



Pages 1 to 15

# GENERAL REQUIREMENTS FOR THE MARKING OF ESCC COMPONENTS

**ESCC Basic Specification No. 21700**

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**TABLE OF CONTENTS**

<b><u>1.</u></b>	<b><u>SCOPE</u></b>	<b><u>5</u></b>
<b><u>2.</u></b>	<b><u>APPLICABLE DOCUMENTS</u></b>	<b><u>5</u></b>
<b><u>3.</u></b>	<b><u>REQUIRED MARKING</u></b>	<b><u>5</u></b>
3.1	Qualified Components	5
3.2	Unqualified Components	5
3.3	Non-Conforming Components	5
<b><u>4.</u></b>	<b><u>GENERAL REQUIREMENTS</u></b>	<b><u>5</u></b>
4.1	Characters and Numerals	5
4.2	Location of Marking	5
4.3	Colour of Marking	6
4.4	Marking Precedence	6
4.5	Lay Out and Grouping of Marking	6
4.6	Permanence of Marking	7
<b><u>5.</u></b>	<b><u>MARKING CODES</u></b>	<b><u>7</u></b>
5.1	Polarity and Lead Identification	7
5.2	ESCC Qualified Components Symbol	7
5.3	The ESCC Component Number	7
5.3.1	Total Dose Radiation Level Letter	7
5.4	Characteristics and Ratings	8
5.5	Traceability Information	8
5.5.1	Manufacturing Date Code	8
5.5.2	Lot and Selected Sublot Identification	8
5.5.3	Serial Number	8
5.6	Warning Signs	8
5.7	Additional Marking	9
5.8	Manufacturer's Name, Symbol or Code	9
5.9	Numerical Values	9
5.9.1	3-Digit Code	9
5.9.2	4-Digit Code	10
5.9.3	5-Digit Code	10
5.9.4	Colour Code	11
5.10	Tolerance	12
5.10.1	Symmetrical Tolerances in Percent	12
5.10.2	Asymmetrical Tolerances in Percent	12
5.10.3	Tolerances on Capacitance - Values below 10pF	12
5.11	Temperature Coefficient	13
5.12	Rated Voltage	13
APPENDIX A		15

## 1. **SCOPE**

This specification defines the general marking requirements for electronic components produced to the ESCC system of specifications. The precise marking requirements for a component are provided in the relevant Detail Specification.

## 2. **APPLICABLE DOCUMENTS**

The following documents form part of this specification and shall be read in conjunction with it:

- (a) ESCC Basic Specification No. 20600, Preservation, Packaging and Despatch of ESCC Electronic Components.
- (b) ESCC Basic Specification No. 22900, Total Dose Steady-State Irradiation Test Method.
- (c) ESCC Basic Specification No. 24800, Resistance to Solvents of Marking, Materials and Finishes.
- (d) IEC Publication No. 62, Marking Codes for Resistors and Capacitors.

## 3. **REQUIRED MARKING**

### 3.1 **QUALIFIED COMPONENTS**

Components procured from a qualified source, whose qualification status is valid at the time of delivery, shall be marked with the ESCC qualified components symbol to signify their conformance to the ESCC qualification requirements and their full compliance with the relevant ESCC Generic and Detail Specifications. For such components, the marking requirements specified herein are mandatory.

Note: Delivery is taken to mean despatch to the orderer or delivery into a "finished goods store" provided that the components are enclosed in their primary package per the requirements of ESCC Basic Specification No. 20600.

### 3.2 **UNQUALIFIED COMPONENTS**

Components procured from sources which are not qualified but which fully comply with the procurement requirements of the relevant ESCC Generic and Detail Specifications, may be marked in accordance with the requirements specified herein. They may not be marked with the ESCC qualified components symbol.

### 3.3 **NON-CONFORMING COMPONENTS**

Components failing any test or inspection or non-conforming in any respect with the procurement requirements of the relevant ESCC Generic and Detail Specification shall have any and all ESCC marking removed or permanently obliterated.

## 4. **GENERAL REQUIREMENTS**

### 4.1 **CHARACTERS AND NUMERALS**

Alphabetic characters shall be in upper case Roman and numerals shall be of Arabic type. Letters and numbers shall be uniform in height. The physical dimensions may be varied to suit particular requirements provided legibility is maintained.

### 4.2 **LOCATION OF MARKING**

Unless otherwise specified in the relevant Detail Specification, the location of marking on a component

shall be such that it is clearly visible under all normal mounting arrangements for the component.

The Process Identification Document (PID) shall give requirements for the physical location of marking on a component.

#### 4.3 COLOUR OF MARKING

Unless otherwise specified in the relevant Detail Specification, the colour of the marking shall be at the discretion of the manufacturer. The colour chosen shall provide clear legibility.

The Process Identification Document (PID) shall give requirements for the colour of marking on a component.

#### 4.4 MARKING PRECEDENCE

The precise marking requirements, as specified in the relevant Detail Specification, may exceed the space available on the component. For such components, marking items shall be applied to respect the following order of precedence:

- (1) Polarity and/or Lead identification.
- (2) ESCC qualified components symbol (for ESCC qualified components only).
- (3) ESCC Component number.
- (4) Characteristics and ratings (if applicable).
- (5) Lot identification (Date code and lot number as applicable).
- (6) Serial number.
- (7) Warning signs (BeO, electrostatic discharge, dangerous materials...).
- (8) Additional (special-to-purpose) marking.
- (9) Manufacturer's name, symbol or code.

The precedence of items 3 and 4 may be reversed for components where it is important to be able to identify the characteristics and ratings during their utilisation.

Items 3-9 inclusive shall be complete or shall otherwise be omitted. If an item has to be omitted due to space constraints, a smaller item of lower precedence may then be incorporated.

The exact marking shall be defined in the PID and shall respect layout and grouping requirements so as to be clearly identifiable as to its purpose.

#### 4.5 LAY OUT AND GROUPING OF MARKING

The marking required on a component in respect of:

- (a) The ESCC Component Number.
- (b) Characteristics and ratings (if applicable).
- (c) Traceability information (lot identification and serial number).

shall generally constitute three distinct groups and shall be so marked on the component. The relevant Detail Specification may specify the sequence and division or line spacing of the marking, but in any case the marking shall be so disposed that each of the groups is readily identifiable.

Where space or other practical considerations so demand, the groups may be marked contiguously provided that this does not contravene the requirements of the applicable Detail Specification and the marking remains unambiguous.

#### 4.6 PERMANENCE OF MARKING

All marking shall remain legible after being submitted to all the tests and conditions specified for the component in the relevant Generic and Detail Specifications. When a permanence of marking test is called for in a Generic Specification it shall include the ESCC resistance to solvents test as specified in ESCC Basic Specification No. 24800.

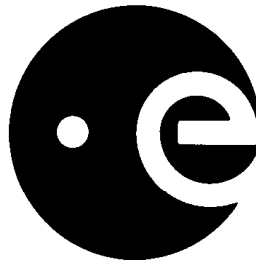
### 5. MARKING CODES

#### 5.1 POLARITY AND LEAD IDENTIFICATION

When applicable, the marking requirements for polarity or lead identification will be specified in the relevant Detail Specification.

#### 5.2 ESCC QUALIFIED COMPONENTS SYMBOL

The ESCC qualified components symbol shall be scaled to appropriate sizes for use in marking the component and, where appropriate, its primary package in accordance with ESCC Basic Specification No. 20600. The dot and the stylised e shall remain distinct.



#### 5.3 THE ESCC COMPONENT NUMBER

The ESCC Component Number shall be as specified in the relevant Detail Specification.

The ESCC Component Number shall be formed by grouping together the following:

- (a) The number of the applicable Detail Specification.
- (b) The type variant number. (If there is only one component type variant covered by the Detail Specification, Variant 01 shall be used. It is not permitted to omit a variant number).
- (c) The total dose radiation level letter (as applicable).

The Detail Specification shall specify the marking required and show, by an example, how the ESCC Component Number is to be constituted and marked as a group.

##### 5.3.1 Total Dose Radiation Level Letter

The marking to indicate the total dose radiation level shall only be added to those components for which the test has been specified and for which the lot has been successfully tested to the level indicated by the marking.

The total dose radiation level letter shall be as specified in ESCC Basic Specification No. 22900.

#### 5.4 CHARACTERISTICS AND RATINGS

The characteristics and ratings to be marked on a component shall comprise a combination of the following:

- (a) Numerical value.
- (b) Tolerance.
- (c) Temperature coefficient, where applicable.
- (d) Rated voltage.

For the purpose of ESCC marking, these parameters are coded and constituted into a marking group. The characteristics and ratings to be marked on the component shall be as specified in the relevant Detail Specification.

#### 5.5 TRACEABILITY INFORMATION

The traceability information to be marked on a component shall comprise a manufacturing date code, a lot identification and, when applicable, a serial number. This information shall be coded in accordance with the codes specified herein and marked as a group in this order of sequence.

Manufacturing date code, e.g.	0216
Lot and Selected Sublot identification, e.g.	AA
Serial number, e.g.	116
Example	0216AA116

##### 5.5.1 Manufacturing Date Code

A four-digit code number shall be used for the manufacturing date. The first two digits shall be the last two figures of the year of manufacture. The last two digits shall indicate the week of the year (i.e. 01 to 52), during which encapsulation or the final production process occurred.

##### 5.5.2 Lot and Selected Sublot Identification

If it is necessary to differentiate between more than one lot processed in the same week, a suffix letter (beginning with the letter A) shall be added to the date code. For a single lot, the suffix letter shall always be A.

For a Selected Sublot a second suffix letter (beginning with the letter A) shall be added to the date code. This letter shall be omitted when there are no Selected Sublots.

##### 5.5.3 Serial Number

Where serialisation of components is required, a serial number consisting of two or more digits shall be used. Serial numbers shall run sequentially and shall not be duplicated if more than one sub-lot is taken from one production lot.

#### 5.6 WARNING SIGNS

A warning sign will be required if a component is either susceptible to damage from external conditions or contains hazardous material(s). When such a warning is required, an appropriate safety clause shall be contained in the Detail Specification.

The symbol to be used to indicate the warning shall be selected from those given in Appendix A of this specification.



5.7 ADDITIONAL MARKING

If additional (special-to-purpose) marking is required it will be fully specified in the relevant Detail Specification, together with its degree of precedence.

5.8 MANUFACTURER'S NAME, SYMBOL OR CODE

Provided it does not conflict with any of the requirements specified herein, the code and method used by the Manufacturer for his own marking is left to his discretion.

5.9 NUMERICAL VALUES

Numerical values shall be expressed by means of one of the codes detailed hereafter.

These codes allow for the expression of two, three or four significant figures and the code chosen will depend on the size of the component, the range of values to be covered and the accuracy with which they are designated. The code to be used for a particular component will be defined in the relevant Detail Specification.

The numerical codes are shown for resistors, using the letter R as the decimal point indicator.

When one of these codes is used for the marking of capacitors or inductors, the letter C or L respectively shall be substituted for the letter R. The unit quantity for marking shall be stated in the relevant Detail Specification and shall be:

- (a) Ohms for resistors,
- (b) Pico-farads for capacitors,
- (c) Micro-henrys for inductors.

5.9.1 3-Digit Code

Numerical Value	Code
0.XX	RXX
X.X	XRX
XX	XX0
XX10 <sup>1</sup>	XX1
XX10 <sup>2</sup>	XX2
XX10 <sup>3</sup>	XX3
XX10 <sup>4</sup>	XX4
XX10 <sup>5</sup>	XX5
XX10 <sup>6</sup>	XX6
XX10 <sup>7</sup>	XX7
XX10 <sup>8</sup>	XX8
XX10 <sup>9</sup>	XX9

For values of 10 and above, the first two digits (X) represent significant figures and the last digit specifies the number of zeros to follow. When values of less than 10 are required, the letter is used to indicate the decimal point.

When the letter is used, all succeeding digits represent significant figures, as in the following examples:

R04=0.04Ω  
 R25=0.25Ω  
 5R0=5Ω  
 8R5=8.5Ω

5.9.2 4-Digit Code

Numerical Value	Code
0.XXX	RXXX
X.XX	XRXX
XX.X	XXRX
XXX	XXX0
XXX10 <sup>1</sup>	XXX1
XXX10 <sup>2</sup>	XXX2
XXX10 <sup>3</sup>	XXX3
XXX10 <sup>4</sup>	XXX4
XXX10 <sup>5</sup>	XXX5
XXX10 <sup>6</sup>	XXX6

For values of 100 and above, the first three digits (X) represent significant figures and the last digit specifies the number of zeros to follow.

When values of less than 100 are required, the letter is used to indicate the decimal point.

When the letter is used, all succeeding digits represent significant figures, as in the following examples:

R005=0.005Ω  
 R025=0.025Ω  
 R125=0.125Ω  
 4R50=4.5Ω  
 10R5=10.5Ω

5.9.3 5-Digit Code

Numerical Value	Code
0.XXXX	RXXXX
X.XXX	XRXXX
XX.XX	XXRXX
XXX.X	XXXRX
XXXX	XXXX0
XXXX10 <sup>1</sup>	XXXX1

XXXX10 <sup>2</sup>	XXXX2
XXXX10 <sup>3</sup>	XXXX3
XXXX10 <sup>4</sup>	XXXX4
XXXX10 <sup>5</sup>	XXXX5
XXXX10 <sup>6</sup>	XXXX6

For values of 1000 and above, the first four digits (X) represent significant figures and the last digit specifies the number of zeros to follow.

When values of less than 1000 are required, the letter is used to indicate the decimal point.

When the letter is used, all succeeding digits represent significant figures, as in the following examples:

- R1000=0.1Ω.
- R1250=0.125Ω.
- 5R500=5.5Ω.
- 25R05=25.05Ω.
- 150R5=150.5Ω.

5.9.4 Colour Code

In cases where it is more practical to mark numerical values by means of a colour code, the coding shall be in accordance with the following table.

Colour	Significant Figure	Multiplier	Tolerance
Silver	-	10 <sup>-2</sup>	±10%
Gold	-	10 <sup>-1</sup>	±5%
Black	0	1	-
Brown	1	10	±1%
Red	2	10 <sup>2</sup>	±2%
Orange	3	10 <sup>3</sup>	-
Yellow	4	10 <sup>4</sup>	-
Green	5	10 <sup>5</sup>	±0.5%
Blue	6	10 <sup>6</sup>	±0.25%
Violet	7	10 <sup>7</sup>	±0.1%
Grey	8	10 <sup>8</sup>	-
White	9	10 <sup>9</sup>	-
None	-	-	±20%

For values to two significant figures, the component shall be marked with three colour bands to indicate the numerical value. For values to three significant figures the component shall be marked with four colour bands.

The bands shall be so placed and spaced that there can be no confusion in the coding.

**NOTES:**

For resistors, the colour code conforms to IEC 62.

If this code is used for capacitors or inductors, the precise requirements, disposition of colour bands or dots etc. will be clearly specified in the relevant Detail Specification.

5.10 TOLERANCE

To indicate tolerance on numerical values, a letter code shall be used. Tolerances, as applicable, shall be tabulated in the relevant Detail Specification and each allocated a code letter. The following codes, conforming to IEC 62, shall be used where applicable.

5.10.1 Symmetrical Tolerances in Percent

Tolerance (%)	Code Letter
±0.005	E
±0.01	L
±0.02	P
±0.05	W
±0.1	B
±0.25	C
±0.5	D
±1	F
±2	G
±5	J
±10	K
±20	M
±30	N

5.10.2 Asymmetrical Tolerances in Percent

Tolerance (%)	Code Letter
-10 +30	Q
-10 +50	T
-20 +50	S
-20 +80	Z

5.10.3 Tolerances on Capacitance - Values below 10pF

Tolerance (%)	Code Letter
±0.1	B
±0.25	C
±0.5	D
±1.0	F

Where a range of tolerances applicable to a specific component is not covered by the above, it shall be tabulated in the relevant Detail Specification and a letter code allocated.

5.11 TEMPERATURE COEFFICIENT

To indicate the temperature coefficient applicable to a component, a numerical code shall be used. The range of applicable temperature coefficients shall be tabulated in the relevant Detail Specification and each allocated a single digit (1-9) code.

For symmetrical temperature coefficients and where applicable, the following code shall be used.

Temperature Coefficient $\pm\text{ppm}/^{\circ}\text{C}$	10	25	50	100	150	200	250	500
Digit	1	2	3	4	5	6	7	8

Where a range of temperature coefficients applicable to a specific component is not covered by the above or where asymmetrical temperature coefficients are involved, they shall be tabulated in the relevant Detail Specification and a digit code allocated.

5.12 RATED VOLTAGE

The rated voltage applicable to a component shall be indicated by a letter code. The range of applicable rated voltages shall be tabulated in the relevant Detail Specification and each allocated a single letter code. Wherever applicable, the following codes shall be used.

For Capacitors: Tantalum, Solid Dielectric  
 Glass  
 Aluminium, Solid Dielectric  
 Mica

Rated Voltage	6	6.3	8	10	15	20	25	30	35	40	50
Code Letter	A	B	C	D	E	F	G	H	J	K	L

Rated Voltage	60	63	75	100	150	160	200	250	300	400	500
Code Letter	M	N	P	Q	R	S	T	U	V	W	Y

For Capacitors: Ceramic  
 Metallised Plastic Film

Rated Voltage	25	40	50	63	100	160	200	250	300	400	500
Code Letter	A	B	C	D	E	F	G	H	J	K	L

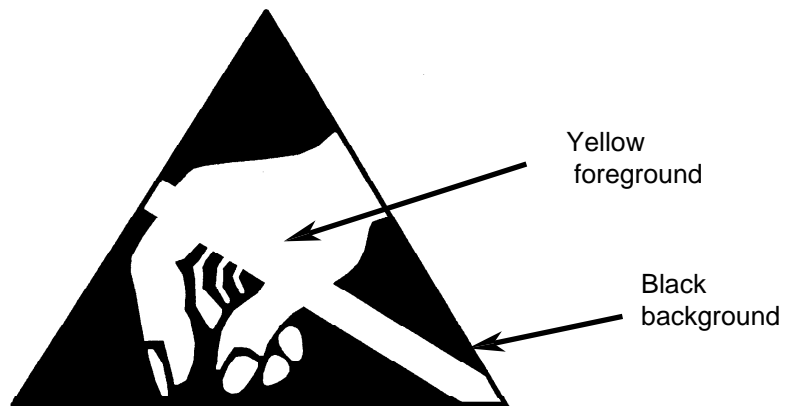
Rated Voltage	1k	1.6k	2k	2.5k	3k	4k	6k	6.3k	8k	10k	12.5k
Code Letter	M	N	P	Q	R	S	T	U	V	W	Y

Where a range of rated voltages applicable to a specific component is not covered by the above, they shall be tabulated in the relevant Detail Specification and letter codes allocated.

**APPENDIX A**

**WARNING SIGNS**

1. Electrostatic Discharge Symbol



2. Beryllium Oxide Symbol

**BeO**