

JIS

JAPANESE INDUSTRIAL STANDARD

Fixed polyester film
capacitors for use in
electronic equipment

Ⓔ JIS C 5113—1991

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In the event of any doubt arising,
the original Standard in Japanese is to be final authority.

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1. Scope

This Japanese Industrial Standard specifies capacitors employing polyester film as the dielectric and metal foil as the electrodes which are used mainly in d.c. circuits (hereafter referred to as the "capacitors") based on JIS C 5111.

Remarks 1. The following Standards are cited in this Standard:

JIS C 0805-Packaging of Electronic Components on Continuous Tapes (Components with Axial Type and Radial Wire Lead Terminals)

JIS C 2318-Polyester Films for Electrical Purposes

JIS C 5101-General Rules of Fixed Capacitors for Electronic Equipment

JIS C 5102-Test Methods of Fixed Capacitors for Electronic Equipment

JIS C 5111-General Rules of Fixed Paper and Plastic Film Capacitors for Use Electronic Equipment

JIS C 5700-General Rules for Reliability Assured Electronic Components

JIS Z 9015-Sampling Inspection Procedures and Tables by Attributes with Severity Adjustment (Receiving Inspection Where A Consumer Can Select Suppliers)

2. Corresponding International Standards are given below.

IEC 384-11 (1980) Fixed capacitors for use in electronic equipment.

Part 11: Sectional specification: Fixed polyethylene-terephthalate film dielectric metal foil d.c. capacitors

IEC 384-11-1 (1988) Fixed capacitors for use in electronic equipment.

Part 11: Blank detail specification: Fixed polyethylene-terephthalate film dielectric metal foil d.c. capacitors. Assessment level E

3. The units and numerical values given in { } in this Standard are based on the traditional unit system and are appended for informative reference.

2. Definitions

For the purpose of this Standard, the principal definitions specified in JIS C 5111 shall apply.

3. Type designation

3.1 Composition of type designation The type designation shall be composed by arranging the symbols as given below.

Symbol denoting kind of capacitor	Symbol denoting style	Symbol denoting characteristic	Symbol denoting rated voltage	Symbol denoting nominal capacitance	Symbol denoting tolerance on capacitance	Symbol denoting grade	Symbol denoting failure rate level	Symbol denoting outside dimensions	Symbol denoting classification of processed lead wire terminations
3.2.1	3.2.2	3.2.3	3.2.4	3.2.5	3.2.6	3.2.7	3.2.8	3.2.9	3.2.10
Example: CQ	921	MG	1H	104	K	E	M	A1C1	F

Reference Standards: See page 24.

3.2 Symbols

3.2.1 Kind of capacitor The symbol denoting kind of capacitor shall be CQ.

3.2.2 Style The symbol denoting style shall be as given in Table 1.

Table 1. Style

Symbol	Outline	Enclosure	Termination		Lead-out method of electrodes
			Kind	Direction	
921	Square	Non-metal enclosure (dipping)	Lead wire	Same	Tab construction
922					Foil extruded construction

3.2.3 Characteristic The symbol denoting characteristic shall be MG which is consisting of symbol M denoting main material of dielectric (polyester) and symbol G denoting category temperature range (– 40 to + 85°C).

3.2.4 Rated voltage The symbol denoting rated voltage shall be as given in Table 2.

Table 2. Rated voltage

Symbol	Rated voltage V
1 H	50
2 A	100
2 D	200
2 G	400

3.2.5 Nominal capacitance The symbol denoting nominal capacitance shall consist of three digits based on the unit of picofarad (pF). The first and second digits shall represent the significant figures of nominal capacitance, and the third digit shall represent the number of zeros following the significant figures.

Examples: 152 1500 pF (0.0015μF)

153 ... 15000 pF (0.015μF)

154 .. 150000 pF (0.15μF)

3.2.6 Tolerance on capacitance The symbol denoting tolerance on capacitance shall be as given in Table 3.

Table 3. Tolerance on capacitance

Symbol	Tolerance on capacitance %
J	± 5
K	± 10

3.2.7 Grade The symbol denoting grade shall be as given in Table 4.

Table 4. Grade

Symbol	Description of grade
B	General level I for which quality assessment is required.
C	Simplified level for which quality assessment is required.
E	General level II for which quality assessment is required.
X	Others for which quality assessment are not specified.

Remarks: General level I and simplified level correspond to the general level and simplified level of JIS C 5700, respectively.

Informative reference: General level II corresponds to Assessment Level E specified in IEC 384-11-1.

3.2.8 Failure rate level The symbol denoting failure rate level shall be as given in Table 5.

Table 5. Failure rate level

Symbol	Failure rate %/1000 h	Applicable grade
M	1.0	B, C, E
P	0.1	
R	0.01	
X	Not specified.	B, C, E, X

3.2.9 Outside dimensions The symbol denoting outside dimensions (hereafter referred to as the "size symbol") shall consist of four characters.

The first and second characters express the maximum value of width and the third and fourth characters express the maximum value of height.

Each of the first and third characters shall consist of an English capital letter which expresses the basic numerical value in the unit of millimeter as given in Table 6.

Each of the second and fourth characters shall be a numeral for power of 10 to be multiplied to the basic numerical value.

Table 6. Basic numerical value and symbol

Symbol	Basic numerical value mm	Symbol	Basic numerical value mm	Symbol	Basic numerical value mm	Symbol	Basic numerical value mm
A	1.00	F	1.80	L	3.15	R	5.60
B	1.12	G	2.00	M	3.55	S	6.30
C	1.25	H	2.24	N	4.00	T	7.10
D	1.40	J	2.50	P	4.50	U	8.00
E	1.60	K	2.80	Q	5.00	V	9.00

Remarks 1. The basic numerical values are the values of R 20 series.

2. Dimension of each part shall be as specified in Attached Fig. 1.

3.2.10 Classification of processed lead wire termination The symbol denoting classification of processed lead wire termination is used to express processed lead wire termination and taped component and shall consist of an English capital letter as shown in Table 7.

Table 7. Classification of processed lead wire termination

Symbol	Classification of processed lead wire termination
F	Processed lead wire termination
T	Taped product

4. Ratings

4.1 Category temperature range The category temperature range shall be -40 to $+85^{\circ}\text{C}$.

4.2 Rated voltage The rated voltage shall be as given in Table 2.

4.3 Nominal capacitance The nominal capacitance shall be expressed in microfarad (μF), the numerical values shall be 10^n (n is an integer) times the preferred number of E 12 series given in Table 8, and the capacitance shall be within the range of 0.001 to $0.47 \mu\text{F}$.

Table 8. Preferred number of E 12 series

E 12	1	1.2	1.5	1.8	2.2	2.7	3.3	3.9	4.7	5.6	6.8	8.2
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4.4 Tolerance on capacitance The tolerance on capacitance shall be as given in Table 3.

4.5 Combination of rated voltage and nominal capacitance for respective style and grade The combination of rated voltage and nominal capacitance for respective style and grade is subject to agreement between the parties on delivery.

The outside dimensions to cope with this combination are also subject to agreement between the parties on delivery.

5. Performances and test methods

5.1 Test methods The test methods shall be as specified in JIS C 5102. However, the test methods of taping shall be as specified in JIS C 0805.

The test method when JIS C 0805 is not applicable and the test method of processed lead wire termination are subject to the parties on delivery.

5.2 Performances The performances shall be as specified in Table 9. However, performances relating to the taped products and processing of lead wire termination shall be as specified in JIS C 0805 and subject to agreement between the parties on delivery.

Table 9. Performances and test methods

No.	Item	Performances			Test method (JIS C 5102)	Informative reference (essential points of JIS C 5102)										
		Grades C and X	Grade B	Grade E												
1.	Between terminations	No abnormality.			As specified in 7.1. Test conditions:	—										
	Between termination and enclosure							As specified in 7.1. Test conditions:								
2.	Between terminations	Insulation resistance	Capacitor not exceeding 0.33 μF	30000 MΩ min.		50000 MΩ min.		30000 MΩ min.	As specified in 7.6. Measuring voltage: As specified in Table 9. However, rated voltage of 50 V shall be shown as 50 V. Temperature correction: If the measurement is carried out at a temperature other than 20°C and the measured value is disputable, correction shall be made according to Table 10 of this Standard (JIS C 5113).	Measuring voltage: Unit: V <table><tr><th>Rated voltage</th><th>Measuring voltage</th></tr><tr><td>100</td><td rowspan="3">100</td></tr><tr><td>200</td></tr><tr><td>400</td></tr></table> Duration of measurement: 60 ± 5 s after starting of voltage application	Rated voltage	Measuring voltage	100	100	200	400
			Rated voltage	Measuring voltage												
	100		100													
	200															
400																
Between termination and enclosure	Capacitor exceeding 0.33 μF	$\frac{10000}{C_R}$ MΩ min.	$\frac{16000}{C_R}$ MΩ min.	$\frac{10000}{C_R}$ MΩ min.	As specified in 7.6. Measuring voltage: As specified in Table 9. However, rated voltage of 50 V shall be shown as 50 V. Measuring method: By metal pellet method.											
		30000 MΩ min.	50000 MΩ min.	30000 MΩ min.												

Remarks: The C_R in the table is the numerical value of nominal capacitance expressed in the unit of microfarad (μF).

Table 9. (Continued)

No.	Item	Performances			Test method (JIS C 5102)	Informative reference (essential points of JIS C 5102)
		Grades C and X	Grade B	Grade E		
3	Capacitance	Within the specified tolerance			As specified in 7.8. Measuring conditions: 2 of Table 10 However, measuring frequency shall be 1 kHz $\pm 20\%$.	Measuring voltage: 5 Vrms max.
4	Tangent of loss angle	0.01 max.	0.009 max.	0.01 max.	As specified in 7.9. Measuring conditions: 2 of Table 10 However, measuring frequency shall be 1 kHz $\pm 20\%$.	Measuring voltage: 5 Vrms max.
5	Connection of elements (applicable to grades C and X)	No instantaneous opening of capacitor exists.	—	—	As specified in 7.10. Measuring frequency: 10 kHz to 1 MHz	Test voltage: 100 mV max. Test method: To be carried out giving slight shock to the specimen.
6	Temperature characteristics (applicable to grades B and E)	—	0 % — 7 % $\pm 5\%$	2500 M Ω min. 1500 M Ω min. 500 M Ω min. C_R	As specified in 7.12. Measuring method: Static method	The variation rate of capacitance corresponds to the capacitance at step 3.

Remarks: The C_R in the table is the numerical value of nominal capacitance expressed in the unit of microfarad (μF).