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Lampes à fluorescence à deux culots – Prescriptions de performance

Double-capped fluorescent lamps – Performance specifications

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DOUBLE-CAPPED FLUORESCENT LAMPS – PERFORMANCE SPECIFICATIONS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical specifications, technical reports or guides and they are accepted by the National Committees in that sense.
4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.
5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.
6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60081 has been prepared by subcommittee 34A: Lamps, of IEC technical committee 34: Lamps and related equipment.

This fifth edition cancels and replaces the fourth edition, published in 1984, amendment 1 (1987), amendment 2 (1988), amendment 3 (1992), amendment 4 (1993) and amendment 5 (1994). It constitutes a technical revision.

This consolidated version of IEC 60081 is based on the fifth edition (1997) [documents 34A/759/FDIS and 34A/778/RVD] and its amendment 1 (2000) [documents 34A/896/FDIS and 34A/907/RVD].

It bears the edition number 5.1.

Annexes A, B, C and D form an integral part of this standard.

Annexes E and F are for information only.

The committee has decided that the contents of the base publication and its amendment 1 will remain unchanged until 2003. At this date, the publication will be

- reconfirmed;
- withdrawn;
- replaced by a revised edition, or
- amended.

DOUBLE-CAPPED FLUORESCENT LAMPS – PERFORMANCE SPECIFICATIONS

1 General

1.1 Scope

This International Standard specifies the performance requirements for double-capped fluorescent lamps for general lighting service.

The requirements of this standard relate only to type testing. Conditions of compliance, including methods of statistical assessment, are under consideration.

The following lamp types and modes of operation are included:

a) lamps having preheated cathodes, designed for operation on a.c. mains frequencies with the use of a starter, and additionally operating on high frequency;

b) lamps having preheated high-resistance cathodes, designed for operation on a.c. mains frequencies without the use of a starter (starterless), and additionally operating on high frequency;

c) lamps having preheated low-resistance cathodes, designed for operation on a.c. mains frequencies without the use of a starter (starterless), and additionally operating on high frequency;

d) lamps having preheated cathodes, designed for operation on high frequency;

e) lamps having non-preheated cathodes, designed for operation on a.c. mains frequencies;

f) lamps having non-preheated cathodes, designed for operation on high frequency.

1.2 Statement

It may be expected that lamps which comply with this standard will start and operate satisfactorily at voltages between 92 % and 106 % of rated supply voltage and at an ambient air temperature of between 10 °C and 50 °C, when operated with a ballast complying with IEC 60921 or IEC 60929, where relevant with a starter complying with IEC 60155 or IEC 60927, and in a luminaire complying with IEC 60598.

1.3 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(845):1987, *International Electrotechnical Vocabulary (IEV) – Chapter 845: Lighting*

IEC 60061-1:1969, *Lamp caps and holders together with gauges for the control of interchangeability and safety – Part 1: Lamp caps*

IEC 60155:1993, *Glow starters for fluorescent lamps*

IEC 60598 (all parts), *Luminaires*

IEC 60921:1988, *Ballasts for tubular fluorescent lamps – Performance requirements*

IEC 60927:1996, *Auxiliaries for lamps – Starting devices (other than glow starters) – Performance requirements*

IEC 60929:1990, *A.C. supplied electronic ballasts for tubular fluorescent lamps – Performance requirements*

IEC 61049:1991, *Capacitors for use in tubular fluorescent and other discharge lamp circuits – Performance requirements*

IEC 61195:1993, *Double-capped fluorescent lamps – Safety specifications*

IEC 61231:1993, *International lamp coding system (ILCOS)*

1.4 Definitions

For the purpose of this International Standard, the definitions of IEC 60050(845) and the following definitions apply.

1.4.1
fluorescent lamp
discharge lamp of the low-pressure mercury type, in which most of the light is emitted by one or several layers of phosphors excited by the ultra-violet radiation from the discharge [IEV 845-07-26, modified]

1.4.2
double-capped fluorescent lamp
fluorescent lamp having two separate caps and mostly of tubular form and linear shape

1.4.3
nominal value
approximate quantity value used to designate or identify a lamp

1.4.4
rated value
quantity value for a characteristic of a lamp for specified operating conditions. The value and the conditions are specified in this standard, or assigned by the manufacturer or responsible vendor

1.4.5
lumen maintenance
ratio of the luminous flux of a lamp at a given time in its life to its initial luminous flux, the lamp being operated under specific conditions. The ratio is generally expressed as a percentage

1.4.6
initial readings
starting characteristics of a lamp, measured before ageing, and the electrical, photometric and cathode characteristics of a lamp, measured at the end of the 100 h ageing period

1.4.7
starting aid
conductive strip affixed to the outer surface of a lamp, or a conductive plate which is spaced within an appropriate distance from the lamp. A starting aid is usually connected to earth potential, and can only be effective when it has an adequate potential difference from one end of the lamp

1.4.8
reference ballast
special ballast, either inductive for lamps for operation on a.c. mains frequencies, or resistive for lamps for operation on high frequency. It is designed for the purpose of providing comparison standards for use in testing ballasts, for the selection of reference lamps and for testing regular production lamps under standardized conditions. It is essentially characterized by the fact that, at its rated frequency, it has a stable voltage/current ratio which is relatively uninfluenced by variations in current, temperature and magnetic surroundings, as outlined in the relevant ballast standard [IEC 845-08-36, modified]

1.4.9
calibration current of a reference ballast
value of the current on which the calibration and control of the reference ballast are based

1.4.10
type test
test or a series of tests made on a type test sample for the purpose of checking compliance of the design of a given product with the requirements of the relevant standard

1.4.11
type test sample
sample consisting of one or more similar units submitted by the manufacturer or responsible vendor for the purpose of a type test

1.5 Lamp requirements

1.5.1 General

A lamp, on which compliance with this standard is claimed, shall comply with the requirements of IEC 61195.

A lamp shall be so designed that its performance is reliable in normal and accepted use. In general, this can be achieved by satisfying the requirements of the following subclauses.

The requirements and information given apply to 95 % of production.

NOTE The requirements and tolerances permitted by this standard are based on testing of a type test sample submitted by the manufacturer for that purpose. In principle, this type test sample should consist of units having characteristics typical of the manufacturer's production and be as close to the production centre-point values as possible.

It may be expected with the tolerances given in the standard that products manufactured in accordance with the type test sample will comply with the standard for the majority of the production. Due to the production spread, however, it is inevitable that there will sometimes be products outside the specified tolerances. For guidance on sampling plans and procedures for inspection by attributes, see IEC 60410.

1.5.2 Caps

The dimensions of the caps on a finished lamp shall be in accordance with IEC 60061-1.

a) For lamps with G5 or G13 caps, both pins (excluding flanges) of the two caps of a finished lamp shall pass simultaneously, freely without binding, through parallel slots, suitably spaced longitudinally to receive the lamp. The slots shall each be 2,87 mm wide for G5 caps, and 3,05 mm wide for G13 caps.

b) For lamps with R17d caps, both cap bosses of a finished lamp shall pass simultaneously, freely without binding, through parallel slots, suitably spaced longitudinally to receive the lamp with the bottom of the slots against the boss ends. The slots shall each be 6,35 mm deep and 9,22 mm wide.

1.5.3 Dimensions

The dimensions of a lamp shall comply with the values specified on the relevant lamp data sheet.

1.5.4 Starting characteristics

A lamp shall start fully within the time specified on the relevant lamp data sheet and remain alight.

Conditions and method of test are given in annex A.

1.5.5 Electrical and cathode characteristics

a) The initial reading of the voltage at the lamp terminals shall comply with the values specified on the relevant lamp data sheet.

b) The initial reading of the power dissipated by a lamp shall not exceed the rated wattage, specified on the relevant lamp data sheet, by more than 5 % + 0,5 W.

NOTE – Cathode watts due to supplementary heating are not included in the rated lamp wattage unless otherwise stated on the lamp data sheet.

c) For a lamp having preheated cathodes for operation on a.c. mains frequencies starterless circuits, the initial reading of the resistance of each cathode shall be not less than the minimum value specified on the relevant lamp data sheet.

d) For a lamp having preheated cathodes for operation on high frequency, the initial reading of the resistance of each cathode shall comply with the values specified on the relevant lamp data sheet.

Conditions and method of test are given in annex B.

1.5.6 Photometric characteristics

a) The initial reading of the luminous flux of a lamp shall be not less than 92 % of the rated value.

b) The initial reading of the chromaticity coordinates x and y of a lamp shall be within 5 SDCM (standard deviation of colour matching) from the rated values.

NOTE – See also annex D on chromaticity co-ordinates.

c) The initial reading of the general colour rendering index Ra of a lamp shall be not less than the rated value decreased by three.

Conditions and method of test are given in annex B.

1.5.7 Lumen maintenance

The lumen maintenance of a lamp shall be not less than 92 % (under consideration) of the rated lumen maintenance value at any time in its life.

Conditions and method of test are given in annex C.

1.5.8 Marking

The following information shall be marked on a lamp:

a) the nominal wattage or current;

NOTE – If necessary for proper identification, additional information should be added (for example the nominal lamp dimensions in millimetres).

b) a further identification which defines, with the aid of information made available by the manufacturer or responsible vendor, the electrical and photometric characteristics of a lamp.

1.6 Information for ballast and starter design

Refer to the relevant lamp data sheet and to annex E for information for ballast and starter design.

1.7 Information for luminaire design

Refer to annex F for information for luminaire design.

Annex A
(normative)

Method of test for starting characteristics

A.1 General

Tests shall be made in a draught-free atmosphere at an ambient temperature of between 20 °C and 27 °C and a relative humidity of 65 % maximum.

Metallic parts and wires in the vicinity of the lamp, except starting aids when required, shall be avoided as far as possible.

Immediately prior to the starting test the lamps shall be kept inoperative and in an ambient temperature of between 20 °C and 27 °C and a relative humidity of 65 % maximum for a period of at least 24 h.

A.2 Lamps having preheated cathodes for operation on a.c. mains frequencies with the use of a starter

A.2.1 Test circuit

Lamps shall be tested with a 50 Hz or 60 Hz supply in the circuit shown in figure A.1.

A.2.2 Ballast

The ballast used shall be of the inductive type, unless specified otherwise on the relevant lamp data sheet, and shall comply with the requirements of IEC 60921. It shall be rated as specified on the relevant lamp data sheet. Where a capacitive circuit is specified, additionally the capacitor used shall comply with the requirements of IEC 61049.

When the ballast, at its rated voltage, is associated with a test lamp, the lamp shall dissipate a power which does not differ from its rated value by more than 4 %. A test lamp is a lamp whose voltage at lamp terminals does not deviate by more than 2 % from its rated value, when operated with its reference ballast.

The preheating current, when measured at 90 % of rated ballast voltage, shall be between 1,1 and 1,2 times the rated lamp current. To obtain a value of the preheating current within this range, it may be necessary either to make a special selection from among commercial ballasts or else to design and manufacture a ballast for this specific purpose. In some cases, it may be possible to bring the preheating current down to be within this range by adding resistance in series with the starter.

NOTE – In some cases the ballast may include an autotransformer to increase (or reduce) the voltage to the proper value for the starting and operation of the lamp. Ballasts incorporating step-up transformers are particularly likely to be used in countries where 120 V or 100 V power systems predominate.

A.2.3 Starter

The type of glow starter to be used shall comply with the requirements of IEC 60155, and shall in any case be subject to agreement with the lamp manufacturer or responsible vendor.

A.2.4 Test voltage

The test voltage applied to the circuit shall be as specified on the relevant lamp data sheet.

A.3 Lamps having preheated cathodes for operation on a.c. mains frequencies without the use of a starter (starterless)

A.3.1 Test circuit

Lamps shall be tested with a 50 Hz or 60 Hz supply in the circuit shown in figure A.2.

A.3.2 Ballast

The ballast used shall be of the inductive type, and shall comply with the requirements of IEC 60921. It shall be rated as specified on the relevant lamp data sheet.

When the ballast, at its rated voltage, is associated with a test lamp, the lamp shall dissipate a power which does not differ from its rated value by more than 4 %. A test lamp is a lamp whose voltage at lamp terminals does not deviate by more than 2 % from its rated value, when operated with its reference ballast.

NOTE 1 – In some cases the ballast may include an autotransformer to increase (or reduce) the voltage to the proper value for the starting and operation of the lamp. Ballasts incorporating step-up transformers are particularly likely to be used in countries where 120 V or 100 V power systems predominate.

NOTE 2 – The earthing of the circuit as shown in figure A.2 may make it necessary to supply it through an isolating transformer.

A.3.3 Starting aid

The starting aid, a metal plate, shall be connected to earth potential together with one lamp cathode. Its length shall be not less than that of the lamp under test and it shall be 25 mm wide for 16 mm diameter lamps and 40 mm wide for 26 mm to 38 mm diameter lamps. The distance between the surface of the lamp and the starting aid shall be as specified on the relevant lamp data sheet.

The manufacturer or responsible vendor shall specify whether or not the lamps require an external starting aid, and whether one cathode shall be connected to earth potential. For lamps not requiring a separate starting aid, the metal plate shall be removed.

A.3.4 Test voltages

The voltage of the heating circuit to be applied to the cathode terminals and the open circuit voltage at the lamp terminals for the starting test shall be as specified on the relevant lamp data sheet.

NOTE – The voltages specified for the starting test are chosen primarily to secure reproducibility of test results, and are not necessarily applicable to the design of ballasts.

The voltages of the main circuit and of the heating circuits shall be applied simultaneously.

The voltage applied to the cathode heating circuits shall not be so connected as to increase the voltage of the main circuit. The two circuits shall be connected to the same phase of the supply.

The two cathode heating transformers may be replaced by one with isolated secondary windings. The transformer(s) shall be such that the voltage does not change by more than 2 % when the maximum cathode load is connected.

If the lamp does not start at the specified open circuit voltage, this voltage shall be gradually increased up to a maximum of 110 % of the test value. If the lamp still does not start, it shall be rejected. If the lamp does start, it shall be operated for 30 min at rated voltage and the normal test shall be made again after a rest period of 24 h.

A.4 Lamps having non-preheated cathodes for operation on a.c. mains frequencies

A.4.1 Test circuit

Lamps shall be tested with a 50 Hz or 60 Hz supply in the circuit shown in figure A.3.

A.4.2 Ballast

The ballast used shall be of the inductive type, and shall comply with the requirements of IEC 60921. It shall have a suitable open circuit voltage.

A.4.3 Test voltage

The open circuit voltage at the lamp terminals for the starting test shall be as specified on the relevant lamp data sheet.

NOTE – The voltage specified for the starting test is chosen primarily to secure reproducibility of test results and is not necessarily applicable to the design of ballasts.

If the lamp does not start at the specified open circuit voltage, this voltage shall be gradually increased up to a maximum of 125 % of the test value. If the lamp still does not start, it shall be rejected. If the lamp does start, it shall be operated for 30 min at rated voltage, and the normal test shall be made again after a rest period of 24 h.

A.5 Lamps for operation on high frequency

A.5.1 Test circuit

Lamps shall be tested with an a.c supply with a frequency between 20 kHz and 26 kHz, unless otherwise specified on the relevant lamp data sheet, and in the circuits shown in:

– figure A.4 for lamps with preheated cathodes;
– figure A.5 for lamps with non-preheated cathodes.

NOTE – The frequency range specified for this lamp test is not necessarily applicable to the design of ballasts (see also annex E).

A.5.2 Ballast

The non-inductive ballast resistor shall be so adjusted that the high frequency lamp current is equal to the value as specified on the relevant lamp data sheet.

A.5.3 Starting aid

For lamps with preheated cathodes, the starting aid, a metal plate, shall be connected to earth potential together with one lamp cathode. Its length shall be not less than that of the lamp under test, and it shall be 25 mm wide for 16 mm diameter lamps, and 40 mm wide for 26 mm to 38 mm diameter lamps. The distance between the surface of the lamp and the starting aid shall be as specified on the relevant lamp data sheet.

The manufacturer or resposible vendor shall specify whether or not the lamps require an external starting aid, and whether one cathode shall be connected to earth potential. For lamps not requiring a separate starting aid, the metal plate shall be removed.

A.5.4 Test voltage and current

For lamps with preheated cathodes, the cathode heating supplies shall be adjusted to supply a preheat current as specified on the relevant lamp data sheet. During the preheat time, specified on the relevant lamp data sheet, switch S_1 shall be kept open and switches S_2 closed. After this period of time, switches S_2 shall be opened simultaneously as switch S_1 is closed.

The open circuit voltage applied to the circuit shall be as specified on the relevant lamp data sheet.

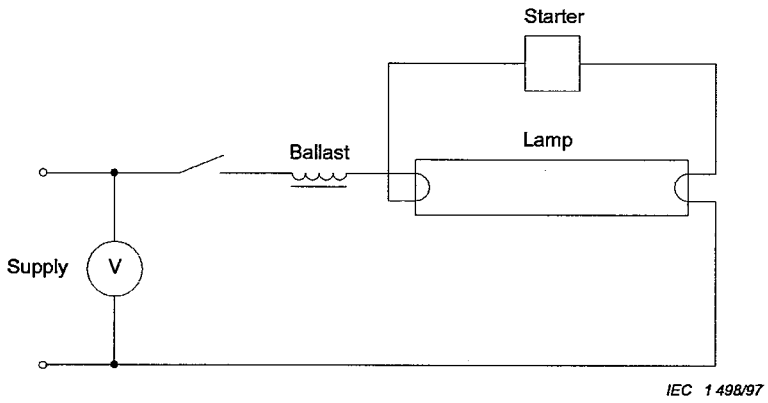


Figure A.1 – Circuit diagram for starting test for lamps for operating with starter

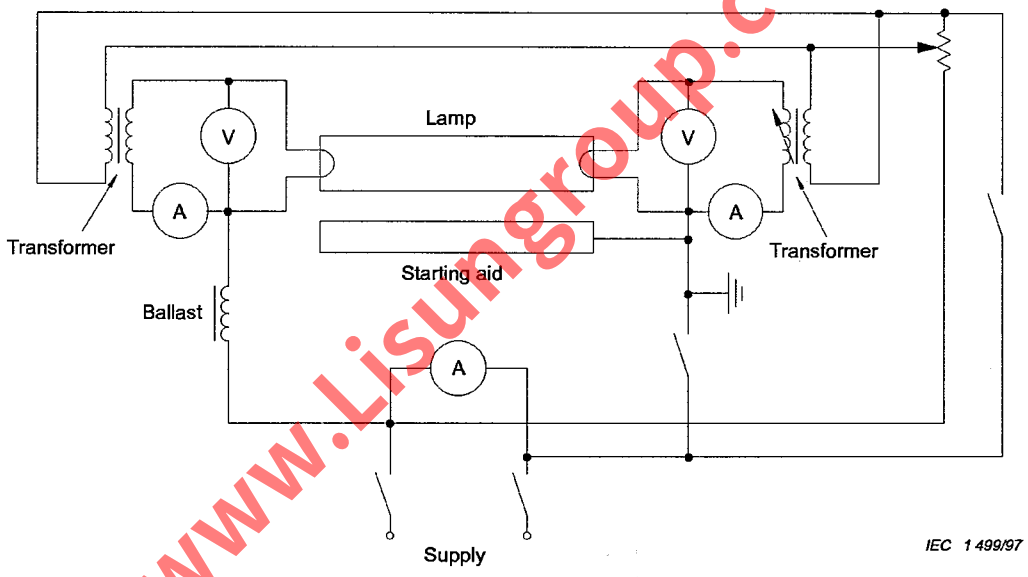


Figure A.2 – Circuit diagram for starting test for lamps with preheated cathodes for operation on starterless circuits

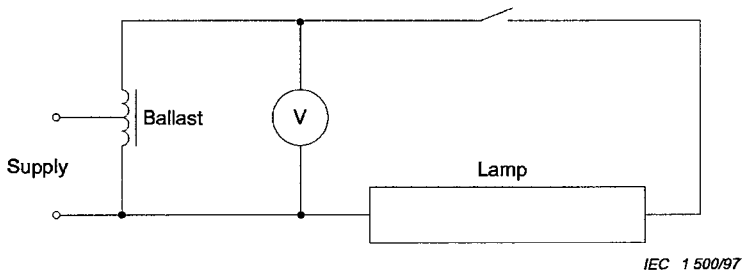


Figure A.3 – Circuit diagram for starting test for lamps with non-preheated cathodes

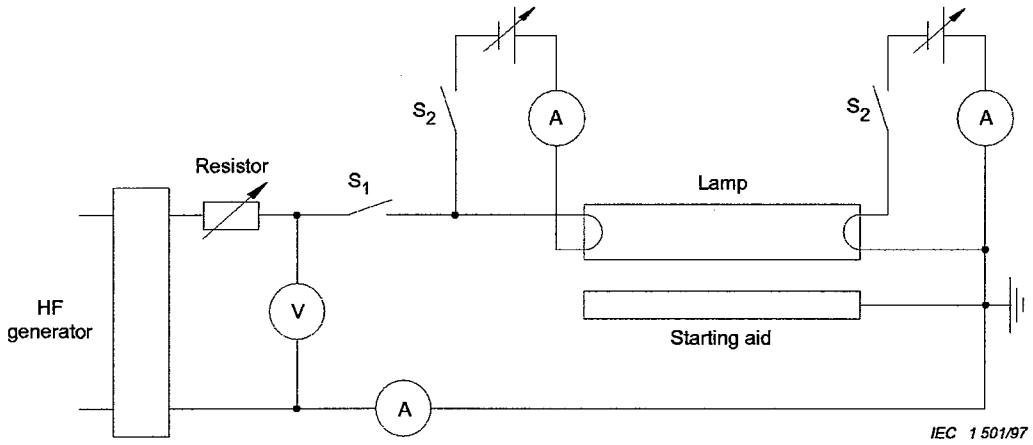


Figure A.4 – Circuit diagram for starting test for lamps with preheated cathodes for operation on high frequency

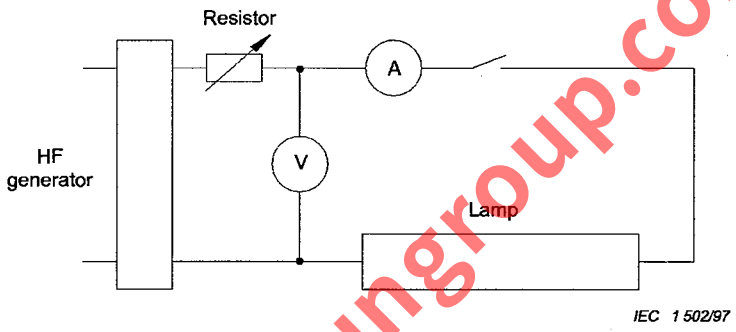


Figure A.5 – Circuit diagram for starting test for lamps with non-preheated cathodes for operation on high frequency

Annex B
(normative)

Method of test for electrical, photometric and cathode characteristics

B.1 Electrical and photometric characteristics for lamps without supplementary cathode heating during operation

B.1.1 General

Photometric characteristics shall be measured in accordance with the relevant recommendations of the CIE (Commission Internationale de l'Eclairage).

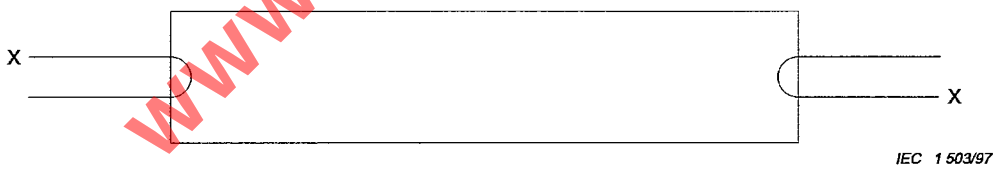
Before the lamps are measured for the first time, they shall be aged for a period of 100 h of normal operation.

Measurements shall be made after a sufficient period of stabilization of the lamp. An appropriate stabilization time is 15 min.

NOTE – If a pre-warming position is used, from which the lamp is moved to the test position, a further stabilization period is necessary in the test position. The interruption of the supply should be as short as possible, and the additional stabilization period should be at least 5 min.

Lamps shall be tested in a horizontal operating position.

The connections of the lamp contacts, with reference to the terminations of the ballast, shall not be changed for the whole course of the tests. For lamps having caps with two pins or contacts, by convention the following arrangement is used (where x indicates the contacts to be connected to the main circuit):



IEC 1503/97

Lamps shall be tested in a draught-free atmosphere at an ambient temperature of 25 °C ± 1 °C, unless otherwise specified on the relevant lamp data sheet.

When measuring in a suitable photometric integrator the ambient temperature is taken to be the air temperature at the following position:

– at a distance from the bulb wall of not less than 10 % of the nominal diameter of the integrator;
– at a distance from the wall of the integrator of not less than one-sixth of the nominal diameter of the integrator;
– near the lamp axis on a level with the centre of the lamp.

A uniform temperature distribution in the integrator shall be maintained during the test. In the horizontal plane containing the lamp centre, except in the immediate vicinity of the lamp wall, a uniform temperature of ±1 °C is required. Special care shall be taken if the integrator incorporates a heating system.

The temperature is usually measured by a thermocouple or a thermistor, both protected against radiation by a small shield.

B.1.2 Test circuit

Lamps shall be tested in the circuits shown in:

- figure B.1 for lamps having preheated cathodes;
- figure B.2 for lamps having non-preheated cathodes;
- figure B.3 for lamps for operation on high frequency.

Before making the measurements, any device used to start the lamp shall be disconnected from the test circuit.

In the test circuit for lamps for operation on high frequency, given in figure B.3, connections shall be as short and straight as possible to avoid parasitic capacitance. The parasitic capacitance parallel to the lamp shall be less than 1 nF.

B.1.3 Ballast

Ballasts used for these tests shall be reference ballasts as specified in IEC 60921 for a.c. mains frequencies, or IEC 60929 for high frequency. The reference ballast electrical characteristics shall be as specified on the relevant lamp data sheet.

B.1.4 Supply voltage

The supply voltage shall be equal to the rated voltage of the reference ballast. During periods of stabilization, the supply voltage shall be stable within ±0,5 %, this tolerance being reduced to 0,2 % during measurement.

For a.c. mains supplies, the frequency shall be equal to the rated frequency of the reference ballast, with a tolerance of 0,5 %. For high frequency supplies, the frequency shall be between 20 kHz and 26 kHz, unless otherwise specified on the relevant lamp data sheet.

NOTE – The frequency range specified for this lamp test is not necessarily applicable to the design of ballasts, see also annex E.

The wave shape of the supply voltage shall be a sine wave. The total harmonic content shall not exceed 3 % of the fundamental (for high frequency supplies this value is under consideration). The total harmonic content is defined as the root-mean-square (r.m.s.) summation of the individual harmonic components, using the fundamental as 100 %.

NOTE – This implies that the source of supply should have sufficient power, and that the supply circuit should have a sufficiently low impedance, compared with the ballast impedance. Care should be taken that this applies under all conditions that occur during the measurement.

B.1.5 Electrical instruments

Instruments shall be of the true r.m.s. type, essentially free from waveform errors, and suitable for the frequency of operation.

The voltage measuring circuit of the instruments shall have an impedance of not less than 100 000 Ω, and shall be disconnected when not in use. The current measuring circuit of the instruments shall have the lowest possible resistance and, if necessary, shall be short circuited when not in use.

When measuring the lamp wattage, no correction shall be made for the wattmeter consumption (the circuit connection being made on the lamp side of the current measuring circuit).

When measuring the luminous flux, the voltage measuring circuit of the voltmeter and of the wattmeter shall be open.

B.2 Electrical and photometric characteristics for lamps with supplementary cathode heating during operation

B.2.1 General

For lamps having preheated low-resistance cathodes, for operation on 60 Hz starterless circuits, the characteristics shall also be measured with supplementary cathode heating during operation.

The conditions and method of test are the same as given in B.1 except for the test circuit.

For lamps measured according to this method, the lamp power shall be considered to be the sum of the power delivered through the reference ballast (as measured in the conventional portion of the circuit) and the power used to heat the cathodes (being the power measured on the input side of the cathode heating transformers, minus the transformer losses determined as described in B.2.4).

B.2.2 Test circuit

Lamps shall be tested in the circuit shown in figure B.4.

Supply voltage A is the voltage specified for the reference ballast for the type of lamp being measured. Supply voltage B shall have separate voltage control so that it can be adjusted independently of supply voltage A. The voltage sources A and B shall come from the same supply, and shall not come from different phases of a polyphase power supply.

The primary voltage of the low voltage transformers, used to heat the lamp cathodes shall be adjustable in order that the desired output voltage may be obtained. The cathode transformers shall be so connected that their voltage subtracts from the voltage of the ballast circuit.

B.2.3 Cathode heating transformers

The two cathode heating transformers (or one transformer with two secondary windings) shall have good regulation, and have a current capacity several times the actual current required. They shall also have low losses to minimize the effect that any error in the measurement of these losses would have on the total lamp watts.

The centre value of the cathode voltage for low-resistance cathodes is 3,6 V, and it is convenient to use a regular 6,3 V filament transformer operated at a reduced primary voltage so that an output of 3,6 V is obtained.

B.2.4 Calibration of cathode heating transformer

Each cathode transformer (or pair of transformers) shall be individually calibrated to determine the power loss that will exist during normal operation.

This power will vary with the current to be supplied to the particular type of cathode involved. These loss values, however, need to be determined only once for a given transformer for each cathode type. The appropriate transformer loss can then be applied to the measurement of the various types of lamps.

It is convenient to obtain a "voltage calibration" on each transformer. This involves determining the primary voltage that must be set in order to obtain the required secondary output voltage. This calibration, although not entirely essential, makes it possible to use primary voltage settings in all routine work, thus avoiding the need for constant use of the more fragile low-range thermocouple voltmeters.

In making the calibration, each secondary winding of the transformer should be connected to a substitution resistor, having the electrical characteristics specified for the particular cathode type involved. The primary voltage should be adjusted so that the average of the two secondary voltages is 3,6 V, and the value of the primary voltage should then be recorded. It is essential that this calibration is repeated for any other cathode type with which the transformer is used.

The power loss in the transformer (core loss and E^2/R loss considered together) shall also be determined for each load condition. With the primary voltage again set so as to give the specified voltage of 3,6 V across the substitution resistors, the power input shall be read. (Since the total wattage to be read is likely to be below 10 W, a low-range wattmeter shall be used). The loss in the transformer may be calculated as the wattage input reading, minus the instrument corrections, and also minus the power absorbed by the substitution resistors. This power in the resistors can be calculated as E^2/R for each of the windings.

The transformer loss is assumed to be constant for all lamps having the same cathode resistance, and no allowance is necessary for the slight differences resulting from variations in actual cathodes.

B.3 Cathode characteristics of lamps having preheated cathodes for operation on starterless circuits

B.3.1 Test circuit

Cathode resistance shall be measured using a suitable d.c. supply or a 50 Hz or 60 Hz a.c. supply.

B.3.2 Lamps for operation on a.c. mains frequencies

The voltage at the cathode terminals shall be adjusted to the value of the test voltage given on the relevant lamp data sheet, and the current shall be measured. From these, after deduction of the consumption of the voltmeter, the cathode resistance shall be determined.

B.3.3 Lamps for operation on high frequency

The current flowing through the cathode shall be adjusted to the value of the test current given on the relevant lamp data sheet, and the supply voltage shall be measured. From these, after deduction of the voltage across the ammeter, the cathode resistance shall be determined.

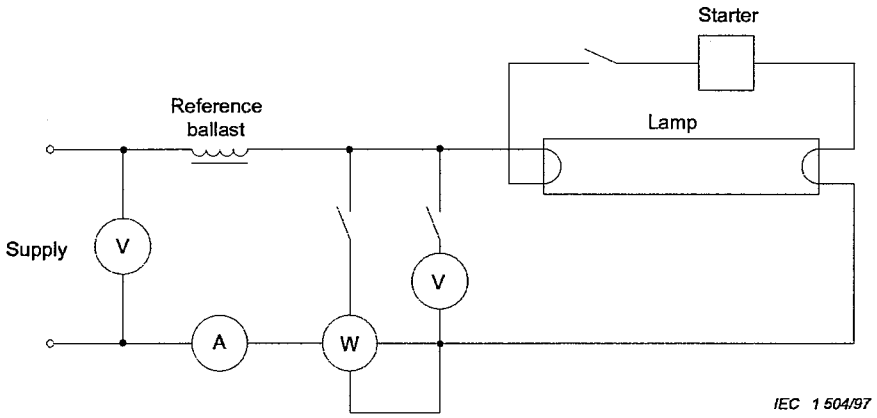


Figure B.1 – Circuit diagram for measurement of electrical and photometric characteristics for lamps with preheated cathodes

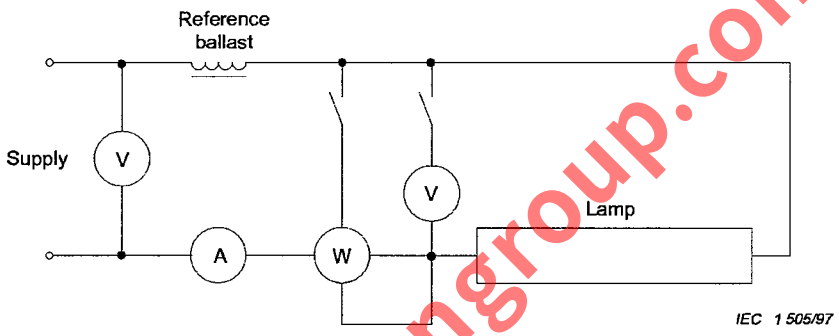


Figure B.2 – Circuit diagram for measurement of electrical and photometric characteristics for lamps with non-preheated cathodes

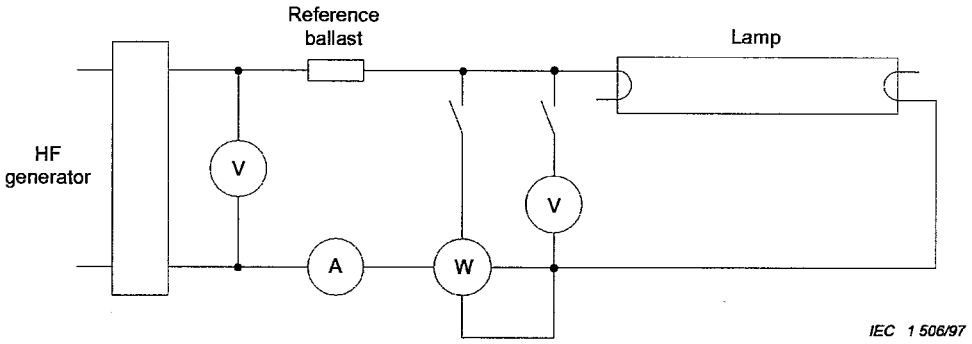


Figure B.3 – Circuit diagram for measurement of electrical and photometric characteristics for lamps for operation on high frequency

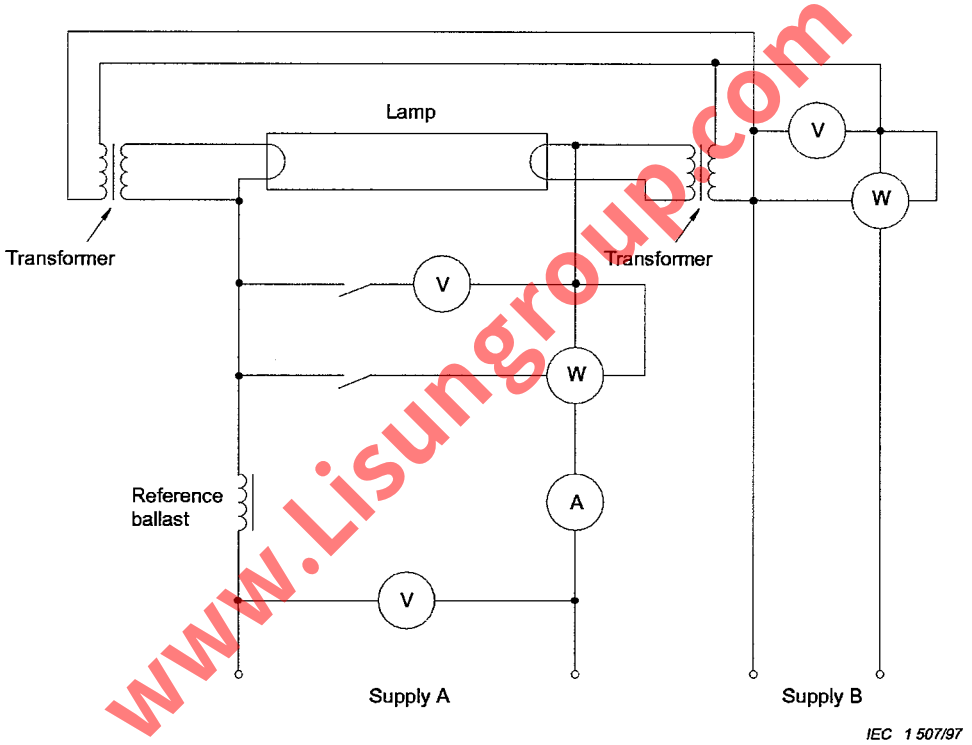


Figure B.4 – Circuit diagram for measurement of electrical and photometric characteristics for lamps with supplementary cathode heating

Annex C
(normative)

Method of test for lumen maintenance and life

C.1 General

The luminous flux at a given time in the life of a lamp shall be measured as specified in annex B.

During the life testing, lamps shall be operated as follows:

- lamps shall be operated at an ambient temperature of between 15 °C and 50 °C. Excessive draughts shall be avoided, and the lamps shall not be subject to extreme vibration and shock;
- lamps shall be operated in a horizontal position;
- the connections of the lamp contacts, with reference to the terminations of the ballast, shall not be changed for the whole course of the tests;
- lamps shall be operated in the circuit for which they are intended by the manufacturer;
- lamps shall be switched off for 15 min after each 2 h 45 min of operation.

NOTE – In North America, a cycle of 3 h on, 20 min off is used.

C.2 Lamps for operation on a.c. mains frequencies

The ballast used shall comply with the requirements of IEC 60921. For capacitive circuits additionally the capacitor used shall comply with the requirements of IEC 61049.

When the ballast, at its rated voltage, is associated with a test lamp, the lamp shall dissipate a power which does not differ from its rated value by more than 4 %. A test lamp is a lamp whose voltage at lamp terminals does not deviate by more than 2 % from its rated value, when operated with its reference ballast.

NOTE – The choice of the type of ballasts for these tests is left open, but the type used can have an influence on the results of the test. It is recommended that the type of ballast employed should be stated. In case of doubt, the use of an inductive type of ballast is recommended because such a type has the smallest number of parameters capable of affecting the results.

For lamps operated with a starter the preheating current, at rated supply voltage, shall not differ by more than 10 % from the rated value specified on the relevant lamp data sheet.

For lamps operated with a starter, the type of starter to be used shall comply with the requirements of IEC 60155, and shall in any case be subject to agreement with the lamp manufacturer or responsible vendor.

During the life testing, the supply voltage and frequency shall not differ by more than 2 % from the rated voltage and frequency of the ballast used.

C.3 Lamps for operation on high frequency

The ballast used shall comply with the requirements of IEC 60929.

Annex D
(normative)

Chromaticity co-ordinates

D.1 General

This annex covers the standardized rated values and tolerance areas for the chromaticity co-ordinates x and y applying to fluorescent lamps.

For lamps with non-standardized chromaticity co-ordinates, the rated values shall be assigned by the manufacturer or responsible vendor.

NOTE – The chromaticity co-ordinates x and y are specified according to the CIE 1931 Standard Colorimetric System (see CIE Publication 15-2)[1]. The tolerance areas are based on the ellipses defined by D.L. MacAdam in his paper "Specification of small chromaticity differences", published in the Journal of the Optical Society of America, vol 1, No. 1, Jan. 1943, pp 18-26.

The tolerance areas are defined by MacAdam ellipses of 5 SDCM (standard deviation of colour matching). Co-ordinates 5 SDCM away from the rated values are given by the equation:

$$g_{11}\,\Delta x^2 + 2\,g_{12}\,\Delta x\,\Delta y + g_{22}\,\Delta y^2 = 5^2$$

in which Δx and Δy represent the deviations with respect to the rated co-ordinates, while the coefficients g_{11}, g_{12} and g_{22} depend on these rated values. These coefficients are the basis for calculating θ, a and b, where θ is the angle between the major axis of the ellipse and the x-axis, and a and b are the major and minor semi-axes of an ellipse of 1 SDCM.

D.2 Standard chromaticity co-ordinates

For the standardized chromaticity co-ordinates the following rated values x and y apply for the different lamp "colours" (with the correlated colour temperatures T_c in kelvin given as extra information):

"Colour"	T_c	x	y
F 6500	6400	0,313	0,337
F 5000	5000	0,346	0,359
F 4000	4040	0,380	0,380
F 3500	3450	0,409	0,394
F 3000	2940	0,440	0,403
F 2700	2720	0,463	0,420

[1] CIE 15-2: 1986, *Colorimetry*.

For the coefficients g_{11}, g_{12} and g_{22}, the following values apply:

"Colour"	g_{11}	g_{12}	g_{22}
F 6500	86 $\times 10^4$	- 40 $\times 10^4$	45 $\times 10^4$
F 5000	56 $\times 10^4$	- 25 $\times 10^4$	28 $\times 10^4$
F 4000	39,5 $\times 10^4$	- 21,5 $\times 10^4$	26 $\times 10^4$
F 3500	38 $\times 10^4$	- 20 $\times 10^4$	25 $\times 10^4$
F 3000	39 $\times 10^4$	- 19,5 $\times 10^4$	27,5 $\times 10^4$
F 2700	44 $\times 10^4$	- 18,6 $\times 10^4$	27 $\times 10^4$

For θ, a and b, the following values apply:

"Colour"	θ	a	b
F 6500	58° 23'	0,00223	0,00095
F 5000	59° 37'	0,00274	0,00118
F 4000	54° 00'	0,00313	0,00134
F 3500	52° 58'	0,00317	0,00139
F 3000	53° 10'	0,00278	0,00136
F 2700	57° 17'	0,00258	0,00137

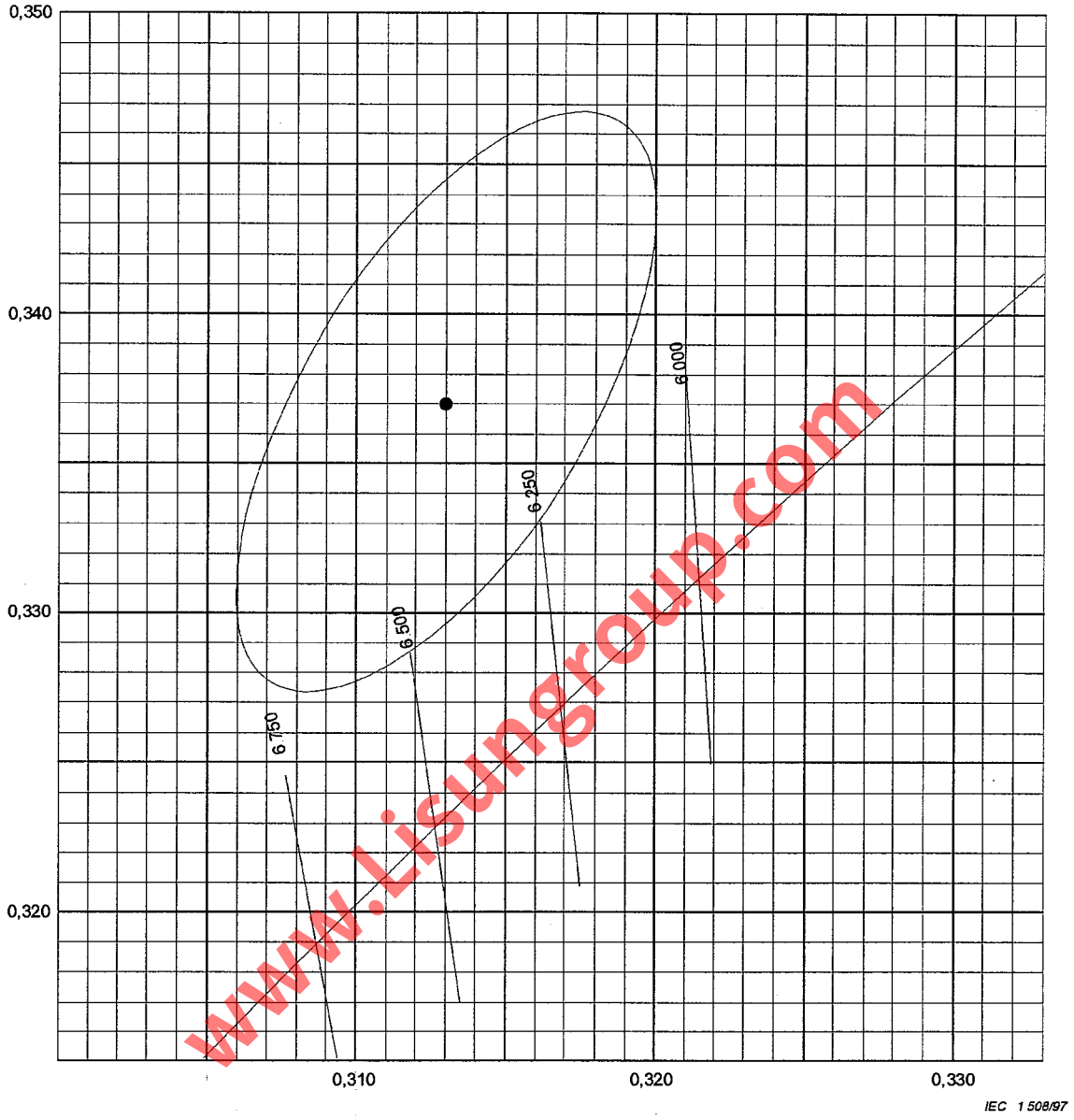
The tolerance areas are shown in figures D.1 to D.6, together with the rated values, a part of the black body locus, and lines of constant correlated colour temperature.

D.3 Shifted chromaticity co-ordinates

For some lamps, as specified on the relevant lamp data sheet, slightly shifted chromaticiy co-ordinates apply, but only for types having a general colour rendering index less than 80.

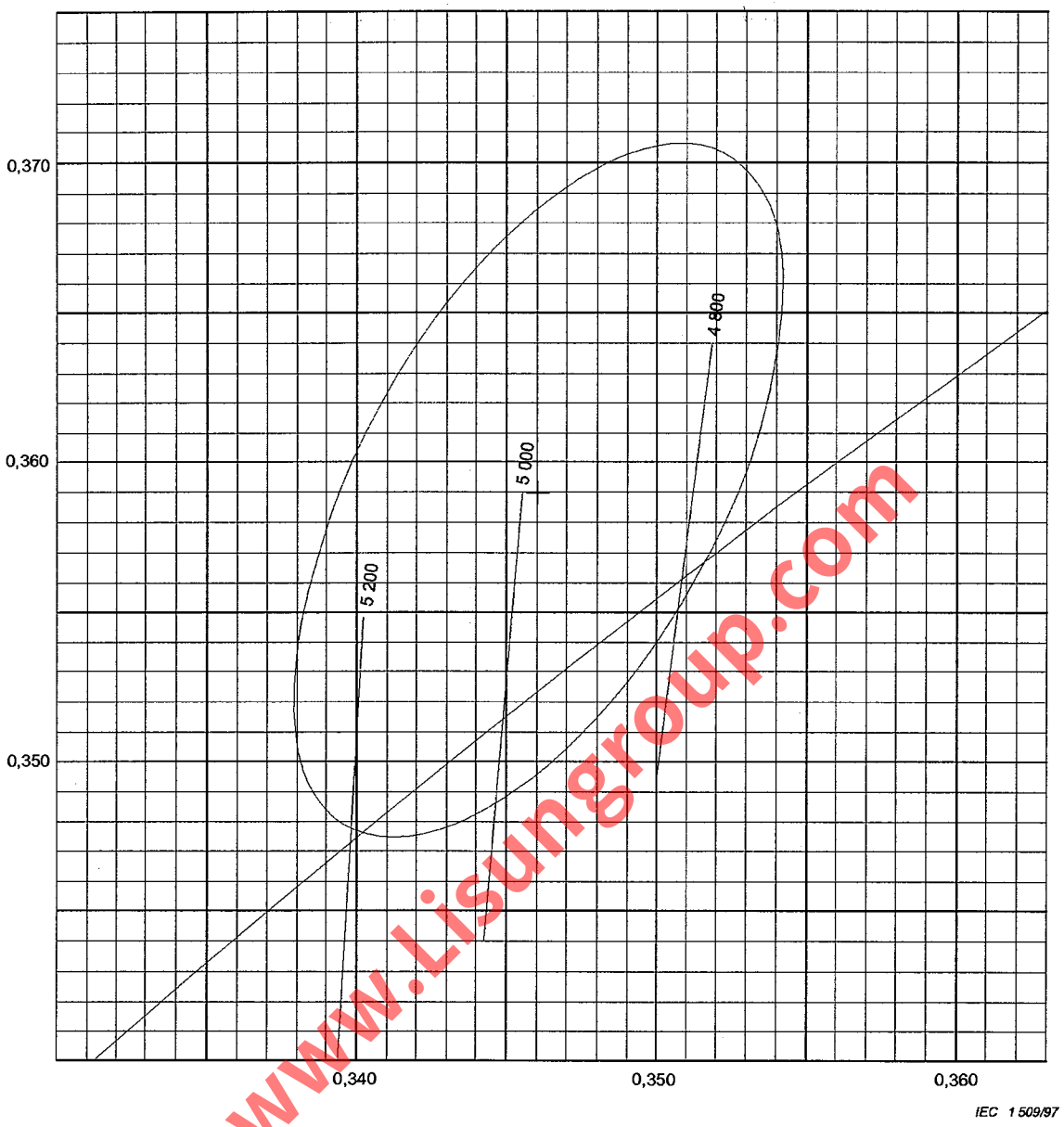
The same tolerance areas as given in D.2 shall be used, but centred on the rated values given in the following table:

"Colour"	x	y
F 6500	0,309	0,337
F 5000	0,342	0,359
F 4000	0,375	0,380
F 3500	0,403	0,394
F 3000	0,433	0,403
F 2700	–	–



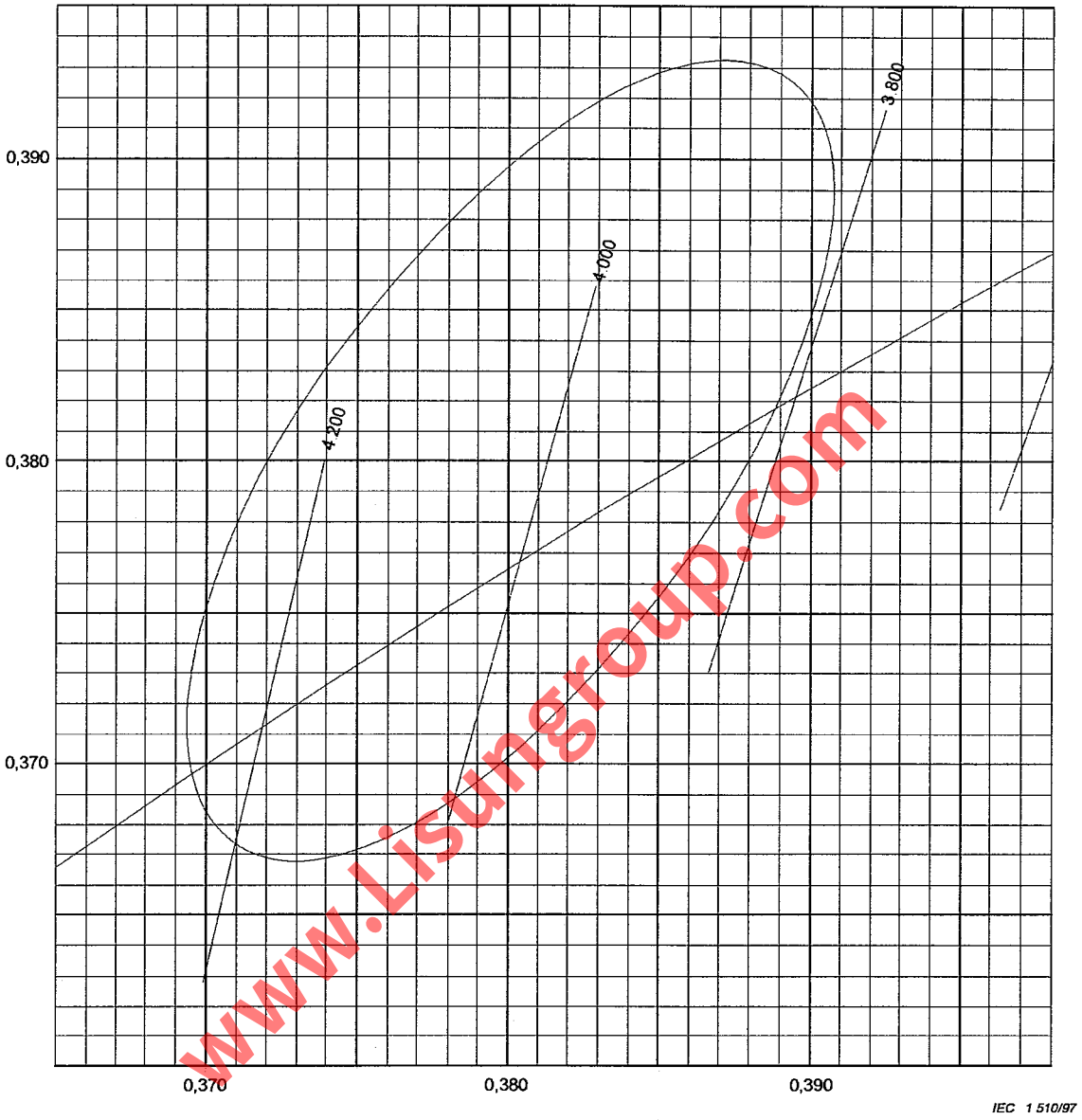
$x = 0{,}313$ $y = 0{,}337$

Figure D.1 – Tolerance area for standard "colour" F 6500



$x = 0,346$ $y = 0,359$

Figure D.2 – Tolerance area for standard "colour" F 5000



x = 0,380 y = 0,380

Figure D.3 – Tolerance area for standard "colour" F 4000

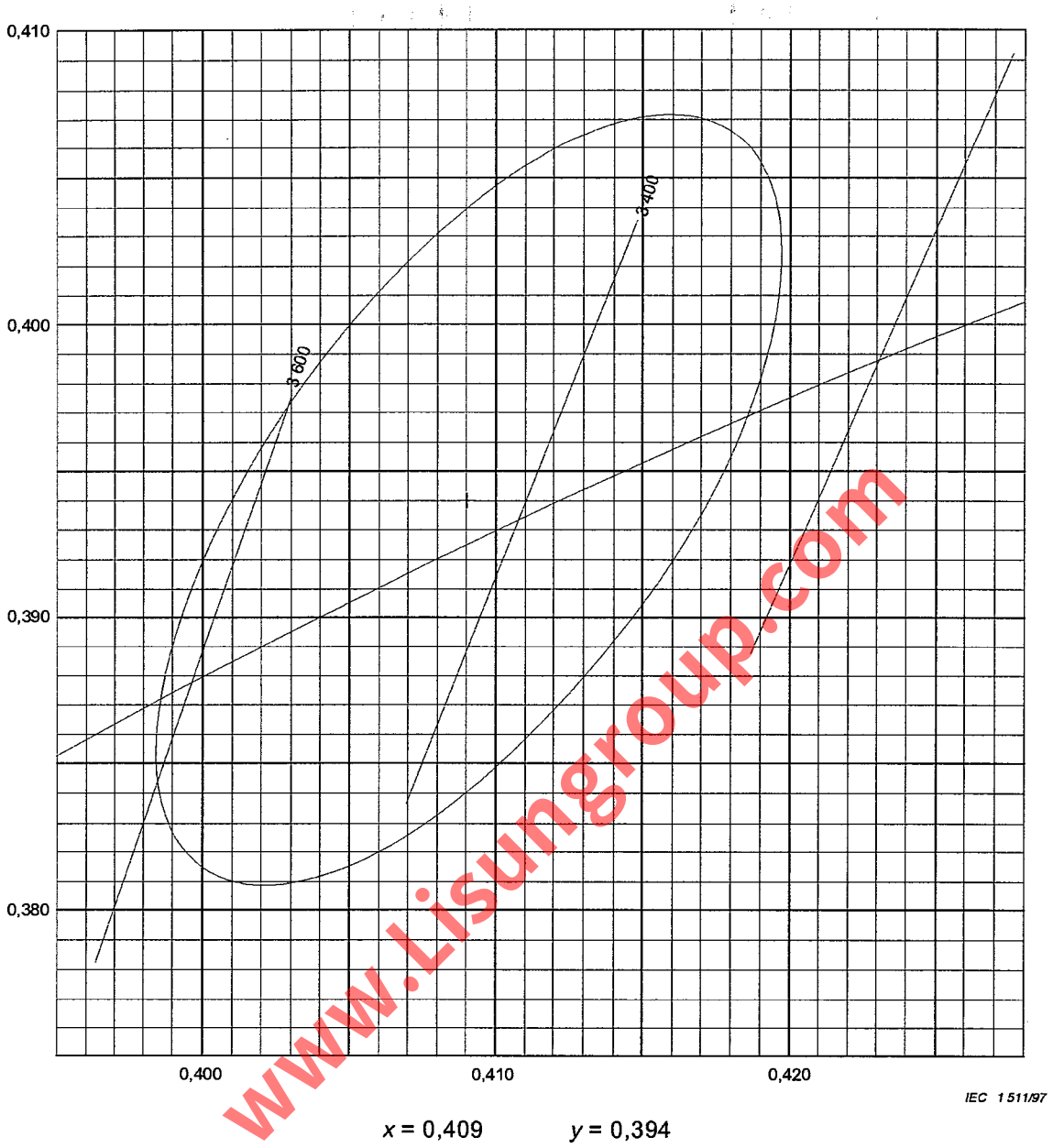
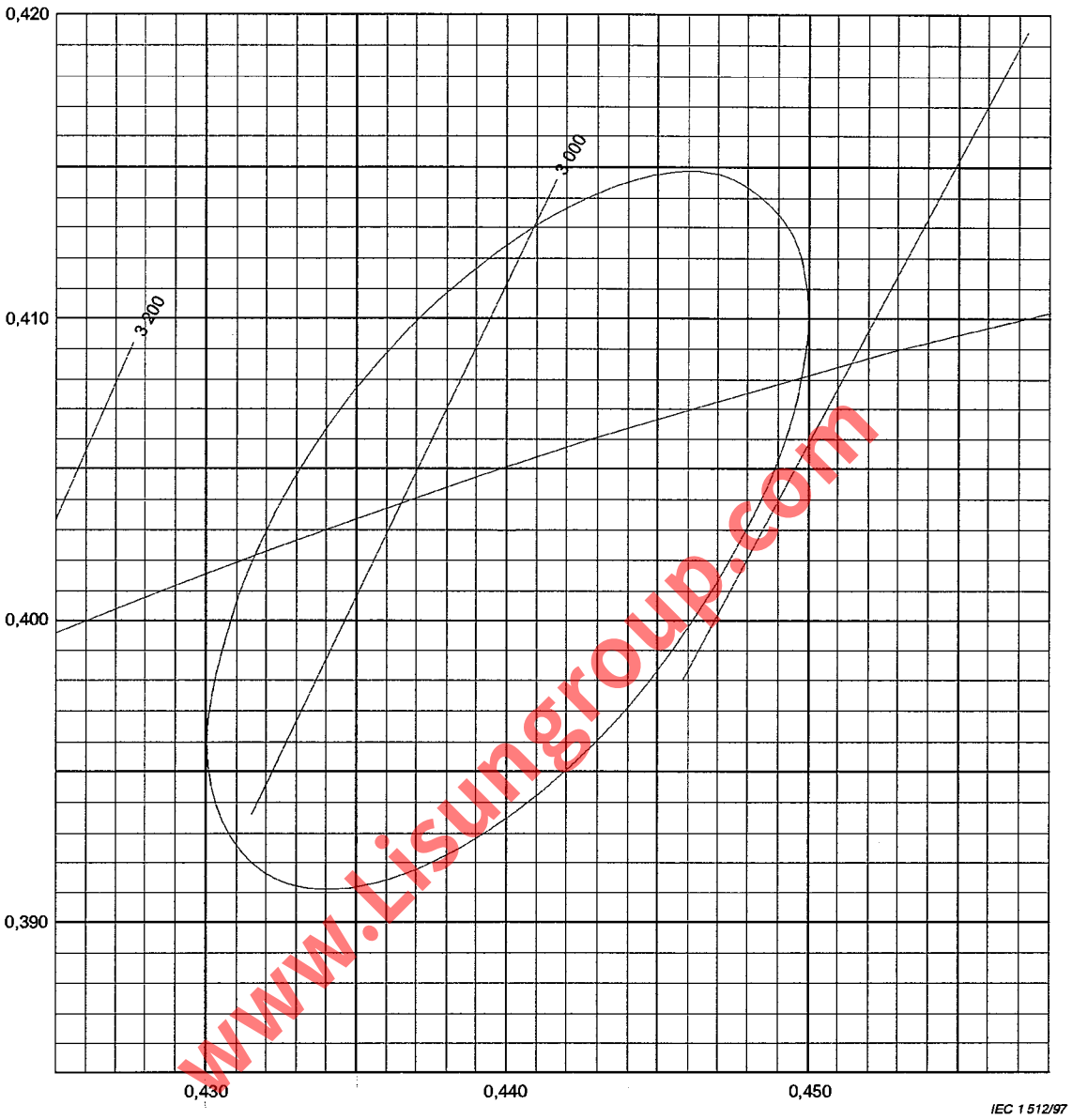


Figure D.4 – Tolerance area for standard "colour" F 3500



$x = 0,440$ $y = 0,403$

Figure D.5 – Tolerance area for standard "colour" F 3000

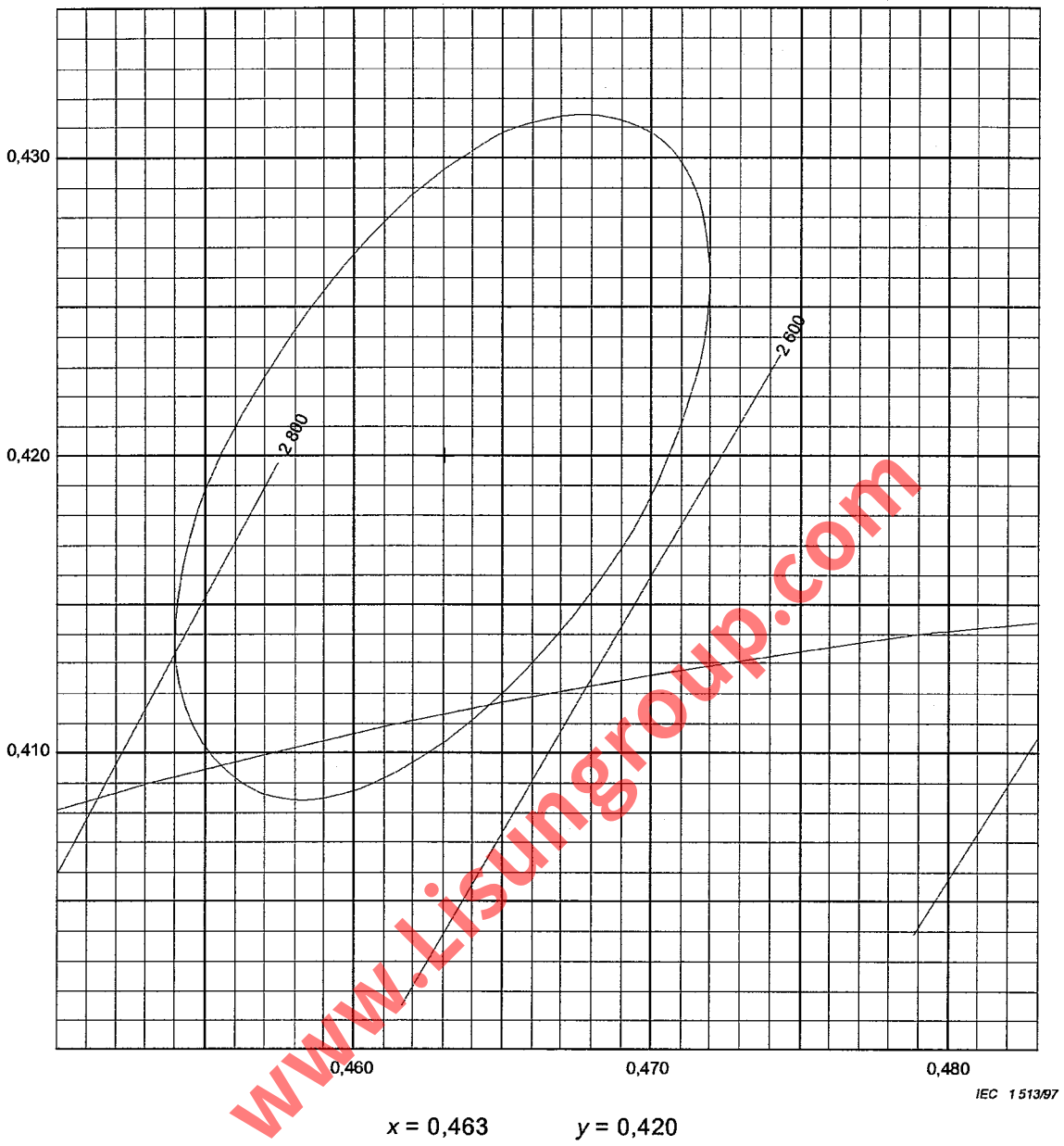


Figure D.6 – Tolerance area for standard "colour" F 2700

Annex E
(informative)

Information for ballast and starter design

E.1 General

In order to safeguard proper functioning of the lamp, the relevant information, given on the lamp data sheet and in this annex, should be taken into account when designing ballasts and starters.

E.2 Prestarting conditions for high frequency operated lamps

For lamps operated on high frequency and having preheated cathodes, the requirements for proper preheating are specified on the relevant lamp data sheet. An explanation of these requirements is given in annex D of IEC 60929 and in annex B of IEC 60927.

For some lamps, additional information concerning high frequency non-preheat starting requirements is given on the relevant lamp data sheet.

E.3 Frequency to be used for high frequency operated lamps

For lamps designed for operation on high frequency, the lamp data sheets prescribe a frequency range for the reference ballast and for the testing of lamps (starting, electrical and photometric characteristics). This frequency range has been chosen for ease of reproducing test results and is not intended to restrict the design of high frequency ballasts, where for practical reasons a higher frequency may be appropriate.

Annex F
(informative)

Information for luminaire design

F.1 General

In order to safeguard proper functioning of the lamp, the relevant information, given in this annex, should be taken into account when designing luminaires.

F.2 Free space

For mechanical acceptance of lamps complying with this standard, a free space should be provided in the luminaire, based on the maximum lamp dimensions specified on the relevant lamp data sheet.

F.3 Series capacitors used in capacitive circuits

An initial capacitor tolerance of 10 %, which is typical for shunt connected capacitors, is unsuitable for series capacitors. The summation of capacitor and ballast tolerances may lead to poor lamp performance, when unfavourable tolerances coincide.

In order to satisfy the requirements specified on the relevant lamp data sheets, either the capacitor tolerance should be narrow, or the capacitor and the inductive reactance component of the ballast should be selected so that unfavourable tolerances do not coincide.

F.4 Starting aid

Operation of lamps on a.c. mains or high frequency starterless circuits requires, in most cases, the presence of a conductive starting aid at earth potential. This can be a conventional part of the luminaire.

The distance between the surface of the lamp and the starting aid should not exceed the value specified for the lamp starting characteristics on the relevant lamp data sheet. In addition, a minimum distance of 3 mm should be observed.

2 Data sheets

2.1 General principles of numbering of data sheets

The first number represents the number of this standard "60081", followed by the letters "IEC".

The second number represents the data sheet number.

The third number represents the edition of the page of the data sheet. In cases where a data sheet has more than one page, it is possible for the pages to have different edition numbers, with the data sheet number remaining the same.

2.2 Diagrammatic data sheets for location of lamp dimensions

2.2.1 List of diagrammatic data sheets

60081-IEC-01 Linear-shaped lamps with G5 or G13 caps.

60081-IEC-02 Linear-shaped lamps with Fa6, Fa8, R17d caps or W4.3×8.5d.

2.3 Lamp data sheets

2.3.1 List of lamp data sheets

Sheet No. 60081-IEC-	Nominal wattage W	Frequency Hz		Nominal dimensions mm	Cap	Circuit		Cathode type
						AC mains	High frequency	
1020	4	50	60	16 x 150	G 5	Starter	–	Preheated
1030	6	50	60	16 x 225	G 5	Starter	–	Preheated
1040	8	50	60	16 x 300	G 5	Starter	–	Preheated
1060	13	50	60	16 x 525	G 5	Starter	–	Preheated
2120	15	50	60	26 x 450	G 13	Starter	Starterless	Preheated
2215	15	50	60	26 x 550	G 13	Starterless	Starterless	Preheated
2220	18	50	–	26 x 600	G 13	Starter	Starterless	Preheated
2230	20	50	60	32 x 600	G 13	Starter	–	Preheated
2240	20	50	60	38 x 600	G 13	Starter	–	Preheated
2315	25	50	–	38 x 970	G 13	Starter	–	Preheated
2320	30	50	60	26 x 900	G 13	Starter	Starterless	Preheated
2340	30	50	–	38 x 900	G 13	Starter	–	Preheated
2415	33	50	60	26 x 1150	G 13	Starterless	Starterless	Preheated
2420	36	50	–	26 x 1200	G 13	Starter	Starterless	Preheated
2425	38	50	–	26 x 1050	G 13	Starter	Starterless	Preheated
2430	40	50	60	32 x 1200	G 13	Starter	–	Preheated
2440	40	50	60	38 x 1200	G 13	Starter	–	Preheated
2520	58	50	–	26 x 1500	G 13	Starter	Starterless	Preheated
2530	65	50	–	32 x 1500	G 13	Starter	–	Preheated
2540	65	50	–	38 x 1500	G 13	Starter	–	Preheated
2620	70	50	60	26 x 1800	G 13	Starter	Starterless	Preheated
2640	75	50	–	38 x 1800	G 13	Starter	–	Preheated
2660*	80	50	–	38 x 1500	G 13	Starter	–	Preheated
2670*	85	50	–	38 x 1800	G 13	Starter	–	Preheated
2840	100	50	–	38 x 2400	G 13	Starter	–	Preheated
2880*	125	50	–	38 x 2400	G 13	Starter	–	Preheated
3020	4	50	60	16 x 150	G 5	Starterless	–	Preheated, high resistance
3030	6	50	60	16 x 225	G 5	Starterless	–	Preheated, high resistance
3040	8	50	60	16 x 300	G 5	Starterless	–	Preheated, high resistance
4240	20	50	60	38 x 600	G 13	Starterless	–	Preheated, high resistance
4340	30	50	–	38 x 900	G 13	Starterless	–	Preheated, high resistance
4440	40	50	60	38 x 1200	G 13	Starterless	–	Preheated, high resistance
4540	65	50	–	38 x 1500	G 13	Starterless	–	Preheated, high resistance
4640	75	50	–	38 x 1800	G 13	Starterless	–	Preheated, high resistance
4660*	80	50	–	38 x 1500	G 13	Starterless	–	Preheated, high resistance
4670*	85	50	–	38 x 1800	G 13	Starterless	–	Preheated, high resistance
4880	125	50	–	38 x 2400	G 13	Starterless	–	Preheated, high resistance
5230	20	50	60	32 x 600	G 13	Starterless		Preheated, low resistance
5240	20	50	60	38 x 600	G 13	Starterless		Preheated, low resistance
5340	30	50	60	38 x 900	G 13	Starterless		Preheated, low resistance
5430	40	50	60	32 x 1200	G 13	Starterless		Preheated, low resistance
5440	40	50	60	38 x 1200	G 13	Starterless		Preheated, low resistance
5540	65	50	–	38 x 1500	G 13	Starterless		Preheated, low resistance
5840	85	50	–	38 x 2400	G 13	Starterless		Preheated, low resistance
5960	60	–	60	38 x 1200	R17d	Starterless		Preheated, low resistance
5970	87	–	60	38 x 1800	R17d	Starterless		Preheated, low resistance
5980	112	–	60	38 x 2400	R17d	Starterless		Preheated, low resistance
6030	6	25 k		7 x 220	W4.3		Sans starter	Préchauffée
6040	8	25 k		7 x 320	W4.3		Sans starter	Préchauffée
6050	11	25 k		7 x 420	W4.3		Sans starter	Préchauffée
6060	13	25 k		7 x 520	W4.3		Sans starter	Préchauffée
6520	14	≥ 20 k		16 x 550	G 5	–	Starterless	Preheated
6530	21	≥ 20 k		16 x 850	G 5	–	Starterless	Preheated
6620	24	20 K		16 x 550	G 5	–	Starterless	Preheated
6640	28	≥ 20 k		16 x 1150	G 5	–	Starterless	Preheated
6650	35	≥ 20 k		16 x 1450	G 5	–	Starterless	Preheated
6730	39	20 k		16 x 850	G 5		Starterless	Preheated
6750	49	20 k		16 x 1450	G 5		Starterless	Preheated
6840	54	20 k		16 x 1150	G 5		Starterless	Preheated
6850	80	20 k		16 x 1450	G 5		Starterless	Preheated
7220	16	≥ 20 k		26 x 600	G 13	–	Starterless	Preheated
7420	32	≥ 20 k		26 x 1200	G 13	–	Starterless	Preheated
7520	50	≥ 20 k		26 x 1500	G 13	–	Starterless	Preheated
8240	20	50	–	38 x 600	Fa6	Starterless	–	Non-preheated
8440	40	50	–	38 x 1200	Fa6	Starterless	–	Non-preheated
8540	65	50	–	38 x 1500	Fa6	Starterless	–	Non-preheated
8640	39	–	60	38 x 1200	Fa8	Starterless	–	Non-preheated
8740	57	–	60	38 x 1800	Fa8	Starterless	–	Non-preheated
8840	75	–	60	38 x 2400	Fa8	Starterless	–	Non-preheated
9420	32	≥ 20 k		26 x 1200	Fa6	–	Starterless	Non-preheated
9520	50	≥ 20 k		26 x 1500	Fa6	–	Starterless	Non-preheated

* Mainly intended for replacement purposes.

2.3.2 List of lamp data sheets in order of wattage

Sheet No. 60081-IEC-	Nominal wattage W	Frequency Hz		Nominal dimensions mm	Cap	Circuit		Cathode type
						AC mains	High frequency	
1020	4	50	60	16 x 150	G 5	Starter	–	Preheated
3020	4	50	60	16 x 150	G 5	Starterless	–	Preheated, high resistance
1030	6	50	60	16 x 225	G 5	Starter	–	Preheated
3030	6	50	60	16 x 225	G 5	Starterless	–	Preheated, high resistance
6030	6	25		7 x 220	W4.3 x 8.5d		Starterless	Preheated
1040	8	50	60	16 x 300	G 5	Starter	–	Preheated
3040	8	50	60	16 x 300	G 5	Starterless	–	Preheated, high resistance
6040	8	25		7 x 320	W4.3 x 8.5d		Starterless	Preheated
6050	11	25		7 x 420	W4.3 x 8.5d		Starterless	Preheated
1060	13	50	60	16 x 525	G 5	Starter	–	Preheated
6060	13	25		7 x 520	W4.3 x 8.5d		Starterless	Preheated
6520	14	≥ 20 k		16 x 550	G 5	–	Starterless	Preheated
2120	15	50	60	26 x 450	G 13	Starter	Starterless	Preheated
2215	15	50	60	26 x 550	G 13	Starter		Preheated
7220	16	≥ 20 k		26 x 600	G 13	–	Starterless	Preheated
2220	18	50	–	26 x 600	G 13	Starter	Starterless	Preheated
2230	20	50	60	32 x 600	G 13	Starter	–	Preheated
2240	20	50	60	38 x 600	G 13	Starter	–	Preheated
4240	20	50	60	38 x 600	G 13	Starterless	–	Preheated, high resistance
5230	20	50	60	32 x 600	G 13	Starterless		Preheated, low resistance
5240	20	50	60	38 x 600	G 13	Starterless		Preheated, low resistance
8240	20	50	–	38 x 600	Fa6	Starterless	–	Non-preheated
6530	21	≥ 20 k		16 x 850	G 5	–	Starterless	Preheated
6620	24	20	26	16 x 550	G 5	–	Starterless	Preheated
2315	25	50	–	38 x 970	G 13	Starter	–	Preheated
6640	28	≥ 20 k		16 x 1150	G 5	–	Starterless	Preheated
2320	30	50	60	26 x 900	G 13	Starter	Starterless	Preheated
2340	30	50	–	38 x 900	G 13	Starter	–	Preheated
4340	30	50	–	38 x 900	G 13	Starterless	–	Preheated, high resistance
5340	30	50	60	38 x 900	G 13	Starterless		Preheated, low resistance
7420	32	≥ 20 k		26 x 1200	G 13	–	Starterless	Preheated
9420	32	≥ 20 k		26 x 1200	Fa6	–	Starterless	Non-preheated
2415	33	50	60	26 x 1150	G 13	Starter		Preheated
6650	35	≥ 20 k		16 x 1450	G 5	–	Starterless	Preheated
2420	36	50	–	26 x 1200	G 13	Starter	Starterless	Preheated
2425	38	50	–	26 x 1050	G 13	Starter	Starterless	Preheated
6730	39	20	26	16 x 850	G 5		Starterless	Preheated
8640	39	–	60	38 x 1200	Fa8	Starterless	–	Non-preheated
2430	40	50	60	32 x 1200	G 13	Starter	–	Preheated
2440	40	50	60	38 x 1200	G 13	Starter	–	Preheated
4440	40	50	60	38 x 1200	G 13	Starterless	–	Preheated, high resistance
5430	40	50	60	32 x 1200	G 13	Starterless		Preheated, low resistance
5440	40	50	60	38 x 1200	G 13	Starterless		Preheated, low resistance
8440	40	50	–	38 x 1200	Fa6	Starterless	–	Non-preheated
6750	49	20	26	16 x 1450	G 5		Starterless	Preheated
7520	50	≥ 20 k		26 x 1500	G 13	–	Starterless	Preheated
9520	50	≥ 20 k		26 x 1500	Fa6	–	Starterless	Non-preheated
6840	54	20	26	16 x 1150	G 5		Starterless	Preheated
8740	57	–	60	38 x 1800	Fa8	Starterless	–	Non-preheated
2520	58	50	–	26 x 1500	G 13	Starter	Starterless	Preheated
5960	60	–	60	38 x 1200	R17d	Starterless		Preheated, low resistance
2530	65	50	–	32 x 1500	G 13	Starter	–	Preheated
2540	65	50	–	38 x 1500	G 13	Starter	–	Preheated
4540	65	50	–	38 x 1500	G 13	Starterless	–	Preheated, high resistance
5540	65	50	–	38 x 1500	G 13	Starterless		Preheated, low resistance
8540	65	50	–	38 x 1500	Fa6	Starterless	–	Non-preheated
2620	70	50	60	26 x 1800	G 13	Starter	Starterless	Preheated
2640	75	50	–	38 x 1800	G 13	Starter	–	Preheated
4640	75	50	–	38 x 1800	G 13	Starterless	–	Preheated, high resistance
8840	75	–	60	38 x 2400	Fa8	Starterless	–	Non-preheated
2660*	80	50	–	38 x 1500	G 13	Starter	–	Preheated
4660*	80	50	–	38 x 1500	G 13	Starterless	–	Preheated, high resistance
6850	80	20	26	16 x 1450	G 5		Starterless	Preheated
2670*	85	50	–	38 x 1800	G 13	Starter	–	Preheated
4670*	85	50	–	38 x 1800	G 13	Starterless	–	Preheated, high resistance
5840	85	50	–	38 x 2400	G 13	Starterless		Preheated, low resistance
5970	87	–	60	38 x 1800	R17d	Starterless		Preheated, low resistance
2840	100	50	–	38 x 2400	G 13	Starter	–	Preheated
5980	112	–	60	38 x 2400	R17d	Starterless		Preheated, low resistance
2880*	125	50	–	38 x 2400	G 13	Starter	–	Preheated
4880	125	50	–	38 x 2400	G 13	Starterless	–	Preheated, high resistance

* Mainly intended for replacement purposes.

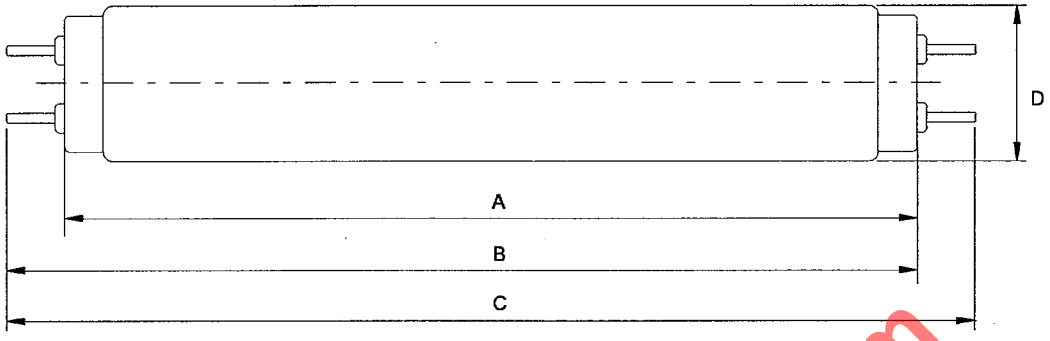
DOUBLE-CAPPED FLUORESCENT LAMPS

DIAGRAMMATIC DATA SHEET FOR LOCATION OF LAMP DIMENSIONS

Linear-shaped

These drawings are intended only to indicate dimensions to be controlled and are to be used in conjunction with the relevant lamp standard sheets

G5 cap (see sheet 7004-52 of IEC 60061-1)
G13 cap (see sheet 7004-51 of IEC 60061-1)



IEC 1514/97

For lamps with G5 and G13 caps

The values for dimensions A, B and C are derived from a basic value, designated X.

A = cap face to cap face

$A_{max.} = X$

B = cap face to end of opposite pins

$B_{max.} = X + 7{,}1$ mm

$B_{min.} = X + 4{,}7$ mm (in some countries, $B_{min.} = X + 4{,}6$ mm)

C = overall length of the lamp between pin ends

$C_{max.} = X + (2 \times 7{,}1) = X + 14{,}2$ mm

$C_{min.}$ = not specified

The dimensions given on the lamp data sheets comply with the above system.

NOTE 1 – When converting the thus calculated values to inches it is obvious that the consistency between the rounded off converted values is lost.

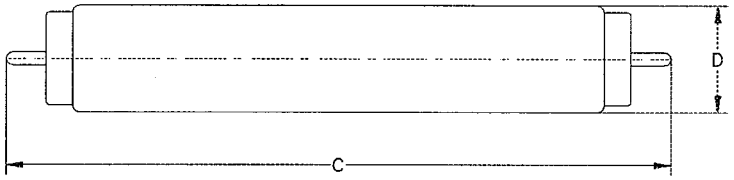
NOTE 2 – In some instances, the dimensions in national specifications differ slightly from those in the data sheets. Because these specifications are well established, it is not intended that they should be changed. The dimensions in the data sheets are quoted as a desirable objective.

NOTE 3 – Original USA types are sometimes designated by the nominal overall length in inches of the lamp assembled in two lampholders, each 5/16 inch thick for G5 caps and 3/8 inch thick for G13 caps.

DOUBLE-CAPPED FLUORESCENT LAMPS
DIAGRAMMATIC DATA SHEET FOR LOCATION OF LAMP DIMENSIONS
Linear-shaped

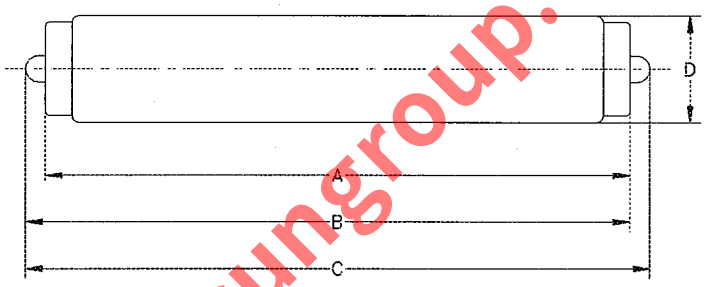
These drawings are intended only to indicate dimensions to be controlled and are to be used in conjunction with the relevant lamp standard sheets

Fa6 cap (see sheet 7004-55 of IEC 60061-1)



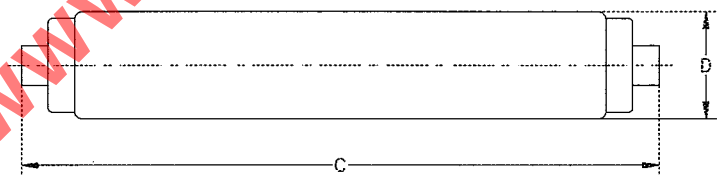
IEC 2009/99

Fa8 cap (see sheet 7004-57 of IEC 60061-1)



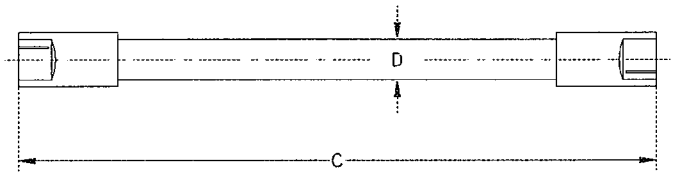
IEC 2010/99

R17d cap (see sheet 7004-56 of IEC 60061-1)



IEC 2011/99

W4.3x8.5d cap (see sheet 7004-115 of IEC 60061-1)



IEC 2012/99

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-4-E-G5-16/150

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
4	With starter	Preheated	G5	16 x 150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
135,9	140,6	143,0	150,1	16,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110/120	103,5	30
60	110/120	103,5	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	4,5	29	24	34	0,170	0,205
60	4,5	29	24	34	0,170	0,205

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-4-E-G5-16/150

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,144	0,144
		Max.	0,275	0,275
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	140	140
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-6-E-G5-16/225

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
6	With starter	Preheated	G5	16 x 225

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
212,1	216,8	219,2	226,3	16,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110/120	103,5	30
60	110/120	103,5	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	6	42	36	48	0,160	0,205
60	6	42	36	48	0,160	0,205

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-6-E-G5-16/225

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,144	0,144
		Max.	0,275	0,275
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series	Ω		140	140
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-8-E-G5-16/300

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
8	With starter	Preheated	G5	16 × 300

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
288,3	293,0	295,4	302,5	16,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110/120	103,5	30
60	110/120	103,5	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	7,1	56	48	64	0,145	0,205
60	7,2	57	48	64	0,145	0,205

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-8-E-G5-16/300

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,144	0,144
		Max.	0,275	0,275
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series	Ω		140	140
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-13-E-G5-16/525

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
13	With starter	Preheated	G5	16 × 525

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
516,9	521,6	524,0	531,1	16,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	220	198	30

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	13	95	85	105	0,165	0,225
60	13	94	*	*	0,165	0,225

Chromaticity co-ordinates: see D.2, annex D.

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-13-E-G5-16/525

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	13	220	0,165	1070	0,12
60	13	236	0,165	1200	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,146	0,146
		Max.	0,297	0,297
Open circuit voltage across starter	V	Min. (r.m.s.)	198	198
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series	Ω		140	140
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	128

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-15-E-G13-26/450

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
15	With starter	Preheated	G13	26 x 450

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
437,4	442,1	444,5	451,6	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110/120	103,5	30
60	110/120	103,5	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	15	55	46	64	0,310	0,440
60	15	55	46	64	0,305	0,550

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-15-E-G13-26/450

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	15	127	0,310	325	0,12
60	15	118	0,300	305	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,280	0,280
		Max.	0,650	0,650
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	50	50
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 3

ILCOS: FD-15-E-G13-26/450

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	13,5	45	0,310		
Current in any lead to cathodes	A		Max.	*	
Lamp operating current	A		Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,130	
			i_m (A)	0,260	
Maximum preheat current	A	$t \leq 0,4$		1,400	
		$0,4 < t < 2,0$		$1,580 - 0,450\ t$	
		$t \geq 2,0$		0,680	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	*	
		$t > t_e$	Min. (r.m.s.)	*	
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*	
		$t > t_e$	Min. (peak)	*	
Substitution resistor for each cathode			Ω	12,5*	
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp	V		Min. (r.m.s.)	*	
Current through lamp substitution resistor	A		Min.	*	
Lamp substitution resistor			Ω	*	
Substitution resistor for each cathode			Ω	*	
Cathode current	A		Max.	*	

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-15-E-G13-26/550

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
15	With starter	Preheated	G13	26 × 550

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
549,0	553,7	556,1	563,2	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110	103,5	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	15	57	50	64	0,300	0,450
60	–	–	–	–	–	–

Chromaticity coordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-15-E-G13-26/550

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	15	127	0,300	327	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,270	–
		Max.	0,630	–
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	50	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 3

ILCOS: FD-15-E-G13-26/550

Information for high-frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	13	52	0,245		
Current in any lead to cathodes		A	Max.	0,650	
Lamp operating current		A	Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,240	
			i_m (A)	0,315	
Maximum preheat current		A	$t \leq 0,4$	1,800	
			$0,4 < t < 2,0$	2,100 - 0,300 t	
			$t \geq 2,0$	0,900	
Open circuit voltage across lamp		V	$t \leq t_e$	Max. (r.m.s.)	270
			$t > t_e$	Min. (r.m.s.)	280
Voltage to starting aid		V	$t \leq t_e$	Max. (peak)	*
			$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode				Ω	12,5*

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	*
Current through lamp substitution resistor	A	Min.	*
Lamp substitution resistor	Ω		*
Substitution resistor for each cathode	Ω		*
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-18-E-G13-26/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
18	With starter	Preheated	G13	26 x 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110	103,5	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	18	57	50	64	0,370	0,550
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-18-E-G13-26/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,333	–
		Max.	0,800	–
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	50	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 3

ILCOS: FD-18-E-G13-26/600

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	16	55	0,290		
Current in any lead to cathodes		A	Max.	0,650	
Lamp operating current		A	Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,240	
			i_m (A)	0,315	
Maximum preheat current		A	$t \leq 0,4$	1,800	
			$0,4 < t < 2,0$	$2,000 - 0,560\ t$	
			$t \geq 2,0$	0,900	
Open circuit voltage across lamp		V	$t \leq t_e$	Max. (r.m.s.)	270
			$t > t_e$	Min. (r.m.s.)	280
Voltage to starting aid		V	$t \leq t_e$	Max. (peak)	*
			$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode				Ω	12,5*
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp		V	Min. (r.m.s.)	*	
Current through lamp substitution resistor		A	Min.	*	
Lamp substitution resistance				Ω	*
Substitution resistor for each cathode				Ω	*
Cathode current		A	Max.	*	

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-20-E-G13-32/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	With starter	Preheated	G13	32 × 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	34,1

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110	95	30
60	110	95	30

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	19	58	52	64	0,360	0,550
60	19	58	52	64	0,360	0,550

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-20-E-G13-32/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	20	118	0,380	240	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,333	0,333
		Max.	0,800	0,800
Open circuit voltage across starter	V	Min. (r.m.s.)	95	95
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series	Ω		50	50
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	70

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-20-E-G13-38/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	With starter	Preheated	G13	38 x 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	110	103,5	30
60	110	103,5	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	19,3	57	50	64	0,370	0,550
60	20,5	57	50	64	0,380	0,550

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-20-E-G13-38/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	20	118	0,380	240	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,333	0,333
		Max.	0,800	0,800
Open circuit voltage across starter	V	Min. (r.m.s.)	103,5	103,5
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	50	50
Voltage across starter with lamp operating	V	Max. (r.m.s.)	68	68

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
250	70

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ILCOS: FD-25-E-G13-38/970

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
25	With starter	Preheated	G13	38 × 970

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
970,0	974,7	977,1	984,2	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	24,5	94	84	104	0,290	0,450
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-25-E-G13-38/970

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	25	220	0,290	605	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,261	–
		Max.	0,609	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	50	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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ILCOS: FD-30-E-G13-26/900

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
30	With starter	Preheated	G13	26 × 900

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
894,6	899,3	901,7	908,8	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	220	198	30

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	30	96	86	106	0,365	0,550
60	30,5	99	89	109	0,355	0,530

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-30-E-G13-26/900

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	30	220	0,360	480	0,10
60	30	236	0,355	548	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,328	0,328
		Max.	0,766	0,766
Open circuit voltage across starter	V	Min. (r.m.s.)	198	198
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	50	50
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	128

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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ILCOS: FD-30-E-G13-26/900

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	24	95	0,260		
Current in any lead to cathodes			A	Max.	0,630
Lamp operating current			A	Min.	*
				Max.	*
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$				a	0,240
				i_m (A)	0,310
Maximum preheat current			A	$t \leq 0,4$	1,600
				$0,4 < t < 2,0$	1,810 - 0,525 t
				$t \geq 2,0$	0,760
Open circuit voltage across lamp			V	$t \leq t_e$	Max. (r.m.s.) *
				$t > t_e$	Min. (r.m.s.) *
Voltage to starting aid			V	$t \leq t_e$	Max. (peak) *
				$t > t_e$	Min. (peak) *
Substitution resistor for each cathode					Ω 12,5
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp			V	Min. (r.m.s.)	*
Current through lamp substitution resistor			A	Min.	*
Lamp substitution resistance					Ω *
Substitution resistor for each cathode					Ω *
Cathode current			A	Max.	*

* Under consideration.

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ILCOS: FD-30-E-G13-38/900

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
30	With starter	Preheated	G13	38 × 900

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
894,6	899,3	901,7	908,8	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	29,5	81	71	91	0,405	0,620
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-30-E-G13-38/900

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	30	220	0,405	460	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,365	–
		Max.	0,850	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	40	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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DATA SHEET

ILCOS: FD-33-E-G13-26/1150

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
33	With starter	Preheated	G13	26 × 1150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1149,0	1153,7	1156,1	1163,2	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	33	103	93	113	0,380	0,570
60	–	–	–	–	–	–

Chromaticity coordinates: see D.2, annex D.

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ILCOS: FD-33-E-G13-26/1150

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	33	230	0,380	474	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,342	–
		Max.	0,798	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	40	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	140

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ILCOS: FD-33-E-G13-26/1150

Information for high-frequency ballast design			
Typical lamp characteristics			
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A
≥ 20	30	103	0,304

Current in any lead to cathodes	A	Max.	0,750
Lamp operating current	A	Min.	*
		Max.	*

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,340
			i_m (A)	0,300
Maximum preheat current	A	$t \leq 0,4$		1,900
		$0,4 < t < 2,0$		2,150 - 0,630 t
		$t \geq 2,0$		0,900
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	290*
		$t > t_e$	Min. (r.m.s.)	330*
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	410*
		$t > t_e$	Min. (peak)	465*
Substitution resistor for each cathode			Ω	10*

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,200
Lamp substitution resistor		Ω	1000
Substitution resistor for each cathode		Ω	2
Cathode current	A	Max.	2,200

* Under consideration.

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ILCOS: FD-36-E-G13-26/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
36	With starter	Preheated	G13	26 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	36	103	93	113	0,430	0,650
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-36-E-G13-26/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,387	–
		Max.	0,904	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	40	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	140

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ILCOS: FD-36-E-G13-26/1200

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	32	102	0,320		
Current in any lead to cathodes		A	Max.	0,750	
Lamp operating current		A	Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,340	
			i_m (A)	0,300	
Maximum preheat current		A	$t \leq 0,4$	1,900	
			$0,4 < t < 2,0$	2,150 - 0,630 t	
			$t \geq 2,0$	0,900	
Open circuit voltage across lamp		V	$t \leq t_e$	Max. (r.m.s.)	290*
			$t > t_e$	Min. (r.m.s.)	330*
Voltage to starting aid		V	$t \leq t_e$	Max. (peak)	410*
			$t > t_e$	Min. (peak)	465*
Substitution resistor for each cathode				Ω	10*
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp		V	Min. (r.m.s.)	800	
Current through lamp substitution resistor		A	Min.	0,200	
Lamp substitution resistor				Ω	1000
Substitution resistor for each cathode				Ω	2
Cathode current		A	Max.	2,200	

* Under consideration.

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ILCOS: FD-38-E-G13-26/1050

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
38	With starter	Preheated	G13	26 x 1050

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1047,0	1051,7	1054,1	1061,2	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	38,5	104	94	114	0,430	0,650
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

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ILCOS: FD-38-E-G13-26/1050

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,387	–
		Max.	0,904	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	40	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	140

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ILCOS: FD-38-E-G13-26/1050

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	32	105	0,310		
Current in any lead to cathodes		A	Max.	0,750	
Lamp operating current		A	Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,340	
			i_m (A)	0,350	
Maximum preheat current		A	$t \leq 0,4$	1,900	
			$0,4 < t < 2,0$	$2,150 - 0,630\ t$	
			$t \geq 2,0$	0,900	
Open circuit voltage across lamp		V	$t \leq t_e$	Max. (r.m.s.)	240*
			$t > t_e$	Min. (r.m.s.)	230*
Voltage to starting aid		V	$t \leq t_e$	Max. (peak)	340*
			$t > t_e$	Min. (peak)	325*
Substitution resistor for each cathode				Ω	10*
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp		V	Min. (r.m.s.)	800	
Current through lamp substitution resistor		A	Min.	0,200	
Lamp substitution resistor				Ω	1000
Substitution resistor for each cathode				Ω	2
Cathode current		A	Max.	2,200	

* Under consideration.

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ILCOS: FD-40-E-G13-32/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	With starter	Preheated	G13	32 x 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	34,1

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	180	30
60	220	180	30

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	39	106	99	113	0,420	0,650
60	39,5	105	98	112	0,425	0,650

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-40-E-G13-32/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	40	236	0,430	439	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,387	0,387
		Max.	0,904	0,904
Open circuit voltage across starter	V	Min. (r.m.s.)	180	180
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	40	40
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	128

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
900	130

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ILCOS: FD-40-E-G13-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	With starter	Preheated	G13	38 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	220	198	30

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	39,5	103	93	113	0,430	0,650
60	40	102	92	112	0,435	0,650

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-40-E-G13-38/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	40	236	0,430	439	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,387	0,387
		Max.	0,904	0,904
Open circuit voltage across starter	V	Min. (r.m.s.)	198	198
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series	Ω		40	40
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	128

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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ILCOS: FD-58-E-G13-26/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
58	With starter	Preheated	G13	26 × 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	58	110	100	120	0,670	1,000
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

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ILCOS: FD-58-E-G13-26/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,603	–
		Max.	1,410	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	132	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
900	140

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 3

ILCOS: FD-58-E-G13-26/1500

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	50	111	0,455		
Current in any lead to cathodes		A	Max.	1,100	
Lamp operating current		A	Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,390	
			i_m (A)	0,350	
Maximum preheat current		A	$t \leq 0,4$	2,900	
			$0,4 < t < 2,0$	3,300 - 0,970 t	
			$t \geq 2,0$	1,350	
Open circuit voltage across lamp		V	$t \leq t_e$	Max. (r.m.s.)	295*
			$t > t_e$	Min. (r.m.s.)	335*
Voltage to starting aid		V	$t \leq t_e$	Max. (peak)	420*
			$t > t_e$	Min. (peak)	475*
Substitution resistor for each cathode				Ω	8*
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp		V	Min. (r.m.s.)	800	
Current through lamp substitution resistor		A	Min.	0,250	
Lamp substitution resistor				Ω	800
Substitution resistor for each cathode				Ω	2
Cathode current		A	Max.	3,000	

* Under consideration.

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ILCOS: FD-65-E-G13-32/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
65	With starter	Preheated	G13	32 x 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	34,1

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	62	110	100	120	0,670	1,000
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-65-E-G13-32/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,603	–
		Max.	1,410	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	132	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
900	140

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ILCOS: FD-65-E-G13-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
65	With starter	Preheated	G13	38 ×1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	220	198	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	64	110	100	120	0,670	1,000
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-65-E-G13-38/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,603	–
		Max.	1,410	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	132	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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ILCOS: FD-70-E-G13-26/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
70	With starter	Preheated	G13	26 × 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1763,8	1768,5	1770,9	1778,0	28,0

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	216	30
60	240	216	30

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	69,5	128	118	138	0,700	1,000
60	69,5	128	118	138	0,700	1,000

Chromaticity co-ordinates: see D.3, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-70-E-G13-26/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	70	240	0,700	240	0,10
60	70	240	0,700	240	0,10

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,590	0,590
		Max.	1,470	1,470
Open circuit voltage across starter	V	Min. (r.m.s.)	216	216
Open circuit voltage across lamp	V	Max. (peak)	400	400
Substitution resistor for both cathodes in series		Ω	25	25
Voltage across starter with lamp operating	V	Max. (r.m.s.)	160	160

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
900	170

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ILCOS: FD-70-E-G13-26/1800

Information for high frequency ballast design					
Typical lamp characteristics					
Frequency kHz	Lamp wattage W	Lamp voltage V	Lamp current A		
≥ 20	60	129	0,470		
Current in any lead to cathodes	A		Max.	1,160	
Lamp operating current	A		Min.	*	
			Max.	*	
Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,800	
			i_m (A)	0,400	
Maximum preheat current	A	$t \leq 0,4$		3,100	
		$0,4 < t < 2,0$		$3,500 - 1,030\ t$	
		$t \geq 2,0$		1,450	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	410*	
		$t > t_e$	Min. (r.m.s.)	465*	
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	580*	
		$t > t_e$	Min. (peak)	660*	
Substitution resistor for each cathode			Ω	8*	
Voltage controlled preheating					
*					
Without preheating					
Open circuit voltage across lamp	V		Min. (r.m.s.)	*	
Current through lamp substitution resistor	A		Min.	*	
Lamp substitution resistor			Ω	*	
Substitution resistor for each cathode			Ω	*	
Cathode current	A		Max.	*	

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-75-E-G13-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
75	With starter	Preheated	G13	38 × 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1763,8	1768,5	1770,9	1778,0	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	216	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	75	130	120	140	0,670	1,000
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-75-E-G13-38/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	75	235	0,670	240	0,10
60	–	–	–	–	–

NOTE – A 65 W reference ballast is used, operated at 235 V.

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,570	–
		Max.	1,410	–
Open circuit voltage across starter	V	Min. (r.m.s.)	216	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series	Ω		25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	160	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	170

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Mainly intended for replacement purposes. **ILCOS:** FD-80-E-G13-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
80	With starter	Preheated	G13	38 × 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	198	30
60	–	–	–

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	76	99	89	109	0,870	1,300
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-80-E-G13-38/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	80	240	0,865	223	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,790	–
		Max.	1,830	–
Open circuit voltage across starter	V	Min. (r.m.s.)	198	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	128	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
400	140

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Mainly intended for replacement purposes. **ILCOS:** FD-85-E-G13-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
85	With starter	Preheated	G13	38 x 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1763,8	1768,5	1770,9	1778,0	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	216	30
60	–	–	–

NOTE – An 80 W/240 V inductive ballast is used.

Electrical characteristics						
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current	Rated preheat current
Hz	W	Rated	Minimum	Maximum	A	A
50	84	120	110	130	0,800	1,300
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-85-E-G13-38/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	80	240	0,865	223	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode current	A	Min.	0,680	–
		Max.	1,700	–
Open circuit voltage across starter	V	Min. (r.m.s.)	216	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series	Ω		25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	160	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	170

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ILCOS: FD-100-E-G13-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
100	With starter	Preheated	G13	38 x 2400

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
2374,3	2379,0	2381,4	2388,5	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	220	30
60	–	–	–

NOTE – An 80 W/240 V inductive ballast is used, together with a 6,8 µF capacitor in series.

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	102	125	110	140	0,960	1,300
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

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ILCOS: FD-100-E-G13-38/2400

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	100	350	0,940	308	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,810	–
		Max.	2,000	–
Open circuit voltage across starter	V	Min. (r.m.s.)	216	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	160	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
900	170

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Mainly intended for replacement purposes. **ILCOS:** FD-125-E-G13-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
125	With starter	Preheated	G13	38 x 2400

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
2374,3	2379,0	2381,4	2388,5	40,5

Starting characteristics			
Frequency Hz	Ballast rated voltage V	Test voltage (r.m.s.) V	Starting time s
50	240	220	30
60	–	–	–

NOTE – An 80 W/240 V inductive ballast is used, together with a 6,8 µF capacitor in series.

Electrical characteristics						
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A	Rated preheat current A
		Rated	Minimum	Maximum		
50	123	149	134	164	0,940	1,300
60	–	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

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ILCOS: FD-125-E-G13-38/2400

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	125	350	0,940	300	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode current	A	Min.	0,800	–
		Max.	1,970	–
Open circuit voltage across starter	V	Min. (r.m.s.)	216	–
Open circuit voltage across lamp	V	Max. (peak)	400	–
Substitution resistor for both cathodes in series		Ω	25	–
Voltage across starter with lamp operating	V	Max. (r.m.s.)	160	–

Information for starter design	
Pulse voltage V	Non-reclosure voltage V
Minimum	Maximum
800	180

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ILCOS: FD-4-L/P/H-G5-16/150

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
4	Starterless	Preheated, high resistance	G5	16 × 150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
135,9	140,6	143,0	150,1	16,0

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	4/6/8	220	6	8,0	200	10
60	4/6/8	220	6	8,0	200	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	4,5	29	24	34	0,170
60	4,5	29	24	34	0,170

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	70	50

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ILCOS: FD-4-L/P/H-G5-16/150

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	6,5
		Max. (r.m.s.)	9,2	9,2
Open circuit voltage across lamp	V	Min. (r.m.s.)	105	105
		Max. (r.m.s.)	145	145
Open circuit voltage across two lamps in series	V	Min. (r.m.s.)	120	120
		Max. (r.m.s.)	165	165
Starting capacitor	µF	Min.	*	0,008
		Max.	*	0,060
Substitution resistor for each cathode		Ω	70	70
Voltage to starting aid	V	Min. (peak)	400	400
Current in any lead to cathodes	A	Max.	*	*

* Under consideration.

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ILCOS: FD-6-L/P/H-G5-16/225

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
6	Starterless	Preheated, high resistance	G5	16 x 225

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
212,1	216,8	219,2	226,3	16,0

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	4/6/8	220	6	8,0	200	10
60	4/6/8	220	6	8,0	200	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	6	42	36	48	0,160
60	6	42	36	48	0,160

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	70	50

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-6-L/P/H-G5-16/225

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	6,5
		Max. (r.m.s.)	9,2	9,2
Open circuit voltage across lamp	V	Min. (r.m.s.)	105	105
		Max. (r.m.s.)	145	145
Open circuit voltage across two lamps in series	V	Min. (r.m.s.)	130	130
		Max. (r.m.s.)	180	180
Starting capacitor	µF	Min.	*	0,008
		Max.	*	0,060
Substitution resistor for each cathode		Ω	70	70
Voltage to starting aid	V	Min. (peak)	400	400
Current in any lead to cathodes	A	Max.	*	*

* Under consideration.

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ILCOS: FD-8-L/P/H-G5-16/300

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
8	Starterless	Preheated, high resistance	G5	16 × 300

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
288,3	293,0	295,4	302,5	16,0

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	4/6/8	220	6	8,0	200	10
60	4/6/8	220	6	8,0	200	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	7,1	56	48	64	0,145
60	7,2	57	48	64	0,145

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	70	50

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ILCOS: FD-8-L/P/H-G5-16/300

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	6	127	0,160	700	0,12
60	6	118	0,160	650	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	6,5
		Max. (r.m.s.)	9,2	9,2
Open circuit voltage across lamp	V	Min. (r.m.s.)	105	105
		Max. (r.m.s.)	145	145
Open circuit voltage across two lamps in series	V	Min. (r.m.s.)	140	140
		Max. (r.m.s.)	190	190
Starting capacitor	µF	Min.	*	0,008
		Max.	*	0,060
Substitution resistor for each cathode		Ω	70	70
Voltage to starting aid	V	Min. (peak)	400	400
Current in any lead to cathodes	A	Max.	*	*

* Under consideration.

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ILCOS: FD-20-L/P/H-G13-38/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	Starterless	Preheated, high resistance	G13	38 × 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	13	8,0	180	10
60	40	220	13	8,0	180	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	19,3	57	50	64	0,370
60	20,5	57	50	64	0,380

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	20	14

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ILCOS: FD-20-L/P/H-G13-38/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	20	118	0,380	240	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	6,5
		Max. (r.m.s.)	10,0	10,0
Open circuit voltage across lamp	V	Min. (r.m.s.)	180	180
		Max. (peak)	345	345
Substitution resistor for each cathode		Ω	19	19
Voltage to starting		Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,650	0,650

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-30-L/P/H-G13-38/900

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
30	Starterless	Preheated, high resistance	G13	38 × 900

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
894,6	899,3	901,7	908,8	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	30	220	13	8,0	205	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	29,5	81	71	91	0,405
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	20	14

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ILCOS: FD-30-L/P/H-G13-38/900

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	30	220	0,405	460	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	10,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	–
		Max. (peak)	420	–
Substitution resistor for each cathode		Ω	19	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	0,750	–

* Under consideration.

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ILCOS: FD-40-L/P/H-G13-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	Starterless	Preheated, high resistance	G13	38 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	13	8,0	205	10
60	40	220	13	8,0	205	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	39,5	103	93	113	0,430
60	40	102	92	112	0,435

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	20	14

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-40-L/P/H-G13-38/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	40	236	0,430	439	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	6,5
		Max. (r.m.s.)	10,0	10,0
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	205
		Max. (peak)	420	420
Substitution resistor for each cathode		Ω	19	19
Voltage to starting	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,750	0,750

* Under consideration.

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ILCOS: FD-65-L/P/H-G13-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
65	Starterless	Preheated, high resistance	G13	38 x 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	65	220	13	8,0	220	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	64	110	100	120	0,670
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	11	*

* Under consideration.

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ILCOS: FD-65-L/P/H-G13-38/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	11,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	220	–
		Max. (peak)	475	–
Substitution resistor for each cathode		Ω	11	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,100	–

* Under consideration.

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ILCOS: FD-75-L/P/H-G13-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
75	Starterless	Preheated, high resistance	G13	38 x 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1763,8	1768,5	1770,9	1778,0	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	75	240	13	8,0	250	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	75	130	120	140	0,670
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	12	9

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ILCOS: FD-75-L/P/H-G13-38/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	75	235	0,670	240	0,10
60	–	–	–	–	–

NOTE – A 65 W reference ballast is used, operated at 235 V.

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	11,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	220	–
		Max. (peak)	500	–
Substitution resistor for each cathode	Ω		11	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,100	–

* Under consideration.

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Mainly intended for replacement purposes. **ILCOS:** FD-80-L/P/H-G13-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
80	Starterless	Preheated, high resistance	G13	38 × 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	40,5

Starting characteristics						
Frequency Hz	Ballast, nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	80	240	13	8,0	220	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	76	99	89	109	0,870
60	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	12	9

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ILCOS: FD-80-L/P/H-G13-38/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	80	240	0,865	223	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	11,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	220	–
		Max. (peak)	475	–
Substitution resistor for each cathode		Ω	11	–
Voltage to starting	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,600	–

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

Mainly intended for replacement purposes. **ILCOS:** FD-85-L/P/H-G13-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
85	Starterless	Preheated, high resistance	G13	38 × 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1763,8	1768,5	1770,9	1778,0	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	85	240	13	8,0	250	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	84	120	110	130	0,800
60	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	12	9

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ILCOS: FD-85-L/P/H-G13-38/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	80	240	0,865	223	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	11,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	250	–
		Max. (peak)	500	–
Substitution resistor for each cathode		Ω	11	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,300	–

* Under consideration.

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ILCOS: FD-125-L/P/H-G13-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
125	Starterless	Preheated, high resistance	G13	38 x 2400

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
2374,3	2379,0	2381,4	2388,5	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	125	240	13	8,0	315	10
60	–	–	–	–	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	123	149	134	164	0,940
60	–	–	–	–	–

Chromaticity co-ordinates: see D.3, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
High resistance	8,0	12	9

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ILCOS: FD-125-L/P/H-G13-38/2400

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	125	350	0,940	300	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	6,5	–
		Max. (r.m.s.)	11,0	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	315	–
		Max. (peak)	*	–
Substitution resistor for each cathode		Ω	11	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,600	–

* Under consideration.

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ILCOS: FD-20-L/P/L-G13-32/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	Starterless	Preheated, low resistance	G13	32 × 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	34,1

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	16	3,05	180	10
60	40	220	16	3,05	180	10

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	19	58	52	64	0,360
B.1	60	19	58	52	64	0,360
B.2	60	*	*	*	*	*

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	10	7

* Under consideration.

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ILCOS: FD-20-L/P/L-G13-32/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	20	118	0,380	240	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	3,05
		Max. (r.m.s.)	5,5	5,5
Open circuit voltage across lamp	V	Min. (r.m.s.)	180	180
		Max. (peak)	345	345
Substitution resistor for each cathode	Ω		9	9
Voltage to starting aid	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,650	0,650

* Under consideration.

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ILCOS: FD-20-L/P/L-G13-38/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	Starterless	Preheated, low resistance	G13	38 × 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	13	3,05	180	10
60	40	220	13	3,05	180	10

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	19,3	57	50	64	0,370
B.1	60	20,0	56	49	63	0,380
B.2	60	*	*	*	*	*

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	10	7

* Under consideration.

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ILCOS: FD-20-L/P/L-G13-38/600

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	20	118	0,380	240	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	3,05
		Max. (r.m.s.)	5,5	5,5
Open circuit voltage across lamp	V	Min. (r.m.s.)	180	180
		Max. (peak)	345	345
Substitution resistor for each cathode		Ω	9	9
Voltage to starting aid	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,650	0,650

* Under consideration.

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ILCOS: FD-30-L/P/L-G13-38/900

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
30	Starterless	Preheated, low resistance	G13	38 x 900

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
894,6	899,3	901,7	908,8	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	30	220	13	3,05	205	10
60	30	220	13	3,05	205	10

Electrical characteristics						
Test method Annex	Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
			Rated	Minimum	Maximum	
B.1	50	29,5	81	71	91	0,405
B.1	60	31,5	78	70	86	0,435
B.2	60	32,5 #	77	69	85	0,430

Includes approximately 2 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	10	7

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-30-L/P/L-G13-38/900

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	30	220	0,405	460	0,10
60	*	*	*	*	*

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	3,05
		Max. (r.m.s.)	5,5	5,5
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	205
		Max. (peak)	420	420
Substitution resistor for each cathode		Ω	9	9
Voltage to starting aid	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,750	0,750

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-40-L/P/L-G13-32/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	Starterless	Preheated, low resistance	G13	32 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	34,1

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	16	3,05	205	10
60	40	220	16	3,05	205	10

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	39,0	106	96	116	0,420
B.1	60	39,5	105	98	112	0,425
B.2	60	40,5 #	104	97	111	0,420

Includes approximately 2 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	10	7

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-40-L/P/L-G13-32/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	40	236	0,430	439	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	3,05
		Max. (r.m.s.)	5,5	5,5
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	205
		Max. (peak)	420	420
Substitution resistor for each cathode		Ω	9	9
Voltage to starting aid	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,750	0,750

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-40-L/P/L-G13-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	Starterless	Preheated, low resistance	G13	38 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	40	220	13	3,05	205	10
60	40	220	13	3,05	205	10

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	39,5	103	93	113	0,430
B.1	60	40,0	102	92	112	0,435
B.2	60	41,0 #	101	91	111	0,430

Includes approximately 2 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	10	7

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-40-L/P/L-G13-38/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	40	236	0,430	439	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	3,05
		Max. (r.m.s.)	5,5	5,5
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	205
		Max. (peak)	420	420
Substitution resistor for each cathode		Ω	9*	9*
Voltage to starting aid	V	Min. (peak)	*	*
Current in any lead to cathodes	A	Max.	0,750	0,750

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-65-L/P/L-G13-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
65	Starterless	Preheated, low resistance	G13	38 × 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	65	220	13	3,05	220	10
60	–	–	–	–	–	–

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	64	110	100	120	0,670
B.1	60	–	–	–	–	–
B.2	60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	6	4

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ILCOS: FD-65-L/P/L-G13-38/1500

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	–
		Max. (r.m.s.)	5,5	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	220	–
		Max. (peak)	475	–
Substitution resistor for each cathode		Ω	6	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	1,100	–

* Under consideration.

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ILCOS: FD-85-L/P/L-G13-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
85 W	Starterless	Preheated, low resistance	G13	38 x 2400

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
2374,3	2379,0	2381,4	2388,5	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	85	240	13	3,05	325	10
60	–	–	–	–	–	–

Electrical characteristics						
Test method	Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Annex	Hz	W	Rated	Minimum	Maximum	A
B.1	50	85	178	163	193	0,550
B.1	60	–	–	–	–	–
B.2	60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	6	4

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-85-L/P/L-G13-38/2400

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	85	350	0,550	480	0,06
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	3,05	–
		Max. (r.m.s.)	5,5	–
Open circuit voltage across lamp	V	Min. (r.m.s.)	*	–
		Max. (peak)	*	–
Substitution resistor for each cathode		Ω	6	–
Voltage to starting aid	V	Min. (peak)	*	–
Current in any lead to cathodes	A	Max.	*	–

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-60-L/P/L-R17d-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
60	Starterless	Preheated, low resistance	R17d	38 x 1200

Dimensions mm		
C		D
Min.	Max.	Max.
1161,2	1166,0	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–	–	–	–	–
60	60	*	13	3,05	205	10

Electrical characteristics						
Test method Annex	Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
			Rated	Minimum	Maximum	
B.1	50	–	–	–	–	–
B.1	60	*	*	*	*	*
B.2	60	63 #	78	70	86	0,800

Includes approximately 7 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: *

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	3,2	2,8

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-60-L/P/L-R17d-38/1200

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	60	230	0,800	244	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	–	*
		Max. (r.m.s.)	–	*
Open circuit voltage across lamp	V	Min. (r.m.s.)	–	*
		Max. (peak)	–	*
Substitution resistor for each cathode		Ω	–	*
Voltage to starting aid	V	Min. (peak)	–	*
Current in any lead to cathodes	A	Max.	–	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-87-L/P/L-R17d-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
87	Starterless	Preheated, low resistance	R17d	38 x 1800

Dimensions mm		
C		D
Min.	Max.	Max.
1770,8	1775,6	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–	–	–	–	–
60	87	*	13	3,05	275	10

Electrical characteristics						
Test method Annex	Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
			Rated	Minimum	Maximum	
B.1	50	–	–	–	–	–
B.1	60	*	*	*	*	*
B.2	60	87 #	117	105	129	0,780

Includes approximately 7 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: *

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	3,2	2,8

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-87-L/P/L-R17d-38/1800

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	87	300	0,800	315	0,075

Information for ballast design				
Frequency	Hz		50	60
Preheat cathode voltage	V	Min. (r.m.s.)	–	*
		Max. (r.m.s.)	–	*
Open circuit voltage across lamp	V	Min. (r.m.s.)	–	*
		Max. (peak)	–	*
Substitution resistor for each cathode	Ω		–	*
Voltage to starting aid	V	Min. (peak)	–	*
Current in any lead to cathode	A	Max.	–	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FD-112-L/P/L-R17d-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
112	Starterless	Preheated, low resistance	R17d	38 x 2400

Dimensions mm		
C		D
Min.	Max.	Max.
2380,4	2385,2	40,5

Starting characteristics						
Frequency Hz	Ballast nominal wattage W	Ballast rated voltage V	Starting aid distance mm	Cathode voltage (r.m.s.) V	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–	–	–	–	–
60	112	*	13	3,05	315	10

Electrical characteristics						
Test method Annex	Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
			Rated	Minimum	Maximum	
B.1	50	–	–	–	–	–
B.1	60	*	*	*	*	*
B.2	60	113 #	153	138	168	0,790

Includes approximately 7 W for supplementary cathode heating with 3,6 V across each cathode.
Chromaticity co-ordinates: *

Cathode characteristics			
Cathode	Test voltage (r.m.s.) V	Resistance of each cathode Ω	
		Rated	Minimum
Low resistance	3,6	3,2	2,8

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FD-112-L/P/L-R17d-38/2400

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	112	400	0,800	415	0,075

Information for ballast design				
Frequency		Hz	50	60
Preheat cathode voltage	V	Min. (r.m.s.)	–	3,05
		Max. (r.m.s.)	–	5,0
Open circuit voltage across lamp	V	Min. (r.m.s.)	–	315
		Max. (peak)	–	*
Substitution resistor for each cathode		Ω	–	3,2
Voltage to starting aid	V	Min. (peak)	–	*
Current in any lead to cathodes	A	Max.	–	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FDH-6-L/P-W4.3x8.5d-7/220

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
6	HF starterless	Preheated	W4.3x8.5d	7 x 220

Dimensions mm		
C		D
Min.	Max.	Max.
217,3	219,3	7,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
25	12	0,120*	1,5	355	0,1

Electrical characteristics**					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
25	5,0	51	46	56	0,100

Chromaticity coordinates: see D.2, annex D.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Min.	Max.
0,060*	50*	40*	60*

* Under consideration.

** Rated values of lamp characteristics at 25 kHz are to be multiplied by factor x_1 for wattage and voltage and x_2 for luminous flux in order to receive the respective values at (47,5 ± 2,5) kHz. The factors are based on unmodulated sine-wave voltage supply. Present value: x_1 = 1,04; values for x_2 are to be specified in the manufacturer's literature.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-6-L/P-W4.3×8.5d-7/220

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
25	6,0	220	0,100	1690

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes**	A	Max.	0,150*
Lamp operating current	A	Min.	0,090*
		Max.	0,110*

Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$				a	0,01*
				i_m (A)	0,085*
Maximum preheat current	A	$t \leq 0,4$		0,200*	
		$0,4 < t < 2,0$		0,220 - 0,050 t*	
		$t \geq 2,0$		0,120*	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	200*	
		$t > t_e$	Min. (r.m.s.)	355*	
Substitution resistor for each cathode				Ω	85*

Voltage controlled preheating
*

* Under consideration.

** In case a ballast is constructed so that an additional current flows through the cathode, this current is limited to 0,060 A.

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FDH-8-L/P-W4.3x8.5d-7/320

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
8	HF starterless	Preheated	W4.3x8.5d	7 × 320

Dimensions mm		
C		D
Min.	Max.	Max.
318,9	320,9	7,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
25	12	0,120*	1,5	370	0,1

Electrical characteristics**					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
25	7,8	79	71	87	0,100

Chromaticity coordinates: see D.2, annex D.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Min.	Max.
0,060*	50*	40*	60*

* Under consideration.

** Rated values of lamp characteristics at 25 kHz are to be multiplied by factor x_1 for wattage and voltage and x_2 for luminous flux in order to receive the respective values at (47,5 ± 2,5) kHz. The factors are based on unmodulated sine-wave voltage supply. Present value: x_1 = 1,04; values for x_2 are to be specified in the manufacturer's literature.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-8-L/P-W4.3x8.5d-7/320

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
25	8,0	220	0,100	1410

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes**	A	Max.	0,150*
Lamp operating current	A	Min.	0,090*
		Max.	0,110*

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,01*
			i_m (A)	0,085*
Maximum preheat current	A	$t \leq 0,4$	0,200*	
		$0,4 < t < 2,0$	0,220 - 0,050 t*	
		$t \geq 2,0$	0,120*	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	220*
		$t > t_e$	Min. (r.m.s.)	370*
Substitution resistor for each cathode			Ω	85*

Voltage controlled preheating
*

* Under consideration.

** In case a ballast is constructed so that an additional current flows through the cathode, this current is limited to 0,060 A.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-11-L/P-W4.3x8.5d-7/420

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
11	HF starterless	Preheated	W4.3x8.5d	7 × 420

Dimensions mm		
C		D
Min.	Max.	Max.
420,5	422,5	7,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
25	12	0,120*	1,5	390	0,1

Electrical characteristics**					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
25	10,8	110	100	120	0,100

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Min.	Max.
0,060*	50*	40*	60*

Chromaticity coordinates: see D.2, annex D.

* Under consideration.

** Rated values of lamp characteristics at 25 kHz are to be multiplied by factor x_1 for wattage and voltage and x_2 for luminous flux in order to receive the respective values at (47,5 ± 2,5) kHz. The factors are based on unmodulated sine-wave voltage supply. Present value: x_1 = 1,04; values for x_2 are to be specified in the manufacturer's literature.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-11-L/P-W4.3x8.5d-7/420

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
25	11,0	277	0,100	1670

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes**	A	Max.	0,150*
Lamp operating current	A	Min.	0,090*
		Max.	0,110*

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,01*
			i_m (A)	0,085*
Maximum preheat current	A	$t \leq 0,4$		0,200*
		$0,4 < t < 2,0$		0,220 - 0,050 t*
		$t \geq 2,0$		0,120*
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	250*
		$t > t_e$	Min. (r.m.s.)	390*
Substitution resistor for each cathode			Ω	85*

Voltage controlled preheating
*

* Under consideration.

** In case a ballast is constructed so that an additional current flows through the cathode, this current is limited to 0,060 A.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-13-L/P-W4.3x8.5d-7/520

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
13	HF starterless	Preheated	W4.3x8.5d	7 × 520

Dimensions mm		
C		D
Min.	Max.	Max.
522,1	524,1	7,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
25	12	0,120*	1,5	410	0,1

Electrical characteristics**					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
25	13,3	136	122	150	0,100

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Min.	Max.
0,060*	50*	40*	60*

Chromaticity coordinates: see D.2, annex D.

* Under consideration.

** Rated values of lamp characteristics at 25 kHz are to be multiplied by factor x_1 for wattage and voltage and x_2 for luminous flux in order to receive the respective values at (47,5 ± 2,5) kHz. The factors are based on unmodulated sine-wave voltage supply. Present value: x_1 = 1,04; values for x_2 are to be specified in the manufacturer's literature.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-13-L/P-W4.3x8.5d-7/520

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
25	13,0	310	0,100	1740

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes**	A	Max.	0,150*
Lamp operating current	A	Min.	0,090*
		Max.	0,110*

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	*
			i_m (A)	0,085*
Maximum preheat current	A	$t \leq 0,4$	0,200*	
		$0,4 < t < 2,0$	0,220 - 0,050 t*	
		$t \geq 2,0$	0,120*	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	270*
		$t > t_e$	Min. (r.m.s.)	410*
Substitution resistor for each cathode			Ω	85*

Voltage controlled preheating
*

* Under consideration.

** In case a ballast is constructed so that an additional current flows through the cathode, this current is limited to 0,060 A.

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ILCOS: FDH-14-L/P-G5-16/550

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
14	HF starterless	Preheated	G5	16 × 550

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
549,0	553,7	556,1	563,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,210	2	230	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	13,7	82	72	92	0,170

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,160	40	30	50

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-14-L/P-G5-16/550

Reference ballast characteristics				
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	14	167	0,170	500

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,220
Lamp operating current	A	Min.	0,130
		Max.	0,205

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,030
			i_m (A)	0,160
Maximum preheat current	A	$t \leq 0,4$	0,400	
		$0,4 < t < 2,0$	0,440 - 0,095 t	
		$t \geq 2,0$	0,250	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	130
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	230
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	275
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	40

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min (r.m.s.)	560
Current through lamp substitution resistor	A	Min.	0,115
Lamp substitution resistor		Ω	1100
Substitution resistor for each cathode		Ω	9
Cathode current	A	Max.	*

* Under consideration.

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ILCOS: FDH-21-L/P-G5-16/850

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
21	HF starterless	Preheated	G5	16 × 850

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
849,0	853,7	856,1	863,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,210	2	350	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
kHz	W	Rated	Minimum	Maximum	
20 - 26	20,7	123	113	133	0,170

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,160	40	30	50

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-21-L/P-G5-16/850

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	21	246	0,170	725

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,220
Lamp operating current	A	Min.	0,130
		Max.	0,205

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,030
			i_m (A)	0,160
Maximum preheat current	A	$t \leq 0,4$	0,400	
		$0,4 < t < 2,0$	0,440 - 0,095 t	
		$t \geq 2,0$	0,250	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	200
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	340
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	390
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	40

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	600
Current through lamp substitution resistor	A	Min.	0,130
Lamp substitution resistor		Ω	1315
Substitution resistor for each cathode		Ω	9
Cathode current	A	Max.	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FDH-24-L/P-G5-16/550

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
24	HF starterless	Preheated	G5	16 × 550

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
549,0	553,7	556,1	563,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,440	2	250	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
kHz	W	Rated	Minimum	Maximum	A
20 - 26	22,5	75	67	83	0,300

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Minimum	Maximum
0,350	12	9	15

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-24-L/P-G5-16/550

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20-26	24	150	0,300	250

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,450*
Lamp operating current	A	Min.	0,260*
		Max.	0,425*

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,190
			i_m (A)	0,330
Maximum preheat current	A	$t \leq 0,4$		0,900
		$0,4 < t < 2,0$		0,972 - 0,181 t
		$t \geq 2,0$		0,610
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	130
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	280
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	350
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	12

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	560
Current through lamp substitution resistor	A	Min.	0,200
Lamp substitution resistor		Ω	580
Substitution resistor for each cathode		Ω	2,5
Cathode current	A	Max.	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FDH-28-L/P-G5-16/1150

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
28	HF starterless	Preheated	G5	16 × 1150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1149,0	1153,7	1156,1	1163,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,210	2	375	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	27,8	167	150	184	0,170

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,160	40	30	50

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-28-L/P-G5-16/1150

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	28	329	0,170	950

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,220
Lamp operating current	A	Min.	0,130
		Max.	0,205

Current controlled preheating					
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$				a	0,030
				i_m (A)	0,160
Maximum preheat current	A	$t \leq 0,4$		0,400	
		$0,4 < t < 2,0$		0,440 - 0,095 t	
		$t \geq 2,0$		0,250	
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	240	
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	425	
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	530	
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*	
		$t > t_e$	Min. (peak)	*	
Substitution resistor for each cathode				Ω	40

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	650
Current through lamp substitution resistor	A	Min.	0,135
Lamp substitution resistor		Ω	1550
Substitution resistor for each cathode		Ω	9
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-35-L/P-G5-16/1450

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
35	HF starterless	Preheated	G5	16 × 1450

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1449,0	1453,7	1456,1	1463,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,210	2	450	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	34,7	209	189	229	0,170

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,160	40	30	50

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-35-L/P-G5-16/1450

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	35	413	0,170	1200

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,220
Lamp operating current	A	Min.	0,130
		Max.	0,205

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,030
			i_m (A)	0,160
Maximum preheat current	A	$t \leq 0,4$		0,400
		$0,4 < t < 2,0$		0,440 - 0,095 t
		$t \geq 2,0$		0,250
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	275
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	530
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	700
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	40

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,140
Lamp substitution resistor		Ω	1800
Substitution resistor for each cathode		Ω	9
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-39-L/P-G5-16/850

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
39	HF starterless	Preheated	G5	16 × 850

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
849,0	853,7	856,1	863,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,440	2	350	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
kHz	W	Rated	Minimum	Maximum	A
20 - 26	38	112	102	122	0,340

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Minimum	Maximum
0,350	12	9	15

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-39-L/P-G5-16/850

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	39	224	0,340	330

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,450*
Lamp operating current	A	Min.	0,260
		Max.	0,425

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$		a		0,190
		i_m (A)		0,330
Maximum preheat current	A	$t \leq 0,4$		0,900
		$0,4 < t < 2,0$		0,972 - 0,181 t
		$t \geq 2,0$		0,610
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	175
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	350
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	390
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	12

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	600
Current through lamp substitution resistor	A	Min.	0,25
Lamp substitution resistor		Ω	620
Substitution resistor for each cathode		Ω	2,5
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-49-L/P-G5-16/1450

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
49	HF starterless	Preheated	G5	16 × 1450

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1449,0	1453,7	1456,1	1463,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,330	2	450	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
kHz	W	Rated	Minimum	Maximum	A
20 - 26	49,3	191	171	211	0,260

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Minimum	Maximum
0,260	16,5	12,4	20,6

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FDH-49-L/P-G5-16/1450

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	49	390	0,255	765

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,330
Lamp operating current	A	Min.	0,180
		Max.	0,295

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,100
			i_m (A)	0,190
Maximum preheat current	A	$t \leq 0,4$		0,585
		$0,4 < t < 2,0$		0,650 - 0,160 t
		$t \geq 2,0$		0,330
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	225
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	450
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	625
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	16,5

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,210
Lamp substitution resistor		Ω	1150
Substitution resistor for each cathode		Ω	3,5
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-54-L/P-G5-16/1150

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
54	HF starterless	Preheated	G5	16 × 1150

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1149,0	1153,7	1156,1	1163,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,720	2	520	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
kHz	W	Rated	Minimum	Maximum	A
20 - 26	53,8	118	108	128	0,460

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Minimum	Maximum
0,500	8	6	10

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-54-L/P-G5-16/1150

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	54	235	0,460	255

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,650
Lamp operating current	A	Min.	0,370
		Max.	0,625

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,450
			i_m (A)	0,540
Maximum preheat current	A	$t \leq 0,4$		1,400
		$0,4 < t < 2,0$		1,525 - 0,313 t
		$t \geq 2,0$		0,900
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	240
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	520
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	620
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	8

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,340
Lamp substitution resistor		Ω	470
Substitution resistor for each cathode		Ω	1,7
Cathode current	A	Max.	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-80-L/P-G5-16/1450

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
80	HF starterless	Preheated	G5	16 × 1450

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1449,0	1453,7	1456,1	1463,2	17,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	6	0,765	2	580	0,1

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
kHz	W	Rated	Minimum	Maximum	A
20 - 26	80	145	130	160	0,555

Chromaticity coordinates: see D.2, annex D.

Ambient test temperature: 35 °C ± 1 °C (for reference purposes)

Cathode characteristics			
Test current	Resistance of each cathode Ω		
A	Rated	Minimum	Maximum
0,550	7,0	5,25	8,75

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-80-L/P-G5-16/1450

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	80	290	0,552	260

Information for high-frequency ballast design			
Frequency		kHz	≥ 20
Current in any lead to cathodes	A	Max.	0,715
Lamp operating current	A	Min.	0,440
		Max.	0,670

Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,510
			i_m (A)	0,570
Maximum preheat current	A	$t \leq 0,4$		1,400
		$0,4 < t < 2,0$		1,525 - 0,313 t
		$t \geq 2,0$		0,900
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	250
		$t > t_e$ (+10 °C)	Min. (r.m.s.)	580
		$t > t_e$ (–15 °C)	Min. (r.m.s.)	750
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	7,0

Voltage controlled preheating
*

Without preheating			
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,425
Lamp substitution resistor		Ω	445
Substitution resistor for each cathode		Ω	1,5
Cathode current	A	Max.	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FDH-16-L/P-G13-26/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
16	HF starterless	Preheated	G13	26 x 600

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
589,8	594,5	596,9	604,0	28,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	19	0,510	2	200	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	16	64	58	70	0,255

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,510	15	10	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-16-L/P-G13-26/600

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	16	128	0,255	250

Information for high frequency ballast design				
Frequency			kHz	≥ 20
Current in any lead to cathodes	A		Max.	0,450
Lamp operating current	A		Min.	*
			Max.	*
Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,200
			i_m (A)	0,250
Maximum preheat current	A	$t \leq 0,4$		1,600
		$0,4 < t < 2,0$		1,800 - 0,500 t
		$t \geq 2,0$		0,800
Open circuit voltage across lamp	V	$t \leq t_e$	Max (r.m.s.)	230
		$t > t_e$	Min. (r.m.s.)	200
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	10
Voltage controlled preheating				
*				

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-32-L/P-G13-26/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
32	HF starterless	Preheated	G13	26 x 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1199,4	1204,1	1206,5	1213,6	28,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	19	0,510	2	240	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	32	128	118	138	0,255

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,510	15	10	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-32-L/P-G13-26/1200

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	32	256	0,255	500

Information for high frequency ballast design				
Frequency			kHz	≥ 20
Current in any lead to cathodes	A		Max.	0,450
Lamp operating current	A		Min.	*
			Max.	*
Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,200
			i_m (A)	0,250
Maximum preheat current	A	$t \leq 0,4$		1,600
		$0,4 < t < 2,0$		1,800 - 0,500 t
		$t \geq 2,0$		0,800
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	280
		$t > t_e$	Min. (r.m.s.)	240
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	10
Voltage controlled preheating				
*				

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 1

ILCOS: FDH-50-L/P-G13-26/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
50	HF starterless	Preheated	G13	26 x 1500

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1500,0	1504,7	1507,1	1514,2	28,0

Starting characteristics					
Frequency kHz	Starting aid distance mm	Preheat current A	Preheat time s	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	19	0,640	2	280	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	50	142	132	152	0,355

Chromaticity co-ordinates: see D.2, annex D.

Cathode characteristics			
Test current A	Resistance of each cathode Ω		
	Rated	Minimum	Maximum
0,640	10	7	*

* Under consideration.

	DOUBLE-CAPPED FLUORESCENT LAMP DATA SHEET	Page 2

ILCOS: FDH-50-L/P-G13-26/1500

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	50	284	0,355	400

Information for high frequency ballast design				
Frequency			kHz	≥ 20
Current in any lead to cathodes	A		Max.	0,600
Lamp operating current	A		Min.	*
			Max.	*
Current controlled preheating				
Minimum preheat current i_k (A) to emission time t_e (s) $i_k = (a/t_e + i_m^2)^{0,5}$			a	0,310
			i_m (A)	0,320
Maximum preheat current	A	$t \leq 0,4$		2,200
		$0,4 < t < 2,0$		2,500 - 0,750 t
		$t \geq 2,0$		1,000
Open circuit voltage across lamp	V	$t \leq t_e$	Max. (r.m.s.)	320
		$t > t_e$	Min. (r.m.s.)	280
Voltage to starting aid	V	$t \leq t_e$	Max. (peak)	*
		$t > t_e$	Min. (peak)	*
Substitution resistor for each cathode			Ω	7
Voltage controlled preheating				
*				

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-20-L/N-Fa6-38/600

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
20	Starterless	Non-preheated	Fa6	38 × 600

Dimensions mm		
C		D
Min.	Max.	Max.
606,5	611,0	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	190	10
60	–	–

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Hz	W	Rated	Minimum	Maximum	A
50	20	58	51	65	0,380
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	20	127	0,370	270	0,12
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Open circuit voltage across lamp	V	Min. (r.m.s.)	190	–

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FD-40-L/N-Fa6-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
40	Starterless	Non-preheated	Fa6	38 × 1200

Dimensions mm		
C		D
Min.	Max.	Max.
1216,0	1220,5	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	205	10
60	–	–

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	39,5	109	99	119	0,425
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	40	220	0,430	390	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Open circuit voltage across lamp	V	Min. (r.m.s.)	205	–

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FD-65-L/N-Fa6-38/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
65	Starterless	Non-preheated	Fa6	38 × 1500

Dimensions mm		
C		D
Min.	Max.	Max.
1516,6	1521,1	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	190	10
60	–	–

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Hz	W	Rated	Minimum	Maximum	A
50	64	110	100	120	0,670
60	–	–	–	–	–

Chromaticity co-ordinates: see D.2, annex D.

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	65	220	0,670	240	0,10
60	–	–	–	–	–

Information for ballast design				
Frequency		Hz	50	60
Open circuit voltage across lamp	V	Min. (r.m.s.)	190	–

DOUBLE-CAPPED FLUORESCENT LAMP

DATA SHEET

ILCOS: FD-39-L/N-Fa8-38/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
39	Starterless	Non-preheated	Fa8	38 × 1200

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1150,6	1153,7	1159,5	1168,4	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–
60	385	10

Electrical characteristics					
Frequency Hz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
50	–	–	–	–	–
60	39	100	90	110	0,425

Chromaticity co-ordinates: *

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	39	430	0,425	930	0,075

Information for ballast design				
Frequency		Hz	50	60
Open circuit voltage across lamp	V	Min. (r.m.s.)	–	385

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-57-L/N-Fa8-38/1800

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
57	Starterless	Non-preheated	Fa8	38 × 1800

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
1760,2	1763,3	1769,1	1778,2	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–
60	475	10

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Hz	W	Rated	Minimum	Maximum	A
50	–	–	–	–	–
60	57	149	134	164	0,425

Chromaticity co-ordinates: *

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	57	525	0,425	1100	0,075

Information for ballast design				
Frequency	Hz		50	60
Open circuit voltage across lamp	V	Min. (r.m.s.)	–	475

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FD-75-L/N-Fa8-38/2400

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
75	Starterless	Non-preheated	Fa8	38 × 2400

Dimensions mm				
A	B		C	D
Max.	Min.	Max.	Max.	Max.
2369,8	2372,9	2378,7	2387,6	40,5

Starting characteristics		
Frequency Hz	Open circuit voltage (r.m.s.) V	Starting time s
50	–	–
60	565	10

Electrical characteristics					
Frequency	Rated wattage	Voltage (r.m.s.) at lamp terminals V			Rated lamp current
Hz	W	Rated	Minimum	Maximum	A
50	–	–	–	–	–
60	75	197	177	217	0,425

Chromaticity co-ordinates: *

Reference ballast characteristics					
Frequency Hz	Nominal wattage W	Rated voltage V	Calibration current A	Voltage/current ratio Ω	Power factor
50	–	–	–	–	–
60	75	625	0,425	1280	0,075

Information for ballast design			
Frequency	Hz	50	60
Open circuit voltage across lamp	V Min. (r.m.s.)	–	565

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FDH-32-L/N-Fa6-26/1200

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
32	HF starterless	Non-preheated	Fa6	26 × 1200

Dimensions mm		
C		D
Min.	Max.	Max.
1216,0	1220,5	28,0

Starting characteristics		
Frequency kHz	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	800	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	32	102	92	112	0,320

Chromaticity co-ordinates: see D.2, annex D.

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	32	204	0,320	318

Information for high frequency ballast design			
Frequency		kHz	≥ 20
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,200
Lamp substitution resistor		Ω	1000
Lamp operating current	A	Min.	*
		Max.	*

* Under consideration.

DOUBLE-CAPPED FLUORESCENT LAMP
DATA SHEET

ILCOS: FDH-50-L/N-Fa6-26/1500

Nominal wattage W	Circuit	Cathode	Cap	Nominal dimensions mm
50	HF starterless	Non-preheated	Fa6	26 x 1500

Dimensions mm		
C		D
Min.	Max.	Max.
1516,6	1521,1	28,0

Starting characteristics		
Frequency kHz	Open circuit voltage (r.m.s.) V	Starting time s
20 - 26	800	0,1

Electrical characteristics					
Frequency kHz	Rated wattage W	Voltage (r.m.s.) at lamp terminals V			Rated lamp current A
		Rated	Minimum	Maximum	
20 - 26	50	111	101	121	0,455

Chromaticity co-ordinates: see D.2, annex D.

Reference ballast characteristics				
Frequency kHz	Nominal wattage W	Rated voltage V	Calibration current A	Resistance Ω
20 - 26	50	222	0,455	244

Information for high frequency ballast design			
Frequency		kHz	≥ 20
Open circuit voltage across lamp	V	Min. (r.m.s.)	800
Current through lamp substitution resistor	A	Min.	0,250
Lamp substitution resistor		Ω	800
Lamp operating current	A	Min.	*
		Max.	*

* Under consideration.