TERMS DEFINITIONS ABBREVIATIONS SYMBOLS AND

UNITS FOR CAPACITORS

ESCC Basic Specification No. 2133000

Issue 2	August 2004

LEGAL DISCLAIMER AND COPYRIGHT

DOCUMENTATION CHANGE NOTICE

(Refer to https://escies.org for ESCC DCR content)

DCR No.	CHANGE DESCRIPTION
51	Specification upissued to incorporate editorial changes per DCR.

TABLE OF CONTENTS

1. SCOPE

This specifications forms part of ESA/ESCC Basic Specification No. 21300, Terms, Definitions, Abbreviations, Symbols and Units, and covers capacitors.

2. TERMS, DEFINITIONS AND ABBREVIATIONS

2.1 TYPES OF CAPACITOR

DC Capacitors	DC capacitors are capacitors designed essentially for application with a direct voltage. **NOTES:** A dc capacitor may not be suitable for use on ac supplies. For other applications, e.g. pulse or ac, the operating voltage will have to be agreed between Customer and Manufacturer.
Polar Capacitors (for electrolytic capacitors)	Polar capacitors are capacitors designed essentially for application with the positive polarity of a direct voltage on the identified terminal.
Bipolar Capacitors (for electrolytic capacitors)	Bipolar capacitors are capacitors designed to withstand reversal of the applied direct voltage.
AC Capacitors	AC capacitors are capacitors designed essentially for application with alternating voltages of stated frequency.
Pulse Capacitors	Pulse capacitors are capacitors designed essentially for application with intermittent charges or discharges at high values of the charge or discharge current.
Rated Capacitance	The rated capacitance of a capacitor is the value which is indicated on it.

2.2 CHARACTERISTICS

Capacitance	Capacitance is defined as $C=Q/V$, where C is the capacitance in farads, Q is the charge in Coulombs and V is the potential difference in volts.
Rated Capacitance (C_n)	The rated capacitance of a capacitor is the value which is indicated on it.
Dielectric	The insulating material between the plates of a capacitor, whether it consists of a gas, liquid or solid, is known as the dielectric (an example is air or glass).
Dielectric Constant	The dielectric constant K of an insulating material is the ratio of the capacitance of a given capacitor using the stated material as the dielectric compared to the capacitance using air as the dielectric; the K of air is 1.
Category Temperature Range	The category temperature range is the range of ambient temperatures for which the component has been designed to operate continuously; this is defined by the temperature limits of the appropriate category.
Upper Category Temperature	The upper category temperature is the maximum ambient temperature for which a capacitor has been designed to operate continuously.
Lower Category Temperature	The lower category temperature is the minimum ambient temperature for which a capacitor has been designed to operate continuously.

Minimum Storage Temperature	The minimum storage temperature is the minimum permissible ambient temperature which the capacitor shall withstand in the non-operating condition without damage.
Maximum Temperature of a Capacitor	The maximum temperature of a capacitor is the temperature at the hottest point of its external surface. **NOTES:** The terminals are considered to be part of the external surface.
Minimum Temperature of a Capacitor	The minimum temperature of a capacitor is the temperature at the coldest point of its external surface. **NOTES:** The terminals are considered to be part of the external surface.
Rated Temperature	The rated temperature is the maximum ambient temperature at which the rated voltage is continuously applicable.
Category Voltage (U_c)	The category voltage Uc is the voltage which may be applied to a capacitor in use at its upper category temperature.
Rated Voltage (U_r)	The rated voltage Ur is the maximum direct voltage or the maximum r.m.s. alternating voltage which may be applied continuously to the terminals of a capacitor at any temperature between the lower category temperature and the rated temperature.
Temperature Derated Voltage	For any temperature between the rated temperature and the upper category temperature, the temperature derated voltage is the maximum voltage that may be applied continuously to the terminals of a capacitor. **NOTES:** The information for the voltage at temperatures between the temperature specified for rated voltage and the maximum category temperature shall be given by the Manufacturer.
Rated Ripple Voltage	The rated ripple voltage is the rms value of the maximum allowable alternating voltage of a specified frequency superposed on the dc voltage at which the capacitor may be operated continuously at a specified temperature.
Surge Voltage Ratio	The surge voltage ratio of a capacitor is the quotient of the maximum instantaneous voltage which may be applied to the terminals of a capacitor for a specified time at any temperature within the category temperature range and the rated voltage or the temperature derated voltage, as appropriate. The number of times per hour that this voltage may be applied must be specified.
DC Leakage (I_l)	The dc leakage varies with the dielectric material, the value of capacitance, the applied dc voltage and the temperature. Leakage current is usually given for electrolytic capacitors.
Insulation Resistance (R_i)	Insulation resistance governs the leakage of current through a capacitor. Leakage is generally of concern for dc or low-frequency circuits and, for that reason, insulation resistance measurements are generally made with dc applied. R_i is often given in megohms x microfarads.
Tangent of Loss Angle (tgδ) or Dissipation Factor	tgδ is the power loss of a capacitor divided by the or Dissipation Factor reactive power of a capacitor at a sinusoidal voltage of specified frequency. It may be calculated as the ratio of a capacitor's equivalent series resistance R_s to its capacitor resistance $$\left(\frac{1}{\omega c}\right).$$

ESCC Basic Specification No. 2133000

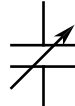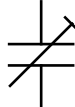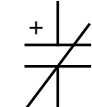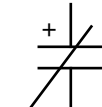|	
Voltage Proof or Dielectric Strength	The dielectric strength of an insulating material is a measure of its ability to withstand the application of voltage across its surfaces without breakdown.
Self-healing	Self-healing is a process by which the electrical properties of a capacitor, after a local breakdown of its dielectric, are instantaneously and essentially restored to their values before the breakdown.
Time Constant	The time constant is the product of the insulation resistance and the capacitance.
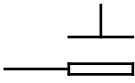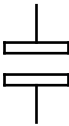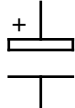
3.   **GRAPHIC REPRESENTATION**

SYMBOL	DESCRIPTION
	Capacitor - General symbol
	Lead-through capacitor Feed-through capacitor
	Chassis capacitor
	Capacitor with inherent series resistor
	Non-polarised electrolytic capacitor

SYMBOL	DESCRIPTION
	Polarised capacitor - general symbol
	Polarised electrolytic capacitor
	Variable capacitor - general symbol
	Capacitor with adjustment
	Temperature-dependent, polarised capacitor when deliberate use is made of the temperature coefficient (e.g. ceramic capacitor)
	Voltage dependent capacitor where deliberate use is made of the voltage-dependent characteristic (e.g. semi-conductor capacitor)