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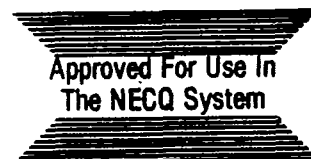
EIA SPECIFICATION

Sectional Specification for Fixed Chip Capacitors with Metallized Electrodes and Polyethylene- Terephthalate Dielectric for Use in Electronic Equipment

EIA-580A000

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(From Standards Proposal No. 2357 formulated under the cognizance of P-2.2 Subcommittee on Plastic and Paper Dielectric)

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FIXED CAPACITORS
FOR USE IN ELECTRONIC EQUIPMENT
SECTIONAL SPECIFICATION:
FIXED CHIP CAPACITORS WITH METALLIZED ELECTRODES AND
POLYETHYLENE-TEREPHTHALATE DIELECTRIC

SELECTION OF METHODS OF TEST AND GENERAL REQUIREMENTS

1. SECTION ONE - GENERAL

1.1 Scope

This standard applies to fixed chip capacitors for direct current, with metallized electrodes and polyethylene-terephthalate dielectric for use in electronic equipment. These capacitors have metallized connecting pads or soldering strips and are intended to be mounted directly onto substrates for hybrid circuits or onto printed boards. These capacitors may have "self-healing properties" depending on conditions of use. They are primarily intended for applications where the ac component is small with respect to the rated voltage. They may be encapsulated or unencapsulated, as indicated in the detail specification.

1.2 Object

The object of this standard is to prescribe preferred ratings and characteristics and to select from IEC Publication 384-1 (1982), the appropriate quality assessment procedures, tests and measuring methods and to give general performance requirements for this type of capacitor. Test severities and requirements prescribed in detail specifications referring to this sectional specification shall be of equal or higher performance level, because lower performance levels are not permitted.

1.3 Related Documents

IEC publications:

Publication 62: Marking Codes for Resistors and Capacitors
(1974)

Publication 63: Preferred Number Series for Capacitors
(1963) and Resistors
 Amendment No. 1 (1967)
 Amendment No. 2 (1977)

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Publication 68:	Basic Environmental Testing Procedures
Publication 384-1: (1982)	Fixed Capacitors for Use in Electronic Equipment. Part 1: Generic Specification.
Publication 410: (1973)	Sampling Plans and Procedures for Inspection by Attributes
Publication QC 001001 (1986):	Basic Rules of the IEC Quality Assessment System for Electronic Components (IECQ)
Publication QC 001002 (1986):	Rules of Procedure of the IEC Quality Assessment System for Electronic Components.
ISO Publication:	
ISO Standard 3:	Preferred Numbers - Series of Preferred Numbers

Note: The above references apply to the current editions except for ICC Publication 68, for which the referenced edition in the applicable test clauses of the generic specification shall be used.

1.4 Information to be given in a detail specification

Detail specifications shall be derived from the relevant blank detail specification.

Detail specification shall not specify requirements inferior to those of the generic, sectional or blank detail specification. When more severe requirements are included, they shall be listed in Subclause 1.9 of the detail specification and indicated in the test schedules, for example by an asterisk.

Note: The information given in Subclause 1.4.1 may for convenience, be presented in tabular form.

The following information shall be given in each detail specification and the values quoted shall preferably be selected from those given in the appropriate clause of this sectional specification.

1.4.1 Outline drawing and dimensions

There shall be an illustration of the capacitor as an aid to easy recognition and for comparison of the capacitor with others. Dimensions and their associated tolerances, which affect interchangeability and mounting, shall be given in the detail specification. All dimensions are preferably to be stated in millimeters; however, when the original dimensions are given in inches, the converted metric dimensions in millimeters shall be added. Normally the numerical values shall be given for the length of the body, the width and height of the body. When necessary, for example when a number of items (sizes and capacitance/voltage ranges) is covered by a detail specification, the dimensions and their associated tolerances shall be placed in a table below the drawing.

When the configuration is other than described above, the detail specification shall state such dimensional information as will adequately describe the capacitor.

1.4.2 Mounting

The detail specification shall give guidance on method of mounting for normal use. Mounting for test and measurement purposes (when required) shall be in accordance with Subclause 4.1 of this sectional specification.

1.4.3 Ratings and Characteristics

The ratings and characteristics shall be in accordance with the relevant clauses of section two of this specification, together with the following:

1.4.3.1 Rated Capacitance Range

See Subclause 2.2.1.

Note: When products approved to the detail specification have different ranges, the following statement should be added: "The range of capacitance values available in each voltage range is given in the Qualified Products List".

1.4.3.2 Particular characteristics

Additional characteristics may be listed when they are considered necessary to specify adequately the component for design and application purposes.

1.4.3.3 Soldering

The detail specification shall prescribe the test methods, severities and requirements applicable for the solderability and the resistance to soldering heat test.

1.4.4 Marking

The detail specification shall specify the content of the marking on the capacitor and on the package. Deviations from Subclause 1.6 of this sectional specification, shall be specifically stated.

1.5 Terminology

In addition to the applicable terms and definitions of IEC Publication 384-1 the following definitions apply:

1.5.1 Chip capacitor

A capacitor whose small dimensions and nature or shape of terminations make it suitable for surface mounting on hybrid circuits or printed boards.

1.5.2 Rated voltage (U_r)

The rated voltage is the maximum dc voltage that may be applied continuously to a capacitor at the rated temperature.

Note: If both ac and dc voltages are applied to a capacitor, the sum of the dc voltage and the peak ac voltage shall not exceed the rated voltage. The ac component of the voltage shall not exceed the percentage listed at the following frequencies and in no case shall be greater than 280 V.

60 Hz	:	20	%
100 Hz	:	15	%
1,000 Hz	:	3	%
10,000 Hz	:	1	%

unless otherwise specified in the detail specification.

1.6 Marking Subclause 2.4 of IEC Publication 384-1, with the following details:

1.6.1 The information given in the marking is normally selected from the following list; the relative importance of each item is indicated by its position in the list:

- a) Rated capacitance (in clear or code according to IEC Publication 62)
- b) Rated voltage (dc voltage may be indicated by the symbol V or V_{dc})
- c) tolerance on rated capacitance
- d) Year and month (or week) of manufacture
- e) Manufacturer's name or trade mark
- f) Manufacturer's type designation
- g) Reference to the detail specification

1.6.2 Chip capacitors are generally not marked on the body. If some marking can be applied, they shall be clearly marked with as many as possible of the above items as is considered useful. Any duplication of information in the marking on the capacitor should be avoided.

1.6.3 Any marking shall be legible and not easily smeared or removed by rubbing with the finger.

1.6.4 The package containing the capacitor(s) shall be clearly marked with all the information listed in Subclause 1.6.1.

1.6.5 Any additional marking shall be so applied that no confusion can arise.

2.2.2 Tolerance on Rated Capacitance

The preferred tolerances on the rated capacitance are $\pm 5\%$, $\pm 10\%$, and $\pm 20\%$.

2.2.3 Rated Voltage (U_R)

The preferred values of rated voltage are: 25 - 40 - 50 - 63 - 100 - 160 - 250 - 400 V. These values conform to the basic series of preferred values as given in ISO Standard 3: Preferred numbers - Series of preferred numbers.

2.2.4 Category Voltage (U_C)

The category voltage is:

0.8 U_R for upper category temperature 100°C

0.5 U_R for upper category temperature 125°C

2.2.5 The standard value of rated temperature is 85°C .

3. SECTION THREE - QUALITY ASSESSMENT PROCEDURES

3.1 Primary stage of manufacture

3.2 Structurally similar components

Capacitors considered as being structurally similar are capacitors produced with similar processes and materials, though they may be of different case sizes and capacitance and voltage values.

3.3 Certified records of released lots

The information required in Subclause 3.5.1 of IEC Publication 384-1 shall be made available when prescribed in the detail specification and when requested by a purchaser. After the endurance test the parameters for which variables information is required are the capacitance change, tangent and the insulation resistance.

3.4 Qualification approval

The procedures for qualification approval testing are given in Subclause 3.4 of the generic specification, IEC Publication 384-1.

The schedule to be used for qualification approval testing on the basis of lot-by-lot and periodic tests is given in Subclause 3.5 of this specification. The procedure using a fixed sample size schedule is given in Subclauses 3.4.1 and 3.4.2 below. For the two procedures the sample sizes and the number of permissible defectives shall be of comparable order. The test conditions and requirements shall be the same.

3.4.1 Qualification approval on the basis of fixed sample size procedures.

Sampling

The fixed sample size procedure is described in Subclause 3.4.2 b) of IEC Publication 384-1. The sample shall be representative of the range of capacitors for which approval is sought. This may or may not be the complete range covered by the detail specification.

The sample shall consist of specimens having the lowest and highest voltages, and for these voltages the lowest and highest capacitances. When there are more than four rated voltages an intermediate voltage shall also be tested. Thus for the approval of range, testing is required of either four or six values (capacitance/voltage combinations). When the range consists of fewer than four values, the number of specimens to be tested shall be that required for four values.

Spare specimens are permitted as follows:

- a) One per value, which may be used to replace the permitted defective in Group "O".
- b) One per value, which may be used as replacements for specimens which are defective because of incidents not attributable to the manufacturer.

The numbers given in Group "O" assume that all groups are applicable. If this is not so the numbers may be reduced accordingly.

When additional groups are introduced into the qualification approval test schedule, the number of specimens required for Group "O" shall be increased by the same number as that required for the additional groups.

Table 1 gives the number of samples to be tested in each group or subgroup together with the permissible number of defectives for qualification approval tests.

3.4.2 Tests

The complete series of tests specified in Tables 1 and 2 are required for the approval of capacitors covered by one detail specification. The tests of each group shall be carried out in the order given.

The whole sample shall be subjected to the tests of Group "O" and then divided for the other groups.

Specimens found defective during the tests of Group "O" shall not be used for the other groups.

"One defective" is counted when a capacitor has not satisfied the whole or a part of the tests of a group.

The approval is granted when the number of defectives does not exceed the specified number of permissible defectives for each group or subgroup and the total number of permissible defectives.

Note: Tables 1 and 2 together form the fixed sample size test schedule. Table 1 includes the details for the sampling and permissible defectives for the different tests or groups of tests. Table 2, together with the details of test contained in Section Four, gives a complete summary of test conditions and performance requirements and indicates where (for example, for the test method or conditions of test) a choice has to be made in the detail specification.

The conditions of test and performance requirements for the fixed sample size test schedule shall be identical to those prescribed in the detail specification for quality conformance inspection.