

AS 1201—1989
IEC 81 (1984)

Australian Standard[®]

**Tubular fluorescent lamps for
general lighting service**

This Australian Standard was prepared by Committee LG/5, Electric Lamps. It was approved on behalf of the Council of Standards Australia on 28 February 1989 and published on 25 August 1989.

The following interests are represented on Committee LG/5:

Australian Chamber of Commerce
Australian Electrical and Electronic Manufacturers Association
Public Works Department, N.S.W.
Electricity Supply Association of Australia
Illuminating Engineering Societies of Australia
Testing interests

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

Australian Standard[®]

Tubular fluorescent lamps for general lighting service

First published as AS 1201, Parts 1 and 2—1974
Revised and redesignated AS 1201—1989.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

PREFACE

This Standard was prepared by the Standards Australia Committee on Electric Lamps to supersede AS 1201 — 1974, *Tubular fluorescent lamps for general lighting service, Part 1: Test and compliance requirements* and *Part 2: Lamp data sheets*.

It is identical with and has been reproduced from IEC 81(1984), *Tubular fluorescent lamps for general lighting service*, including Amendment No. 1(1987) and Amendment No. 2(1988).

Statements expressed in mandatory terms in Notes to tables and figures are deemed to be requirements of this Standard.

Statement expressed in mandatory terms in the following notes to the text are deemed to be requirements of this Standard:

Clause C1.1.1, Note; Clause C1.1.3, Note 1; Clause C2.1 Note; Clause C2.4 Note 1.

For the purposes of this Australian Standard, the IEC test should be modified as follows:

- (a) Substitute a point (.) for a comma (,) as a decimal marker.
- (b) The references to other publications should be replaced by references to Australian Standards.

<i>Reference to international Standard</i>	<i>Australian Standard</i>
IEC	AS
82 Ballasts for tubular fluorescent lamps	2643 Fluorescent lamp ballasts of the reactive type — Performance requirements

- (c) Add the following to Clause 4.1 —

NOTE: Manufacturers making a statement of compliance with this Australian Standard on a product, or on packaging or promotional material related to that product, are advised to ensure that such compliance is capable of being verified.

Independent certification is available from Standards Australia under the StandardsMark Product Certification Scheme. The StandardsMark, shown below, is a (registered) certification trade mark owned by Standards Australia and granted under licence to manufacturers whose products comply with the requirements of suitable Australian Standards and who operate sound quality assurance programs to ensure consistent product quality.

Further information on product certification and the suitability of this Standard for certification is available from Standards Australia's Quality Assurance Services, 1 The Crescent, Homebush, N.S.W., 2140.



© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

CONTENTS

	Page
INTRODUCTION	1-1
SECTION ONE — GENERAL	
Clause	
1.1 General	1-1
1.2 Definitions	1-2
1.3 General principles of layout of data sheets	1-4
SECTION TWO — LAMP DATA SHEETS	
2.1 List of specific lamp types included in this publication	2-1
SECTION THREE — SAMPLING	
3.1 Method of selection	3-1
3.2 Inspection test quantity (I.T.Q.)	3-1
3.3 Rating test quantity (R.T.Q.)	3-1
3.4 Lumen maintenance test quantity (M.T.Q.)	3-1
SECTION FOUR — MARKING, MECHANICAL, PHYSICAL AND STARTING CHARACTERISTICS	
4.1 Lamp marking	4-1
4.2 Glass tubing	4-1
4.3 Lamp dimensions	4-1
4.4 Caps	4-1
4.5 Starting characteristics	4-2
SECTION FIVE — REQUIREMENTS AND CONDITIONS OF TEST FOR INITIAL READINGS AND FOR LUMEN MAINTENANCE	
5.1 Position of burning and lamp connections	5-1
5.2 Ageing	5-1
5.3 Lamp voltage and wattage	5-1
5.4 Luminous characteristics	5-1
5.5 Cathode characteristics for pre-heat type lamps operated without starter	5-2
5.6 Lumen maintenance test	5-2
5.7 Switching on and off during lumen maintenance test	5-2
5.8 Accidentally broken and/or incorrectly operated lamps	5-3
SECTION SIX — CONDITIONS OF COMPLIANCE	
6.1 General conditions	6-1
6.2 Individual batches	6-1
6.3 Whole production of a manufacturer	6-1
6.4 Mechanical, physical and starting requirements	6-3
6.5 Initial readings and colour	6-3
6.6 Lumen maintenance	6-4
APPENDIX A — Suggested method for selection	A-1
APPENDIX B — Method of testing starting characteristics	B-1
APPENDIX C — Methods of measuring electrical and luminous characteristics of the lamp	C-1
APPENDIX D — Rated colour characteristics	D-1
APPENDIX E — Ballasts and starters to be used for tests	E-1
APPENDIX F — Torsion test for bi-pin G13	F-1
APPENDIX G — Statistical basis of the conditions of compliance in Section Six of this standard	G-1
APPENDIX H — Extended lumen maintenance test	H-1
APPENDIX J — Particular requirements of vapour-pressure controlled (Amalgam) lamps	J-1
APPENDIX K — Figures	K-1

(PAGE 4 IN THE HARD COPY IS BLANK.)

STANDARDS AUSTRALIA

Australian Standard**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 lamp data sheet number.

The second 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.

0001 Diagrammatic drawings for location of lamp dimensions — linear lamps.

0002 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	
1000-1999	Starter	Pre-heated	High Low High	
2000-2999	Starter	Pre-heated		
3000-3999	Starterless	Pre-heated		
4000-4999		Pre-heated		
5000-5999	Starter and starterless	Pre-heated		
6000-6999		Pre-heated		
7000-7999	Starterless	Non-pre-heated		
8000-8999				
9000-9999				

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	
1104	15 W	G13	Starter	Pre-heated	
1105	18 W	G13	Starter	Pre-heated	
1110	20 W	G13	Starter	Pre-heated	
1115	20 W	G13	Starter	Pre-heated	
1150	25 W	G13	Starter	Pre-heated	
1210	30 W (T8)	G13	Starter	Pre-heated	
1220	30 W (T12)	G13	Starter	Pre-heated	
1305	36 W	G13	Starter	Pre-heated	
¹⁾ 1310	40 W	G13	Starter	Pre-heated	
1311	40 W	G13	—	Pre-heated	
1315	40 W	G13	Starter	Pre-heated	
1545	58 W	G13	Starter	Pre-heated	
1550	65 W	G13	Starter	Pre-heated	
1610	70 W	G13	Starter	Pre-heated	
1710	80 W	G13	Starter	Pre-heated	
1780	82 W	G13	Starter	Pre-heated	
1930	125 W	G13	Starter	Pre-heated	
2130	22 W	G10q	Starter	Pre-heated	
2230	32 W	G10q	Starter	Pre-heated	
2350	40 W	G10q	Starter	Pre-heated	
2810	90 W	G20	Starter	Pre-heated	
4110	20 W	G13	Starterless	Pre-heated	High-cathode resistance
4210	30 W (T8)	G13	Starterless	Pre-heated	High-cathode resistance
4220	30 W (T12)	G13	Starterless	Pre-heated	High-cathode resistance
4310	40 W	G13	Starterless	Pre-heated	High-cathode resistance
4710	80 W	G13	Starterless	Pre-heated	High-cathode resistance
4780	85 W	G13	Starterless	Pre-heated	High-cathode resistance
4930	125 W	G13	Starterless	Pre-heated	High-cathode resistance
5110	20 W	G13	Starterless	Pre-heated	Low-cathode resistance
5115	20 W	G13	Starterless	Pre-heated	Low-cathode resistance
5210	30 W (T8)	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ ²⁾ 5220	30 W (T12)	G13	Starterless	Pre-heated	Low-cathode resistance
5225	30 W (T12)	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5310	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
5311	40 W	G13	—	Pre-heated	
¹⁾ ²⁾ 5315	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ ²⁾ 5325	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5330	40 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5350	40 W	G10q	Starterless	Pre-heated	Low-cathode resistance
5520	60 W	R17d	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5550	65 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5760	85 W	G13	Starterless	Pre-heated	Low-cathode resistance
¹⁾ 5770	87 W	R17d	Starterless	Pre-heated	Low-cathode resistance
5920	112 W	R17d	Starterless	Pre-heated	Low-cathode resistance
6020	4 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
6030	6 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
6040	8 W	G5	Starter or starterless	Pre-heated	High-cathode resistance
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
6130	22 W	G10q	Starterless	Pre-heated Low-cathode resistance
6230	32 W	G10q	Starterless	Pre-heated Low-cathode resistance
6350	40 W	G10q	Starterless	Pre-heated Low-cathode resistance
¹⁾ 8110	20 W	Fa6	Starterless	Non-pre-heated
¹⁾ 8290	39 W	Fa8	Starterless	Non-pre-heated
¹⁾ 8310	40 W	Fa6	Starterless	Non-pre-heated
¹⁾ 8470	57 W	Fa8	Starterless	Non-pre-heated
¹⁾ 8510	65 W	Fa6	Starterless	Non-pre-heated
¹⁾ 8650	75 W	Fa8	Starterless	Non-pre-heated

¹⁾ Subject to type testing only.

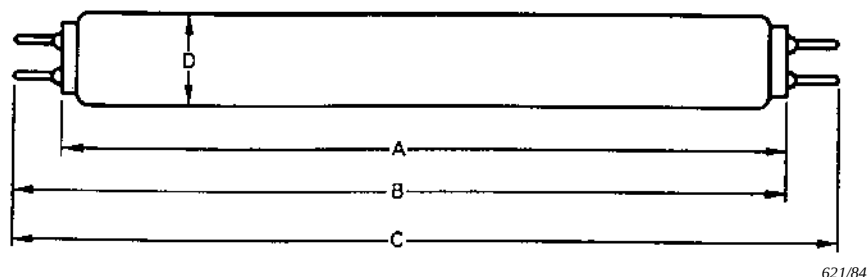
DIAGRAMMATIC DATA SHEET FOR LOCATION OF TUBULAR FLUORESCENT LAMP DIMENSIONS

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. = $X + (2 \times 7.1) = X + 14.2$ mm
C min. = not specified

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

- 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 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.

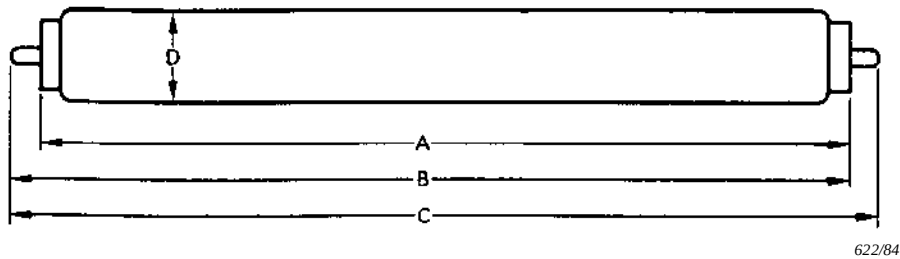
DIAGRAMMATIC DATA SHEET FOR LOCATION OF TUBULAR FLUORESCENT LAMP DIMENSIONS

Linear lamps

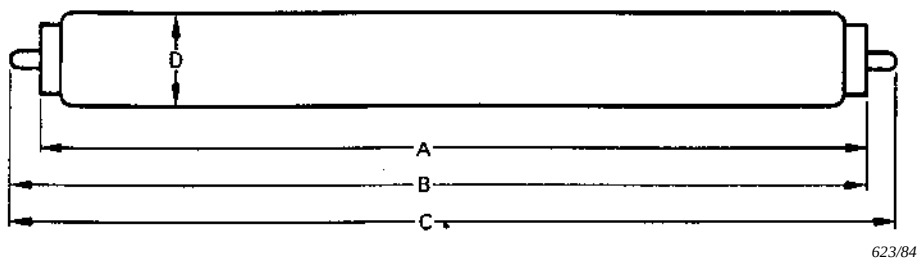
Page 2

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

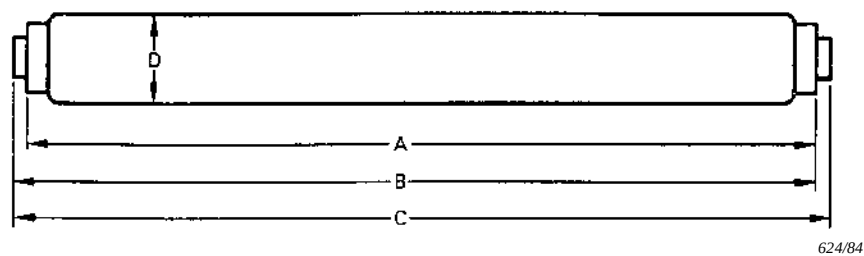
Fa6 Cap*



Fa8 Cap*



R17d Cap*



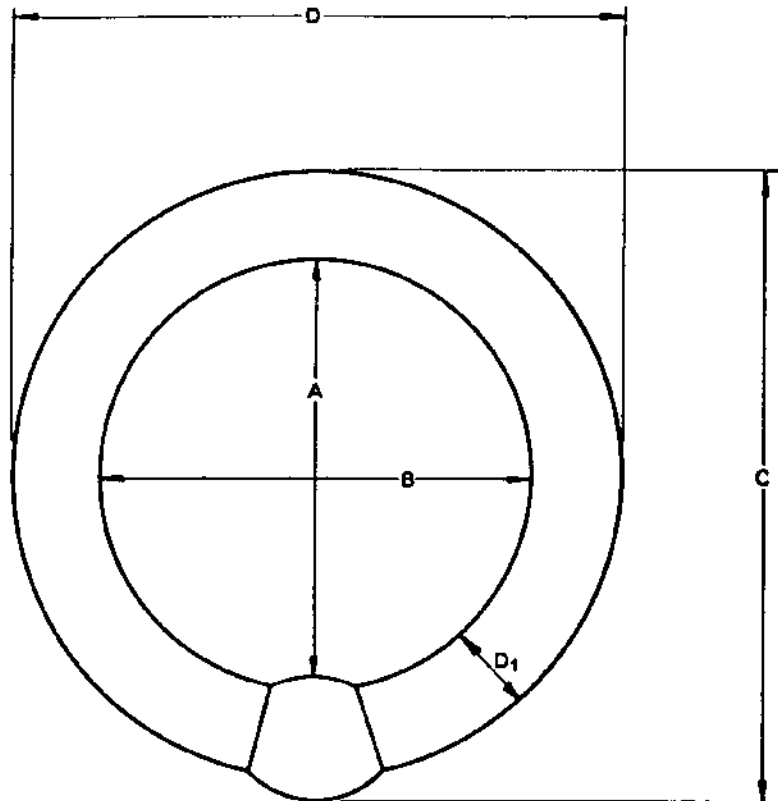
* See IEC Publication 61: Lamp Caps and Holders Together with Gauges for the Control of Interchangeability and Safety.

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.

G10q Cap*



186/74

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

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 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.

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

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 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 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 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	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.
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 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 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	*		
Warm white	2 020		
		0.365**	0.373**
		*	*
		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

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 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 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 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 and requirements

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

Lamp dimensions (mm)— See Sheet 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 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 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	10.

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.

TUBULAR FLUORESCENT LAMP DATA SHEET

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 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

TUBULAR FLUORESCENT LAMP DATA SHEET

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 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)	Min. pulse voltage (V)
175	900

TUBULAR FLUORESCENT LAMP DATA SHEET

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 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	0.365**	0.373**
White	*	*	*
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 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).

COPYRIGHT

1780-2

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

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 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 μ F 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).

COPYRIGHT

1930-3

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	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

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

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 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.

COPYRIGHT

2130-2

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
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

TUBULAR FLUORESCENT LAMP DATA SHEET

Page 1

Rating	Circuit	Cap	Nominal dimensions
32 W	With starter	G10q	305 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 0002-							
A		B		C and D		D ₁	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
246.1	239.7	246.1	236.5	311.2	298.5	34.1	29.4

Lamp starting test		
Frequency (Hz)	Test voltage (V)	Ballast voltage rating (V)
50	180	220
60	132	120 or 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	32	32	81	91	71	0.450	0.675
60	32	32	82	91	73	0.425	0.650

Luminous and colour characteristics		
Colour	Minimum rated luminous flux, in lumens	Chromaticity co-ordinates
Daylight	1 400	} See Appendix D
Cool white	1 650	
White	*	
Warm white	1 650	

* Under consideration.

COPYRIGHT

2230-2