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EN 60 081 : 1989
IEC 81 : 1984

*(including Amendment 1 (1987)
and Amendment 2 (1988))*

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British Standard

Tubular fluorescent lamps for general lighting service

Part 1. Specification for internationally
specified lamps

Lampes tubulaires à fluorescence pour l'éclairage général
Partie 1. Spécification des lampes spécifiées du plan international

Röhrenförmige Leuchtstofflampen für allgemeine Beleuchtungszwecke
Teil 1. Spezifikation für international spezifizierte Lampen

The European Standard EN 60 081 has the status of a British Standard

British Standards Institution

BS 1853 : Part 1 : 1990

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National foreword

This Part of BS 1853 has been produced under the direction of the Electrical Illumination Standards Policy Committee LGL/- and is the English language version of EN 60 081 : 1989 'Tubular fluorescent lamps for general lighting service', published by the European Committee for Electrotechnical Standardization (CENELEC). EN 60 081 is identical with IEC Publication 81 : 1984 plus Amendment 1 (1987) and Amendment 2 (1988) published by the International Electrotechnical Commission (IEC).

Part 2 specifies those tubular fluorescent lamps which are used in the United Kingdom and are not specified in Part 1 of this standard.

For the purposes of this British Standard, any references to page numbers in the text should be ignored.

Cross-references

Details of other international publications referred to in the standard are given in Annex ZA. Where there are British Standards either identical or technically equivalent to these international publications, the relationship is given in national appendix X on the inside back cover.

Additional information

The list of United Kingdom organizations which participated in the preparation of this standard is given in national appendix W on the inside back cover. Cooperating organizations within CENELEC are listed on the outside back cover.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 60 081

December 1989

UDC: 621.327.534.15:628.972

Key words: lighting equipment; fluorescent lamp; tubular lamp; characteristic; testing

English version

Tubular fluorescent lamps for general lighting service

(IEC 81 (1984) edition 4 + Amdt 1 (1987) + Amdt 2 (1988))

Lampes tubulaires à fluorescence pour l'éclairage
général
(CEI 81 (1984) édition 4 + Amdt 1 (1987)
+ Amdt 2 (1988))

Röhrenförmige Leuchtstofflampen für allgemeine
Beleuchtungszwecke
(IEC 81 (1984) 4. Ausgabe + Amdt 1 (1987)
+ Amdt 2 (1988))

This European Standard was ratified by CENELEC on 1 November 1989 (confirmed by 62 BT). CENELEC members are bound to comply with the requirements of the CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CENELEC Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French and German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to CENELEC Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: Rue Bréderode 2, B-1000 Brussels

Brief history

The CENELEC Questionnaire Procedure, performed for finding out whether or not IEC 81 (4th edition - 1984) + Amdt 1 (1987) and Amdt 2 (1988) could be accepted without textual changes, has shown that no common modifications were necessary for the acceptance as European Standard (EN). The Reference Document was submitted to the CENELEC members for formal vote and acceptance by CENELEC.

Technical text

The text of the International Standard IEC 81 (4th edition - 1984) + Amdt 1 (1987) and Amdt 2 (1988), was approved by CENELEC on 1 November 1989 as a European Standard (confirmed by 62 BT).

Annexes designated "normative" are part of the body of the standard.

In this standard, Annex ZA is normative.

The following dates are applicable:

- | | | |
|---|-------|--------------|
| — latest date of announcement of the EN at national level | (doa) | : 1990-06-01 |
| — date of latest publication of a new harmonized standard | (dop) | : 1990-12-01 |
| — date of withdrawal of conflicting national standards | (dow) | : 1990-12-01 |



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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**TUBULAR FLUORESCENT LAMPS
FOR GENERAL LIGHTING SERVICE**

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

This standard has been prepared by Sub-Committee 34A: Lamps, of IEC Technical Committee No. 34: Lamps and Related Equipment.

It forms the fourth edition of IEC Publication 81 and replaces the third edition, 1974, Amendment No. 1, 1976 and Amendment No. 2, 1980.

The text of this standard is based upon the following documents:

Six Months' Rule	Report on Voting
34A(CO)140	34A(CO)157
34A(CO)141	34A(CO)162
34A(CO)142	34A(CO)158
34A(CO)143	34A(CO)159
34A(CO)153	34A(CO)172
34A(CO)163	34A(CO)173
34A(CO)170	34A(CO)192
34A(CO)174	34A(CO)208
34A(CO)186	34A(CO)217
34A(CO)187	34A(CO)218
34A(CO)188	34A(CO)219
34A(CO)189	34A(CO)220
34A(CO)190	34A(CO)221
34A(CO)191	34A(CO)207
34A(CO)227	34A(CO)244
34A(CO)194	34A(CO)230
34A(CO)201	34A(CO)248

Amendment No.	Six Months' Rule	Reports on Voting
2	34A(CO)342	34A(CO)385
	34A(CO)343	34A(CO)386
	34A(CO)344	34A(CO)387
	34A(CO)345	34A(CO)388
	34A(CO)346	34A(CO)389
	34A(CO)367	34A(CO)412
1	34A(CO)258	34A(CO)293
	34A(CO)259	34A(CO)294
	34A(CO)260	34A(CO)295
	34A(CO)264	34A(CO)313
	34A(CO)267	34A(CO)309
	34A(CO)308	34A(CO)334
	34A(CO)310	34A(CO)335

Further information can be found in the relevant Reports on Voting indicated in the table above.

The following IEC publications are quoted in this standard:

Publications No. 61: Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety.

82: Ballasts for Tubular Fluorescent Lamps.

155: Starters for Tubular Fluorescent Lamps.

458: Transistorized Ballasts for Tubular Fluorescent Lamps.

TUBULAR FLUORESCENT LAMPS FOR GENERAL LIGHTING SERVICE

INTRODUCTION

This edition introduces new co-ordinates for the standard colours as the result of improvements in the accuracy of colour measurement together with a new standard colour "white" (see Appendix D).

In the system for whole production testing, emphasis is placed on checking a manufacturer's claim of compliance with this standard in preference to establishing precise levels of quality. As a result considerable reliance is placed on:

- a) confidence between the test authority and the manufacturer based on past testing experience;
- b) reference to the manufacturer's own test results;
- c) the verification of the manufacturer's test results by comparing them with the results obtained by testing a reduced market sample. There is as yet limited experience with such a verification (comparability test) in this field. Possible difficulties due to imperfections of the procedure should be solved by mutual agreement between the test authority and the manufacturer.

This "new" system provides, in practice, the same assurances for consumer safeguards as the former system. It should also enable reciprocal recognition of licensing or certification to be achieved by the testing authorities concerned.

SECTION ONE — GENERAL

1.1 General

1.1.1 Scope

This standard covers a range of tubular fluorescent lamps for general lighting service which are operated on a.c. mains. Lamps of the following types are included:

- 1) lamps with pre-heated cathodes operated with the use of a starter;
- 2) lamps with pre-heated cathodes operated without the use of a starter;
- 3) lamps with pre-heated cathodes operated with or without the use of a starter;
- 4) lamps with non-pre-heated cathodes operated without the use of a starter.

The additional requirements for vapour-pressure controlled (amalgam) lamps are given in Appendix J.

For pre-heat low-voltage cathode lamps operated without a starter, provision is included for two alternative methods of measurement of electrical and luminous characteristics:

- 1) Measurement of lamp electrical and luminous characteristics *without* additional cathode heating.
- 2) Measurement of lamp electrical and luminous characteristics *with* additional cathode heating.

Differences in characteristics specified are dependent only on the method of testing which shall be stated by the manufacturer.

Section Two consists of a series of lamp data sheets, each giving the characteristics of a specific lamp type. In the case of general service lamps, complete characteristics are given together with reference to Sections Three, Four, Five and Six.

In the case of some new lamps, or lamps not yet in general demand, only limited characteristics are given and limited reference to testing requirements is made.

Sections Three, Four and Five cover the technical requirements with which lamps shall comply and the testing methods to be used for checking quality and interchangeability for individual lamp batches or for the whole production of a manufacturer, in an endeavour to maintain the community of interest of user and manufacturer.

Section Six covers the compliance requirements.

Note. — It may be expected that lamps which comply with this standard, when operated with a starter complying with IEC Publication 155: Starters for Tubular Fluorescent Lamps, and with ballasts complying with IEC Publication 82: Ballasts for Tubular Fluorescent Lamps, will start satisfactorily at 90% of rated voltage and at temperatures between 10 °C and 35 °C and will operate satisfactorily at voltages between 90% and 110% of rated voltage and at an ambient air temperature of between 10 °C and 50 °C.

1.1.2 *Object*

Whole product testing is recommended as the preferred system of assessing the quality of a manufacturer's production.

Batch testing should preferably be used only in those cases where whole product testing is not possible.

1.2 Definitions

1.2.1 *Tubular fluorescent lamp*

A low pressure mercury-discharge lamp of tubular form either straight or U-shaped or curved in which most of the light is emitted by a layer of fluorescent material excited by the ultra-violet radiation from the discharge.

Notes 1. — This standard takes into consideration three methods of starting:

- a) Cathodes pre-heated with the use of a starter;
- b) Cathodes pre-heated without the use of a starter;
- c) Non-pre-heated cathodes without the use of a starter.

Some lamps are suitable for both methods of operation a) and b) given above. In normal operation the cathodes are continuously heated, in the case of lamps of type a) and c) by the arc current only, and in the case of lamps of type b), supplementary heating by a current supplied by the ballast may be added.

2. — Definitions for types of cathodes in relation to their resistance are under consideration.

1.2.2 *Lumen maintenance*

The ratio of the luminous flux of an individual lamp after 2 000 h of operation, or 70% of its rated life, as appropriate, to that found in the rating test.

1.2.3 *Life*

The number of hours the lamp operates to "burn-out" or to any other criterion of life performance laid down in this specification.

1.2.4 *Colour*

The colour characteristics of a lamp are defined by the colour appearance and the colour rendering.

- a) The actual colour of the lamp is called colour appearance and is defined in terms of the spectral tristimulus values according to the recommendations of the International Commission on Illumination (C.I.E.).
- b) The effect which the spectral characteristics of the light emitted by the lamp have on the appearance of the objects illuminated by it is called colour rendering.

1.2.5 *Rated colour*

The colour defined by the markings on the lamp.

Note. — The characteristics of the standard colours are given in Appendix D.
Other colours, such as declared by the manufacturer, are called special colours.

1.2.6 *Rated wattage*

The wattage marked on the lamp or, alternatively, declared by the supplier. It is expressed in watts.

1.2.7 *Rated luminous flux*

The luminous flux marked on the lamp or declared as such by the supplier. It is expressed in lumens.

1.2.8 *Rated life*

The declared life.

1.2.9 *Group*

Denotes lamps as represented by a single data sheet of Section Two, having the same rated electrical and cathode characteristics, the same physical dimensions and the same starting method.

1.2.10 *Type*

Denotes lamps of the same group having the same photometric ratings and colour characteristics.

1.2.11 *Batch*

Denotes all the lamps of one type put forward at one time for acceptance tests.

1.2.12 *Whole production*

The production during a period of twelve months of all types of lamps within the scope of this standard and nominated in a list of the manufacturer for inclusion in the certificate.

1.2.13 *Test quantities*

- a) Inspection test quantity (I.T.Q.) is the number of lamps selected for testing the mechanical, physical and starting characteristics.
- b) Rating test quantity (R.T.Q.) is the number of lamps selected for testing the initial readings and colour.

- c) Lumen maintenance test quantity (M.T.Q.) is the number of lamps selected for testing the lumen maintenance performance.

1.2.14 Initial readings

The measurements of the luminous and electrical characteristics, excluding the checking of starting voltages, made at the end of the 100-hour ageing period.

1.2.15 Comparability test

A test to check the consistency between the market sample and the manufacturer's own test data.

1.2.16 Market sample

A specified number of lamps selected by the test authority for the comparability test.

1.2.17 Short-circuit power

The short circuit power of a cathode heating transformer defined by the formula:

$$\frac{(\text{required voltage at cathode terminals})^2}{\text{internal impedance of the source}}$$

1.3 General principles of layout of data sheets

Numbering system for lamp data sheets:

The first number represents the number of this publication "81" followed by the letters "IEC".

The second number represents the lamp 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.

1.3.1 Diagrammatic data sheets.

81-IEC-0001-2 Diagrammatic drawings for location of lamp dimensions — linear lamps.

81-IEC-0002-1 Diagrammatic drawing for location of lamp dimensions — circular lamps.

These follow at the end of Section One.

1.3.2 Grouping of lamp data sheets

Sheet numbers	Method of starting	Cathode	
		Type	Resistance
81-IEC-1000—1999 81-IEC-2000—2999 81-IEC-3000—3999 81-IEC-4000—4999 81-IEC-5000—5999 81-IEC-6000—6999 81-IEC-7000—7999 81-IEC-8000—8999 81-IEC-9000—9999	Starter Starter Starterless Starterless Starter and starterless Starterless	Pre-heated Pre-heated Pre-heated Pre-heated Pre-heated Non-pre-heated	 High Low High



Documents

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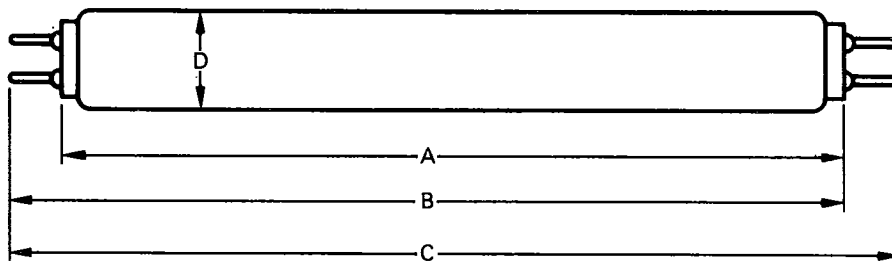
DIAGRAMMATIC DATA SHEET FOR LOCATION OF TUBULAR FLUORESCENT LAMP DIMENSIONS

Linear lamps

Page 1

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, G13, G20 Caps*



For lamps with G5 and G13 caps

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

A = base face to base face

A max. = X

B = base 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 × 7.1) = X + 14.2 mm

C min. = not specified

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

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

2. — In some instances the dimensions in national specification 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.

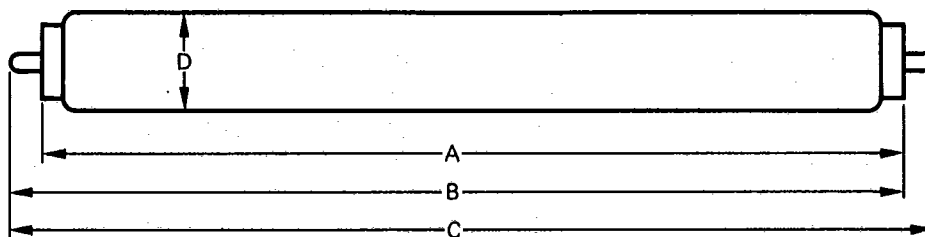
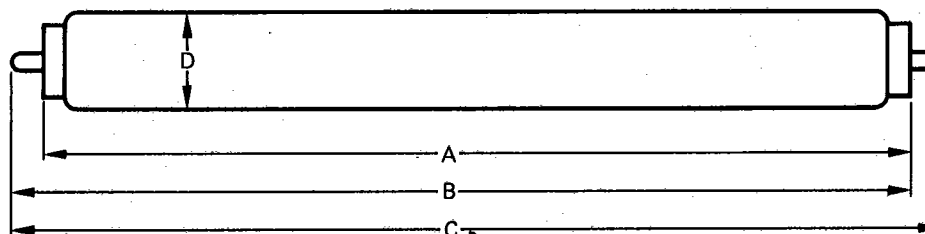
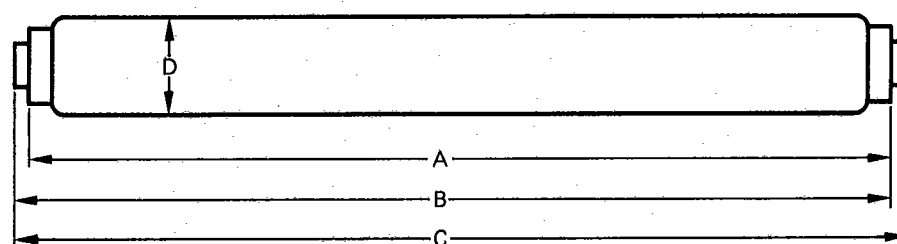
3. — Original USA types are sometimes designated by the nominal overall length in inches of the lamp assembled in two lampholders, each $\frac{5}{16}$ inch thick for G5 caps and $\frac{3}{8}$ inch thick for G13 caps.

* See IEC Publication 61: Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety.

**DIAGRAMMATIC DATA SHEET FOR LOCATION OF
TUBULAR FLUORESCENT LAMP DIMENSIONS****Linear lamps**

Page 2

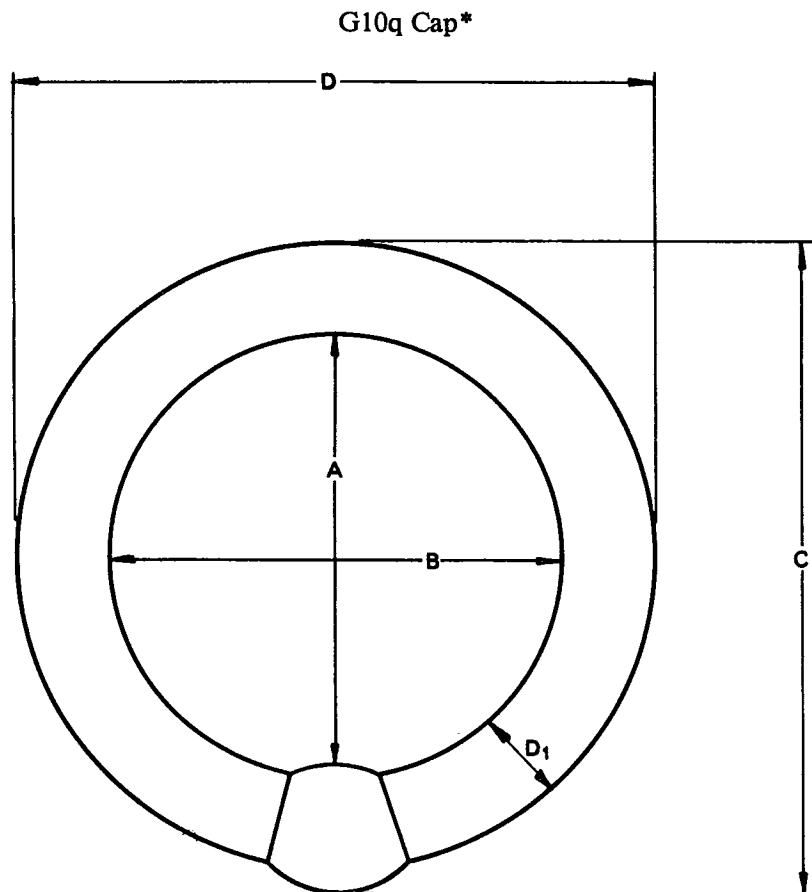
These drawings are intended only to indicate dimensions to be controlled
and are to be used in conjunction with the relevant lamp standard sheets.

Fa6 Cap***Fa8 Cap*****R17d Cap***

* See IEC Publication 61: Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety

**DIAGRAMMATIC DATA SHEET FOR LOCATION OF
TUBULAR FLUORESCENT LAMP DIMENSIONS****Circular lamps**

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



* See IEC Publication 61: Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety.

SECTION TWO — LAMP DATA SHEETS

2.1 List of specific lamp types included in this publication

Sheet No.	Lamp rating	Cap	Method of starting	Cathode type	
81-IEC-1104	15 W	G13	Starter	Pre-heated	
81-IEC-1105	18 W	G13	Starter	Pre-heated	
81-IEC-1110	20 W	G13	Starter	Pre-heated	
81-IEC-1115	20 W	G13	Starter	Pre-heated	
81-IEC-1150	25 W	G13	Starter	Pre-heated	
81-IEC-1210	30 W (T8)	G13	Starter	Pre-heated	
81-IEC-1220	30 W (T12)	G13	Starter	Pre-heated	
81-IEC-1305	36 W	G13	Starter	Pre-heated	
81-IEC-1310	40 W	G13	Starter	Pre-heated	
¹⁾ 81-IEC-1311	40 W	G13	—	Pre-heated	
81-IEC-1315	40 W	G13	Starter	Pre-heated	
81-IEC-1545	58 W	G13	Starter	Pre-heated	
81-IEC-1550	65 W	G13	Starter	Pre-heated	
81-IEC-1610	70 W	G13	Starter	Pre-heated	
81-IEC-1710	80 W	G13	Starter	Pre-heated	
81-IEC-1780	85 W	G13	Starter	Pre-heated	
81-IEC-1930	125 W	G13	Starter	Pre-heated	
81-IEC-2130	22 W	G10q	Starter	Pre-heated	
81-IEC-2230	32 W	G10q	Starter	Pre-heated	
81-IEC-2350	40 W	G10q	Starter	Pre-heated	
81-IEC-2810	90 W	G20	Starter	Pre-heated	
81-IEC-4110	20 W	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4210	30 W (T8)	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4220	30 W (T12)	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4310	40 W	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4710	80 W	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4780	85 W	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-4930	125 W	G13	Starterless	Pre-heated	High-cathode resistance
81-IEC-5110	20 W	G13	Starterless	Pre-heated	Low-cathode resistance
81-IEC-5115	20 W	G13	Starterless	Pre-heated	Low-cathode resistance
81-IEC-5210	30 W (T8)	G13	Starterless	Pre-heated	Low-cathode resistance
81-IEC-5220	30 W (T12)	G13	Starterless	Pre-heated	Low-cathode resistance
^{1) 2)} 81-IEC-5225	30 W (T12)	G13	Starterless	Pre-heated	Low-cathode resistance
81-IEC-5310	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5311	40 W	G13	—	Pre-heated	
81-IEC-5315	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
^{1) 2)} 81-IEC-5325	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
^{1) 2)} 81-IEC-5330	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5350	40 W	G10q	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5520	60 W	R17d	Starterless	Pre-heated	Low-cathode resistance
81-IEC-5550	65 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5760	85 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5770	87 W	R17d	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-5920	112 W	R17d	Starterless	Pre-heated	Low-cathode resistance
81-IEC-6020	4 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
81-IEC-6030	6 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
81-IEC-6040	8 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
81-IEC-6050	13 W	G5	Starter or starterless	Pre-heated	High-cathode resistance

¹⁾ Subject to type testing only.²⁾ Low starting voltage lamps (L.S.V.) with internal conducting layer.

Sheet No.	Lamp rating	Cap	Method of starting	Cathode type	
81-IEC-6130	22 W	G10q	Starterless	Pre-heated	Low-cathode resistance
81-IEC-6230	32 W	G10q	Starterless	Pre-heated	Low-cathode resistance
81-IEC-6350	40 W	G10q	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 81-IEC-8110	20 W	Fa6	Starterless	Non-pre-heated	
¹⁾ 81-IEC-8290	39 W	Fa8	Starterless	Non-pre-heated	
¹⁾ 81-IEC-8310	40 W	Fa6	Starterless	Non-pre-heated	
¹⁾ 81-IEC-8470	57 W	Fa8	Starterless	Non-pre-heated	
¹⁾ 81-IEC-8510	65 W	Fa6	Starterless	Non-pre-heated	
¹⁾ 81-IEC-8650	75 W	Fa8	Starterless	Non-pre-heated	

¹⁾ Subject to type testing only.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
15 W	With starter	G13	450 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
437.4	444.5	442.1*	451.6	28.0

* 442.0 in North America.

Lamp starting test ¹⁾	
Test voltage (V)	Ballast voltage rating (V)
103.5	110/120

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics ¹⁾							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	15	15	55	64	46	0.31	0.44
60	15	15	55	64	46	0.305	0.55

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	700	} See Appendix D
Cool white	820	
White	*	
Warm white	850	

* Under consideration.

¹⁾ Different values may apply in some countries.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics ¹⁾					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	15	127	0.31	325	0.12
60	15	118	0.30	305	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
103.5	400	0.28	0.65
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
68		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Minimum pulse voltage (V)
70	250

¹⁾ In some countries, a 50 Hz or 60 Hz reference ballast with different characteristics is used.

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Rating	Circuit	Cap	Nominal dimensions
18 W	With starter	G13	600 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
589.8	596.9	594.5	604.0	28

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
103.5	110

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	18	18	57	64	50	0.37	0.55

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	880	*
Cool white	1 020	*
White	*	*
Warm white	1 060	*

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	20	127	0.37	270	0.12

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
103.5	400	0.333	0.800
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
68		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
70	800

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
20 W	With starter	G13	600 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
589.8	596.9	594.5	604	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
103.5	110

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	20	19.3	57	64	50	0.37	0.55
60	20	20.5	57	64	50	0.38	0.55

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	880	} See Appendix D
Cool white	1 020	
White	*	
Warm white	1 060	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	20	127	0.37	270	0.12
60	20	118	0.38	240	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
103.5	400	0.333	0.800
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
68		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
70	250

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
20 W	With starter	G13	600 mm × 32 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
589.8	596.9	594.5	604.0	34.1

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
95	110

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	20	19.0	58	64	52	0.36	0.55
60	20	19.0	58	64	52	0.36	0.55

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight Cool white White Warm white	880 1 020 * 1 060	} See Appendix D

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	20	127	0.37	270	0.12
60	20	118	0.38	240	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
95	400	0.333	0.800
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
68		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
70	800

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
25 W	With starter	G13	970 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
970	977,1	974,7	984,2	40,5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	25	24.5	94	104	84	0.29	0.45
60	—	—	—	—	—	—	—

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	1 250	} See Appendix D
Cool white	1 650	
White	*	
Warm white	1 720	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	25	220	0.29	605	0.10
60	—	—	—	—	—

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.261	0.609
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	400

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
30 W (T8)	With starter	G13	900 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
894.6	901.7	899.3	908.8	28

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	30	30	96	106	86	0.365	0.55
60	30	30.5	99	109	89	0.355	0.53

Luminous and colour characteristics			
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates	
		x	y
Daylight	1 650	See Appendix D	
Cool white	1 940		
White	*	0.365**	0.373**
Warm white	2 020	0.432**	0.403**

* Under consideration. ** Philadelphia co-ordinates (see Appendix D).

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	30	220	0.36	480	0.10
60	30	236	0.355	548	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.328	0.766
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		50	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	400



Documents

Document Sharing Hub

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
30 W (T12)	With starter	G13	900 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
894.6	901.7	899.3	908.8	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	30	29.5	81	91	71	0.405	0.62
60	—	—	—	—	—	—	—

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	1 580	} See Appendix D
Cool white	1 860	
White	*	
Warm white	1 930	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated 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			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.365	0.850
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		40	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	400

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
36 W	With starter	G13	1 200 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 199.4	1 206.5	1 204.1	1 213.6	28

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
198	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	36	36	103	113	93	0.43	0.65

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	2 300	*
Cool white	2 700	*
White	*	*
Warm white	2 800	*

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	40	220	0.43	390	0.10

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
198	400	0.387	0.904
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		40	

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
40 W	With starter	G13	1 200 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 199.4	1 206.5	1 204.1	1 213.6	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	40	39.5	103	113	93	0.43	0.65
60	40	40	102	112	92	0.435	0.65

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	2 300	} See Appendix D
Cool white	2 700	
White	*	
Warm white	2 800	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	40	220	0.43	390	0.10
60	40	236	0.43	439	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.387	0.904
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		40	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	400

TUBULAR FLUORESCENT LAMP DATA SHEET
1 050 mm length lamp for metric modular buildings

Rating	Circuit	Cap	Nominal dimensions
40 W	—	G13	1 050 mm × 25 mm

Mechanical and physical requirements

For lamp marking, tubes, dimensions and caps, Clauses 4.1 to 4.4 of this publication apply.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 047.0	1 054.1	1 051.7	1 061.2	28.0

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
40 W	With starter	G13	1 200 mm × 32 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 199.4	1 206.5	1 204.1	1 213.6	34.1

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	40	39.0	106	113	99	0.42	0.65
60	40	39.5	105	112	98	0.425	0.65

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	2 300	} See Appendix D
Cool white	2 700	
White	*	
Warm white	2 800	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	40	220	0.43	390	0.10
60	40	236	0.43	439	0.075

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.387	0.904
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		40	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	900

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
58 W	With starter	G13	1 500 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 500.0	1 507.1	1 504.7	1 514.2	28

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
198*	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	58	58	110	120	100	0.67	1.0

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	3 750	*
Cool white	4 400	*
White	*	*
Warm white	4 600	*

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	65	220	0.67	240	0.10

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
198	400	0.603	1.41
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
132		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
140	900*

* Under consideration.

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Page 1

Rating	Circuit	Cap	Nominal dimensions
65 W	With starter	G13	1 500 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 500.0	1 507.1	1 504.7	1 514.2	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	220

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	65	64	110	120	100	0.67	1.0
60	—	—	—	—	—	—	—

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	3 750	} See Appendix D
Cool white	4 400	
White	*	
Warm white	4 600	

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	65	220	0.67	240	0.10
60	—	—	—	—	—

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.603	1.41
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
132		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
140	400

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Page 1

Rating	Circuit	Cap	Nominal dimensions
70 W	With starter	G13	1 800 mm × 25 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-1 EC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 763.8	1 770.9	1 768.4	1 778.0	28

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
216	240

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50/60	70	69.5	128	138	118	0.70	1.0

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	*	*
Cool white	*	*
White	*	*
Warm white	*	*

* Under consideration.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50/60	70	240	0.7	240	0.10

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
216	400	0.59	1.47
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
170		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Minimum pulse voltage (V)
175	900

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Page 1

Rating	Circuit	Cap	Nominal dimensions
80 W	With starter	G13	1 500 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 500.0	1 507.1	1 504.7	1 514.2	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
180	240

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	80	76	99	109	89	0.87	1.30
60	—	—	—	—	—	—	—

Luminous and colour characteristics			
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates	
		x	y
Daylight	4 250	See Appendix D	
Cool white	5 000		
White	*	0.365**	0.373**
Warm white	5 200	0.432**	0.403**

* Under consideration. ** Philadelphia co-ordinates (see Appendix D).

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated 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			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
180	400	0.79	1.83
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
128		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
130	400

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
85 W	With starter	G13	1 800 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
1 763.8	1 770.9	1 768.5	1 778.0	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
216	240

Note. — The ballast for the lamp starting test is an 80 W-240 V inductive ballast, complying with IEC Publication 82.

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	85	84	120	130	110	0.80	1.30
60	—	—	—	—	—	—	—

Luminous and colour characteristics			
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates	
		x	y
Daylight	4 700	See Appendix D	
Cool white	5 800		
White	*	0.365**	0.373**
Warm white	6 000	0.432**	0.403**

* Under consideration. ** Philadelphia co-ordinates (see Appendix D).

**Documents**

Document Sharing Hub

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
85	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	85	240	0.865	223	0.06
60	—	—	—	—	—

Note. — An 80 W rated reference ballast may be used since the reference ballast for the 1 800 mm/85 W lamp has the same voltage/current ratio, power factor and other characteristics as the 80 W ballast.

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
216	400	0.68	1.70
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
160		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
175	800

TUBULAR FLUORESCENT LAMP DATA SHEET			Page 1
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Rating	Circuit	Cap	Nominal dimensions
125 W	With starter	G13	2 400 mm × 38 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0001-				
A	B		C	D
Max.	Max.	Min.	Max.	Max.
2374.3	2381.4	2379.0	2388.5	40.5

Lamp starting test	
Test voltage (V)	Ballast voltage rating (V)
220	240

Note. — The ballast for the lamp starting test is an 80 W and 240 V inductive ballast complying with IEC Publication 82, together with a 6.8 µF capacitor in series.

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	125	123	149	164	134	0.94	1.30
60	—	—	—	—	—	—	—

Luminous and colour characteristics			
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates	
		x	y
Daylight	—	—	—
Cool white	8 000	0.365*	0.373*
White	—	—	—
Warm white	8 150	0.432*	0.403*

* Philadelphia co-ordinates (see Appendix D).

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Page 2

Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
80	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	125	350	0.94	300	0.06
60	—	—	—	—	—

Information for ballast design			
Open circuit voltage (V)		Pre-heating current (A)	
Min. (r.m.s.) at starter	Max. (peak) at lamp	Min.	Max.
—	—	0.80	1.97
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		Equivalent resistance of both cathodes in series (Ω)	
—		25	

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
180	800

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Rating	Circuit	Cap	Nominal dimensions
22 W	With starter	G10q	210 mm

Mechanical, physical and starting requirements

For lamp marking, tubes, dimensions, caps and starting requirements, Clauses 4.1 to 4.5 of this publication apply. For conditions of compliance, Clause 6.4 applies.

Lamp dimensions (mm) — See Sheet 81-IEC-0002-							
A		B		C and D		D ₁	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
155.6	149.1	157.2	147.6	215.9	203.2	30.9	26.2

Lamp starting test		
Frequency (Hz)	Test voltage (V)	Ballast voltage rating (V)
50	103.5	110
60		120

Initial readings and colour

For lamp voltage, wattage and luminous characteristics, Clauses 5.3 and 5.4 of this publication apply. For conditions of compliance, Clause 6.5 applies.

Lamp electrical characteristics							
Frequency (Hz)	Rated wattage (W)	Objective wattage (W)	Voltage (r.m.s.) at lamp terminals (V)			Nominal current (A)	
			Objective	Max.	Min.	Running	Pre-heat
50	22	22	62	68	55	0.400	0.600
60	22	21,5	62	68	55	0.370	0.600

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	880	} See Appendix D
Cool white	1 000	
White	*	
Warm white	1 000	

* Under consideration.

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Lumen maintenance

For lumen maintenance test, Clause 5.6 of this publication applies. For conditions of compliance, Clause 6.6 applies.

Minimum lumen maintenance (%)	
at 2 000 h	at 70% of rated life
75	70

Ballast

The requirements of IEC Publication 82 apply.

Reference ballast characteristics					
Frequency (Hz)	Rated wattage (W)	Rated voltage (V)	Calibration current (A)	Voltage/ current ratio (Ω)	Power factor
50	22	127	0.400	240	0.12
60	22	236	0.370	575	0.075

Information for ballast design				
Open circuit voltage (V)		Pre-heating current (A)		
Min. (r.m.s.) at starter	Max. (peak) at lamp	Frequency (Hz)	Min.	Max.
103.5	400	50	0.360	0.840
Max. (r.m.s.) voltage across starter terminals with lamp operating (V)		60	0.450	0.770
		Equivalent resistance of both cathodes in series (Ω)		
70		40		

Starter

The requirements of IEC Publication 155 apply.

Information for starter design	
Non-reclosure voltage (V)	Min. pulse voltage (V)
70	250