

European Committee for Electrotechnical Standardization (CENELEC)
Cenelec Electronic Components Committee

CECC



**Système Harmonisé d'Assurance de la Qualité
des Composants Electroniques**

SPECIFICATION GENERALE :
TUBES INDICATEURS
A CATHODE FROIDE

Harmonized System of Quality Assessment for Electronic Components

GENERIC SPECIFICATION : COLD CATHODE INDICATOR TUBES

Harmonisiertes Gütebestätigungssystem für
Bauelemente der Elektronik

FACHGRUNDSPEZIFIKATION: KALTKATHODEN – ANZEIGERÖHREN

CECC 46000 Documents



1976

76 Document Sharing Hub

CONTENTS

	Page
FOREWORD	2
PREFACE	2
Paragraph	
SECTION 1 - SCOPE	3
SECTION 2 - GENERAL	3
2.1 Order of precedence	3
2.2 Related documents	3
2.3 Units, symbols and terminology	4
2.4 Marking	4
SECTION 3 - QUALITY ASSESSMENT PROCEDURES	
3.1 Primary stage of manufacture	4
3.2 Structural similarity	4
3.3 Qualification approval procedure	5
3.4 Resubmission of rejected lots	5
3.5 Delayed delivery	5
SECTION 4 - TEST AND MEASUREMENT PROCEDURES	
4.1 Alternative test methods	5
4.2 Standard conditions for testing	6
4.3 Visual examination	6
4.4 Dimensions	6
4.5 Electrical measurement methods	6
4.6 Environmental tests	8
4.7 Endurance test	8
4.8 Additional test and measurement methods	8

FOREWORD

The CENELEC Electronic Components Committee (CECC) is composed of those member countries of the European Committee for Electrotechnical Standardization (CENELEC) who wish to take part in a harmonized System for electronic components of assessed quality.

The object of the System is to facilitate international trade by the harmonization of the specifications and quality assessment procedures for electronic components, and by the grant of an internationally recognized Mark, or Certificate, of Conformity. The components produced under the System are thereby accepted by all member countries without further testing.

This document has been formally approved by the CECC, and has been prepared for those member countries taking part in the System who wish to issue national harmonized specifications for COLD CATHODE INDICATOR TUBES. It should be read in conjunction with document CECC 00 100: Basic Rules (1974).

At the date of printing of this document, the member countries of the CECC are Belgium, Denmark, Germany, France, Ireland, Italy, Netherlands, Norway, Sweden, Switzerland, and the United Kingdom, and copies of it can be obtained from the National Committees of the CENELEC in these countries.

PREFACE

This generic specification was prepared by CECC Working Group 14: "Space-charge controlled tubes".

In accordance with the requirements of document CECC 00 100 it is based, wherever possible, on the Recommendations of the International Electrotechnical Commission and in particular on IEC Publication 151: Measurements of the electrical properties of electronic tubes.

The text of this specification was circulated to the CECC for voting in document CECC(Secretariat)392 in September 1975, and was formally approved by the CECC for printing as a CECC specification.

This specification will be supplemented by blank detail specifications specific to each sub-family of cold cathode indicator tubes.

SECTION 1 - SCOPE

This document relates to cold cathode indicator tubes which, for convenience, are included in the family of space-charge controlled tubes.

SECTION 2 - GENERAL2.1 Order of precedence

Where any discrepancies occur for any reason, documents shall rank in the following order of authority:

- The detail specification
- The generic specification
- Document CECC 00 100 or any other international (e.g. IEC) documents to which reference is made.

The same order of precedence shall apply to equivalent national documents.

2.2 Related documents

ISO 1000	(1973)	SI units and recommendations for the use of their multiples and of certain other units.
IEC 27	-	Letter symbols to be used in electrical technology.
-1	(1971)	General.
IEC 50	-	International Electrotechnical Vocabulary.
IEC 50 (Chapter 531)	(1974)	Electronic tubes.
IEC 67	(1966)	Dimensions of electronic tubes and valves.
IEC 68	-	Basic environmental testing procedures. (See CECC 00 006).
IEC 117	-	Recommended graphical symbols.
IEC 134	(1961)	Rating system for electronic tubes and valves and analogous semiconductor devices.
IEC 151	-	Measurements of electrical properties of electronic tubes.
-0	(1966)	Precautions relating to methods of measurement of electronic tubes and valves.
-1	(1963)	Measurement of electrode current.
-6	(1965)	Methods of application of mechanical shock (impulse) excitation to electronic tubes and valves.

-15	(1967)	Methods of measurement of spurious and unwanted electrode currents.
-17	(1969)	Methods of measurement of gasfilled tubes and valves.
-22	(1970)	Methods of measurement of cold cathode counting and indicating tubes.
IEC 410	(1973)	Sampling plans and procedures for inspection by attributes. (See CECC 00 007).
CECC 00 100	(1974)	Basic Rules.
CECC 00 006	(1973)	Basic specification: Basic environmental testing procedures.
CECC 00 007	(1973)	Basic specification: Sampling plans and procedures for inspection by attributes.

2.3 Units, symbols and terminology

Units, graphical symbols, letter symbols and terminology shall, whenever possible, be taken from the following documents:

ISO 1000	SI units and recommendations for the use of their multiples and certain other units.
IEC 27	Letter symbols to be used in electrotechnology.
IEC 50	International Electrotechnical Vocabulary.
IEC 117	Recommended graphical symbols.

Any other units, symbols and terminology peculiar to one of the components covered by this specification shall be taken from the relevant IEC or ISO documents or derived in accordance with the principles of the documents listed above and clearly described.

2.4 Marking

The detail specification shall indicate the identification criteria and other information to be shown on the component and/or on the packing. Any identification code used, shall be described in full or reference shall be made to the appropriate document.

Use of potentially hazardous materials in the construction of the tube shall be indicated in accordance with the national safety requirements.

SECTION 3 - QUALITY ASSESSMENT PROCEDURES

3.1 Primary stage of manufacture

The primary stage of manufacture of a cold cathode indicator tube is the process of joining together of all piece parts. Sub-contracting of this stage is prohibited.

3.2 Structural similarity

When simultaneous or successive production is proceeding on several types of tubes having common features, those common features may be sampled from

the complete range of types instead of from each lot of each type.
Admissible common features and associated tests include the following:

Tube outline	-	Dimensions (IEC 67)
Terminations	-	Test U (IEC 68)
Envelope	-	Climatic tests (IEC 68)

3.3 Qualification approval procedure

The national detail specification shall indicate whether procedure 1, or 2, is to be followed, together with the necessary details.

Procedure 1: A single schedule which gives the groups of tests and the sample size together with the permissible number of defectives.

Procedure 2: The use of the quality conformance inspection whereby three consecutive lots are subjected to lot-by-lot inspection and one lot (drawn from the three) subjected to periodic inspection.

In procedure 1, each group shall contain five specimens unless otherwise stated in the detail specification.

In procedure 2, samples shall be taken from the lots in accordance with IEC 410. Normal inspection shall be used but, where the sample size would give acceptance on zero defectives, additional specimens shall be taken to meet the sample size required to give acceptance on one defective.

3.4 Resubmission of rejected lots

Lots rejected in the quality conformance inspections may be resubmitted after reworking and/or retesting by the manufacturer and after eliminating the non-conforming items.

3.5 Delayed delivery

Each cold cathode indicator tube held for a period exceeding twelve months following quality conformance inspection shall be re-examined before delivery, if prescribed by the relevant detail specification. The detail specification shall prescribe the test requirements.

SECTION 4 - TEST AND MEASUREMENT PROCEDURES

This section contains the test methods which shall be included in each harmonized national specification system. Not all the tests are applicable to all detail specifications. The blank detail specification shall prescribe which of the tests are applicable to a particular family of tubes. Additional test methods included in harmonized national detail specifications shall be clearly indicated as non-harmonized.

4.1 Alternative test methods

The test and measurement methods given in the generic specification are intended to unify test and measurement procedures. They are not necessarily the only methods which can be used. However, the manufacturer shall satisfy the National Supervising Inspectorate that any alternative methods which may be used will give results equivalent to those obtained by the method specified.

4.2 Standard conditions for testing

Unless otherwise specified, all tests shall be carried out under standard atmospheric conditions for testing as specified in IEC 68-1.

4.3 Visual examination

Unless otherwise specified, visual examination shall be performed under normal factory lighting conditions and without visual aids.

Visual examination shall be carried out for good appearance and workmanship and shall include the following items where applicable:

- Quality of seals
- Base alignment
- Straightness of pins or non-linked and non-twisted leads
- Freedom from loose elements
- Clarity, correctness and position of marking
- Finish
- Shape of envelope.

4.4 Dimensions

Dimensions and outline drawing, if possible in accordance with IEC 67.

4.5 Electrical measurement methods

The following properties shall be measured in accordance with the IEC Publication clause specified, as prescribed by the detail specification.

4.5.1 Ignition voltage

This test is in accordance with clause 4.2 of IEC 151-22. Conditions of test shall be prescribed in the detail specification:

- Storage conditions (temperature, illumination, duration)
- Test conditions (temperature, illumination), duration and value of any conditioning current.

4.5.2 Alignment of characters

This test is in accordance with clause 4.10 of IEC 151-22. Conditions of test shall be prescribed in the detail specification:

- Electrical operating conditions
- The portion of character
- The reference line through the base of end viewing tubes.

4.5.3 Uniformity of luminance

Purpose. To ensure that each character conforms with the drawing, appears uniformly illuminated along its entire length and is connected correctly.

Test procedure. With the tube operating as specified in the detail specification, each character shall appear uniformly illuminated along its entire length when viewed from a distance of 40 times the character height, in ambient lighting of 100-500 lux.

The measurement shall be performed on every cathode, at the specified current, with a specified bias voltage on all cathodes other than that carrying the main discharge. A fixed value of supply voltage and anode resistor is permitted as an alternative to the specified cathode current. During the test, the correctness of pin connections shall be checked.

Conditions of test shall be prescribed in the detail specification:

- Minimum rated cathode current, (d.c. operation) or minimum rated peak cathode current (pulse operation) or supply voltage and anode resistor to produce this current
- Other electrical operating conditions
- Bias voltage of all cathodes other than that carrying the main discharge.

4.5.4 Overall luminance

Purpose. To measure the light output from each character.

NOTE: If this test is to be performed, the uniformity of luminance test shall be performed first.

Test procedure. With the tube operating as prescribed in the conditions of test and in a dark enclosure, the luminous flux from each character shall be measured with a luxmeter having the CIE standard photopic response.

Conditions of test shall be prescribed in the detail specification:

- Main discharge cathode current or supply voltage and anode resistor.
- Bias potential of all other cathodes.
- Cathodes to be tested.
- Distance of luxmeter from cathode(s).

4.5.5 Probe current

This test is in accordance with clause 4.8 of IEC 151-22.

Conditions of test shall be prescribed in the detail specification:

- Supply voltage and value of anode resistor or anode current or main discharge cathode current.
- Bias potential.
- The main discharge cathode.
- The probe cathode.

4.5.6 Ignition delay time

This test is in accordance with clause 4.4 of IEC 151-22.

Conditions of test shall be prescribed in the detail specification:

- Anode voltage.
- Cathode(s) to be used.
- Conditions during the test (e.g. total darkness).

4.5.7 Interelectrode insulation

This test is in accordance with clause 8.2.2 of IEC 151-15.

Conditions of test shall be prescribed in the detail specification:

- Applied voltage
- External resistance

4.5.8 External discharge

No glow shall be permitted on any part other than the numeral under test.

The maximum current permitted (maximum rated average and maximum peak) shall be prescribed in the detail specification.

4.6 Environmental tests

4.6.1 Robustness of terminations

This test is in accordance with Test U of IEC 68-2-21.

4.6.2 Solderability

This test is in accordance with Test T of IEC 68-2-20.

4.6.3 Shock

This test is in accordance with Test Ea of IEC 68-2-27.

4.6.4 Vibration

This test is in accordance with Test Fc of IEC 68-2-6

4.7 Endurance test

Conditions shall be prescribed in the detail specification.

4.8 Additional test and measurement methods

Additional tests and measurements shall be made in accordance with IEC 151 or any other harmonized test or measurement methods. Failing this, reference may be made to a test or a measurement method described in a harmonized national system. If such methods are used, they shall be fully described in the detail specification.