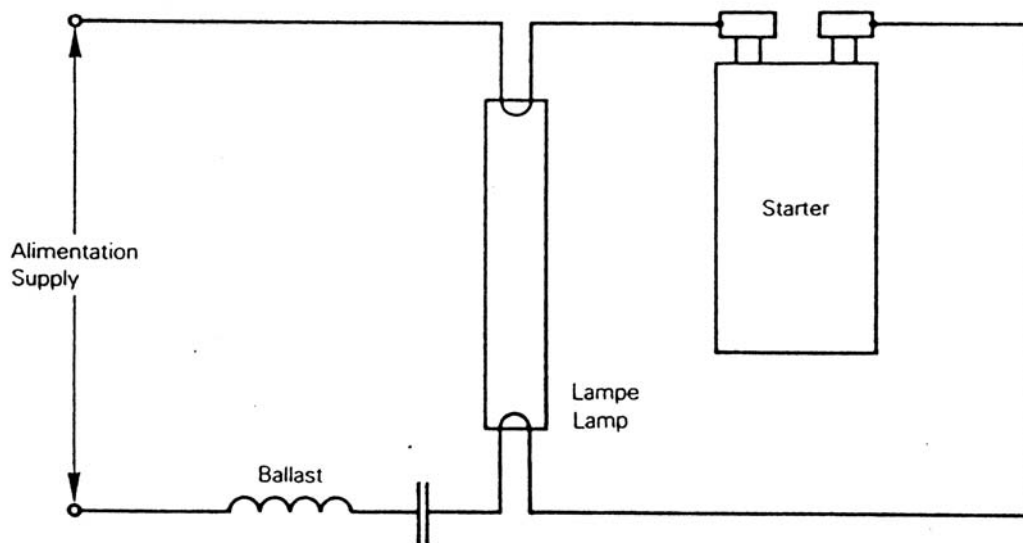
**Figure 2 – Tumbling barrel
(clause 7.8)**



**Figure 3 – Circuit for starting test
(clause 8.3)**

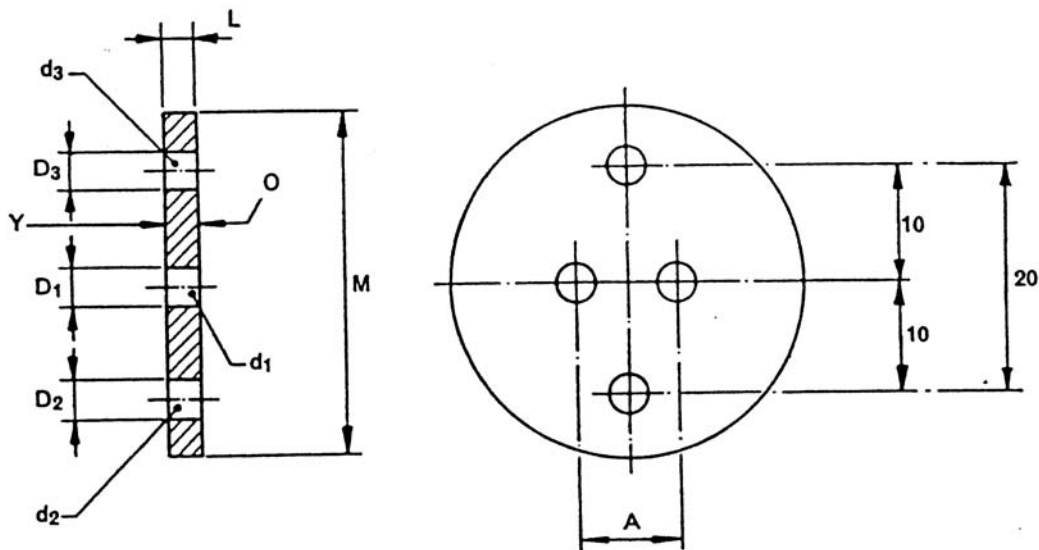


**Figure 4 – Circuit for endurance test-Starters for lamp ratings up to and including 80 W
(clause 9.)**



**Figure 5 – Circuit for endurance test-Starters for lamp rated at 100 W and
125 W
(clause 9.)**

The drawing is intended only to illustrate the essential dimensions of the gauge.



Purpose: For the control of dimensions D min., D max., L max. and the combined pin diameter and displacement of pins of figure 1.

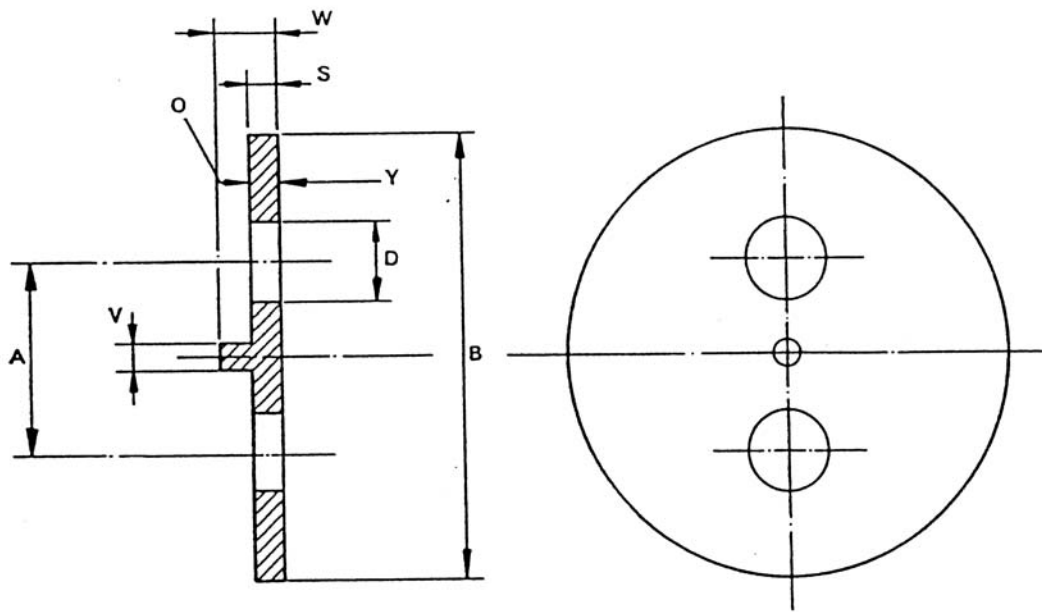
Testing: The pins shall enter the gauge hole d_1 at surface 0 and, when fully inserted, the surfaces of starter and gauge shall contact. In this position, the ends of the pins shall not project beyond surface Y. The individual pin shall enter the hole d_2 , but it shall not enter the hole d_3 .

Reference	Dimension	Tolerance
A	12.70	± 0.005
D1	5.20	+0.01
D2	5.00	+0.01
D3	4.70	-0.01
L	4.30	+0.02
M	35	Approx.

Figure 6 – “GO” and “NOT GO” gauge for starters

(clause 7.6.1)

The drawing is intended only to illustrate the essential dimensions of the gauge.



Dimensions in millimeters

This gauge does not apply to starters (or class II fluorescent lamp luminaires). A gauge for these is given in figure B.2.

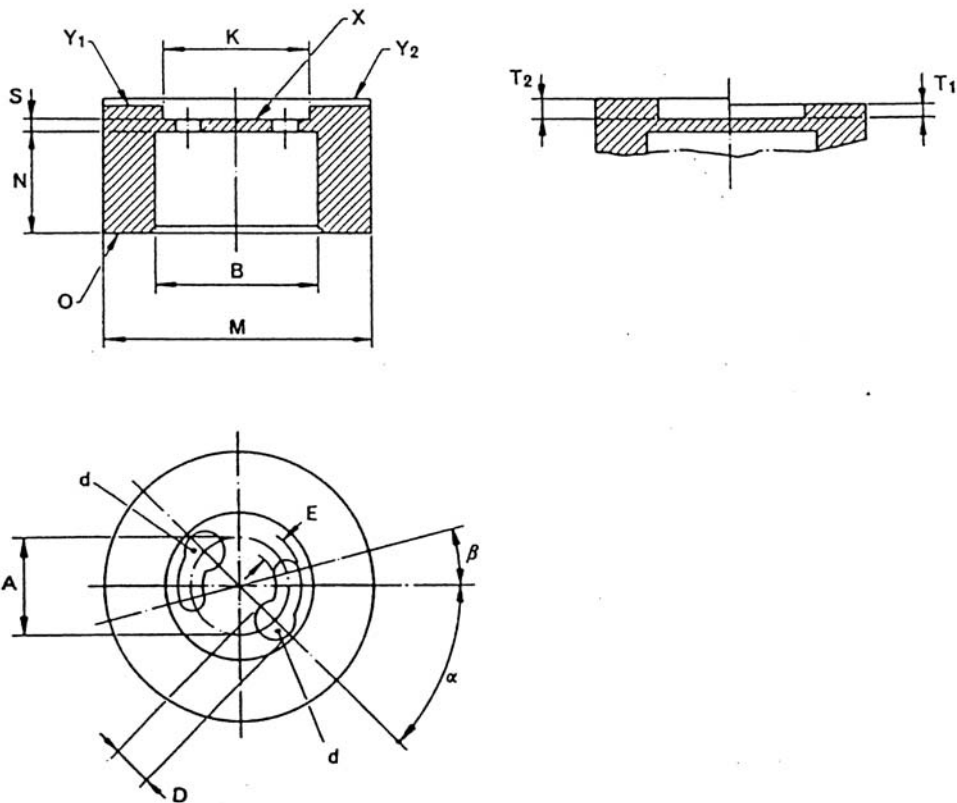
Reference	Dimension	Tolerance
A	12.70	± 0.01
B	30	± 0.5
D	5.20	+0.05
S	1.60	-0.05
V	2.20	+0.01
W	3.60	+0.01

Purpose: For checking that the starter cannot be inserted in a special holder provided with a pin having a diameter V.

Testing: The starter shall enter the gauge from side O, but the heads of the pins shall not pass so far that; they can be turned beyond surface Y.

Figure 7 - "NOT GO" gauge for starters
(clause 7.6.1)

The drawing is intended only to illustrate the essential dimensions of the gauge.



Dimensions in millimeters

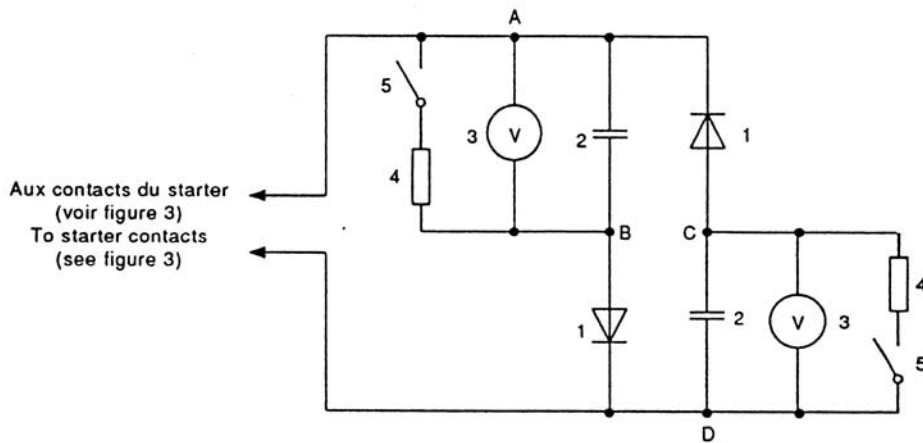
Reference	Dimension	Tolerance
A	12.70	± 0.005
B	21.50	+0.01
D	5.20	+0.01
E	3.40	-0.01
K	19.0	+0.2
M	35	Approx.
N	13	Approx.
S	1.70	-0.01
T_1	1.90	-0.01
T_2	2.20	+0.01
α	45°	Approx.
β	15°	Approx.

Purpose: For the control of dimensions B max., S min.

T min., T max., and the position of the pins with respect, to the dimensions A, D and E of figure 1.

Testing: The starter shall enter the gauge at surface O until the heads of the pins have passed through the holes d. The starter is then turned through approx. 45° and is positioned so that the heads of the pins are in close contact with surface X. In this position the extremities on the heads of the pins shall not be below surface Y, nor shall they project beyond surface Y₂.

Figure 8 - "GO" gauge for starters
(clause 7.6.1)



NOTE The previous circuit using vacuum tubes is still adequate. In case of doubt, the above circuit is the reference circuit.

The leakage resistance between A-B and C-D shall be not less than $10^{11}\Omega$.

1. HV diode(HV)

Blocking voltage	U_{RM}	≥ 6 kV
Rated current (average)	I_{FAVM}	$\geq 1,5$ mA
Periodic current (peak)	I_{RFM}	$\geq 0,1$ A
Forward voltage	V_F	≤ 20 V

NOTE Suitable parts are, HV diodes type BYX90G, for example.

2. HV capacitor

Capacitance	C	= 4000 pF
Rated voltage	U	$\geq 6,3$ kV
Phase-angle (at 10 kHz)	$\tan \delta$	= $20 \cdot 10^{-3}$

3. HV measuring instrument

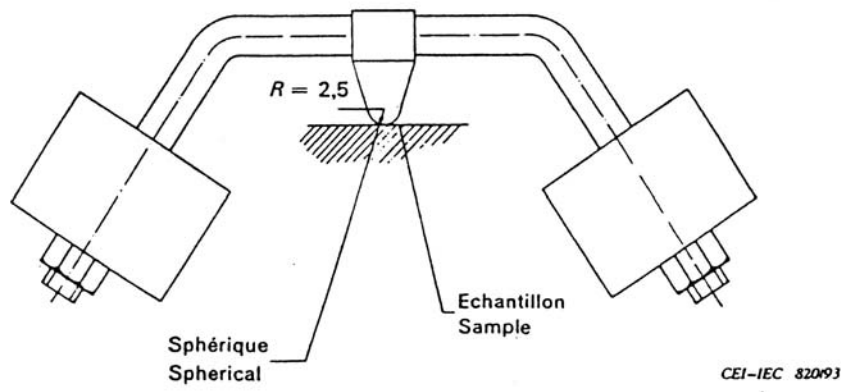
Electrostatic voltmeter		
Capacitance at full deflection	C	< 15 pF
Breakdown voltage	U	> 10 kV
Precision		Class 1 or better

4. Discharge resistance R = 1 M Ω

5. Short-circuit device for discharging HV capacitors

Figure 9 - Circuit for measurement of pulse voltage

(clause 8.7)



Dimensions in millimeters

Figure 10 – Ball-pressure test apparatus
(clause 7.10.2)

Annex A
(normative)

Ballasts to be used for life testing

A ballast used for the life testing of starters shall comply with the following four requirements.

- 1) It shall be of a type complying with TIS.23, and corresponding with the starting conditions of the lamp as indicated on the appropriate lamp data sheet of TIS.236 or of TIS.1713.
- 2) The rated voltage of the ballast shall lie within one of the following ranges:

Starting test voltage of clause 8	Ballast rated voltage
Less than 110 V	110 V - 130 V
180 V and higher	220 V - 230 V

- 3) When, at its rated voltage, it is associated with a lamp whose voltage at lamp terminals does not deviate by more than ± 2 % from the objective value specified in the lamp data sheets of TIS.236 or of TIS.1713, the lamp shall absorb a power which does not differ from its rated value by more than ± 4 %.
- 4) For pre-heated lamps operating with starter, the pre-heating current (short-circuit current) at rated voltage shall not differ by more than ± 10 % from the nominal value specified in the lamp data sheets of TIS.236 or of TIS.1713.

Annex B
(normative)

Starters for class II fluorescent lamp luminaires

INTRODUCTION

For starters for use in class II fluorescent lamp luminaires, the clauses and subclauses of this standard apply with the following amendments.

1. Scope

Replace this clause by the following text:

This annex B is intended to cover a special type of interchangeable glow-starter, used with pre-heat type fluorescent lamps, for application in class II fluorescent lamp luminaires with accessible starters. Corresponding publications for the fluorescent lamp luminaires are TIS 902 TIS 903 TIS 904 TIS 905 TIS 906 TIS 907 and TIS.1112 (in case this standard is not available, IEC 60598 and for starter-holders are TIS.344

7. Requirements and tests for safety

7.3 Protection against accidental electric shocks

Replace this subclause by the following text:

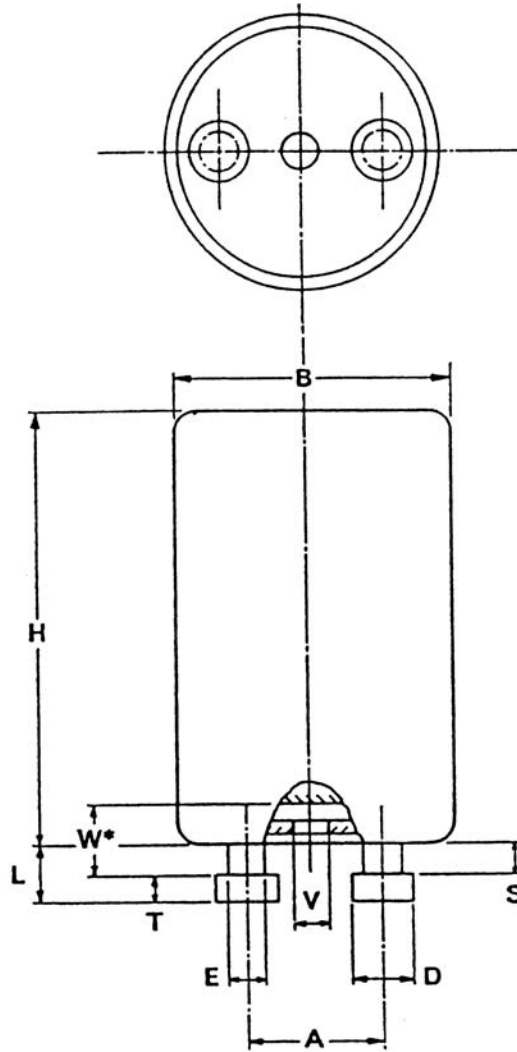
The enclosures of accessible starters shall consist of insulating material. Compliance is checked by inspection.

7.6 Dimensions

Replace subclause 7.6.1 by the following text:

7.6.1 The dimensions shall comply with the requirements of figure B.1 of this annex. Compliance shall be checked by the gauges of figure B.2 of this annex and also figure 6 of this standard.

The drawing is intended only to indicate the dimensions to be checked.



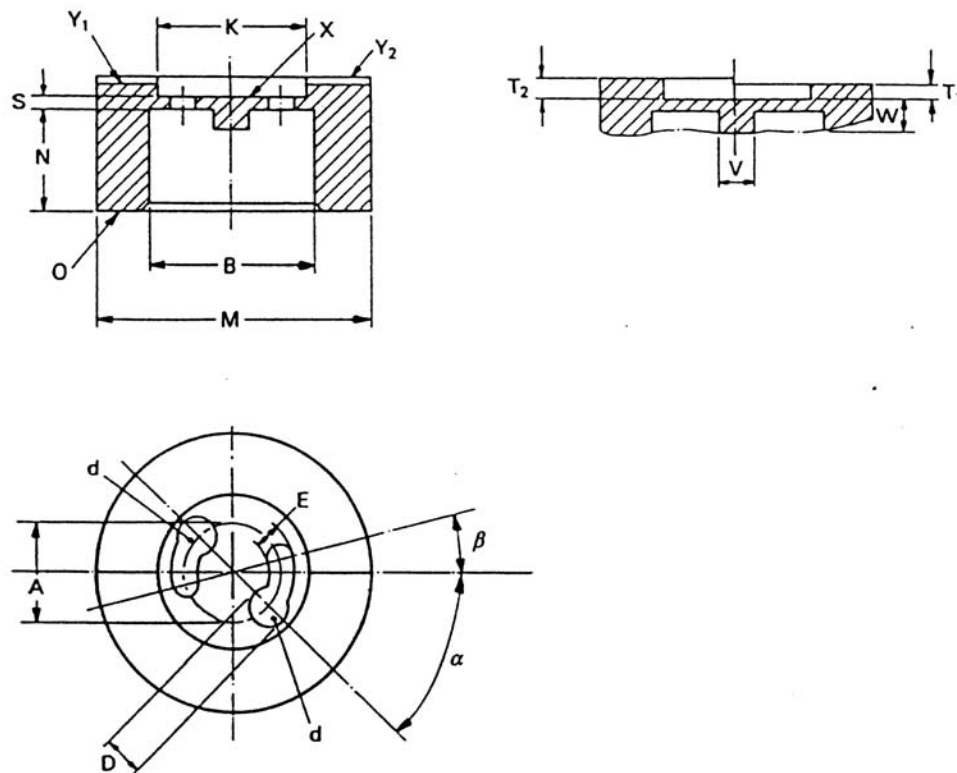
Dimensions in millimeters

Dimension	Min.	Max.
A	12.5	12.9
B	-	21.5
D	4.7	5.0
E	2.8	3.2
H	33.0	36.0
L	-	4.3
S	1.7	-
T	1.9	2.2
V	2.7	-
W*	4.2	-

* Distance over which dimension V applies.

Figure B.1 Dimensions of class II fluorescent lamp luminaires
(clause 7.6.1 Appendix B)

The drawing is intended only to illustrate the essential dimensions of the gauge.



Dimensions in millimeters

Reference	Dimension	Tolerance
A	12.70	± 0.005
B	21.50	+0.01
D	5.20	+0.01
E	3.40	+0.01
K	19.0	+0.2
M	35	Approx.
N	13	Approx.
S	1.70	-0.01
T_1	1.90	-0.01
T_2	2.20	+0.01
∞	45°	Approx.
β	15°	Approx.
V	2.60	-0.01
W	4.15	-0.01

Purpose: For the control of dimensions B max., S min., T min., T max., and the position of the pins with respect to the dimensions A, D and E of figure 1.
 Testing: The starter shall enter the gauge at surface O until the heads of the pins have passed through the holes d. The starter is then turned through approx. 45° and is positioned so that the heads of the pins are in close contact with surface X. In this position the extremities on the heads of the pins shall not be below surface Y, nor shall they project beyond surface Y₂.

Figure B.2 “GO” gauge for starters for class II luminaires (clause 7.6.1 Appendix B)

Annex C

(informative)

Information for luminaire design

The maximum temperature of any part of the starter canister should not exceed 80 °C.