APPROVAL SHEET

ITEM : FILM CAPACITOR

TYPE : CMPR (X2 C-R Capacitor)

SPEC : AC250V/AC300V ALL SERIES

SURGE

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REVISION SHEET

P/N :	PART NAME : CMPR AC250V/AC300V SERIES

REVISION No	REV.REASON	REV.POINT	APPROVE DATE	EXAMINE	REMARK

1. SCOPE

This standard specification applies to metallized polypropylene film + Resistor capacitors for AC power source stipulated under the following European and American standards. (CMPR TYPE)

2. INSPECTION ITEM

2.1 rated voltage : AC250V/AC300V (cUL(UL+CSA),ENEC(UL),KC,CQC)

2.2 Self Heating Temperature : The maximum allowable rise is 7℃

2.3 Operating temperature : -40℃ ~ +85℃

2.4 Testing condition(JIS C 5102 3.2)

Unless otherwise specified, test and measurements shall be conducted at the standard condition 「ordinary temperature(15 to 35℃), ordinary humidity(relative humidity 45 to 75%)」. In case however doubt is entertained in judgment obtained from results, tests and measurements shall be conducted at the standard condition 「temperature(20±2℃), relative humidity(65±5%)

2.5 Construction and appearance

2.5.1 Appearance : See 「STYLE」

2.5.2 Dielectric : METALLIZED POLYPROPYLENE FILM

2.5.3 Resistor : Carbon Resistor

2.5.4 Coating : CASE

2.5.5 Lead wire : LEAD-WIRE(Tin plated)

2.5.6 Structure : C-R Capacitor

3. PERFORMANCE

The performance shall be as given in the table 1.

4. MARKING

Marking shall be clear and legible to capacity, Capacity tolerance, rated voltage, Model Name, Manufacturing date code, Safety Mark, Applicable class, Structure range.

5. REMARKS

If there exist any other opinion it will be decided under the consultation of each concerning party.

6. SAFETY CERTIFICATE

SAFTY	VOLTAGE	CAPACITANCE VALUE	FILE NO
UL60384-14 / CAN/CSA-E60384-14 Fixed Capacitor - X2	AC250V/AC300V	0.01㎌~0.22㎌	E327138
ENEC/CB (IEC60384-14) - X2	AC250V/AC300V	0.01㎌~0.22㎌	ENEC-00852
KC(KTL)	AC250V/AC300V	0.01㎌~0.10㎌	(AC250V)SU03030-14001 (AC300V)SU03030-14002
CQC	AC250V/AC300V	0.01㎌~0.22㎌	(AC250V)CQC14001114947 (AC300V)CQC14001114948

3. Performance. (Table 1)

No	Item	Test method	Performance
3-1	Operating temp.		-40℃ ~ +85℃
3-2	dielectric strength	T-T:(Terminal-Terminal) Apply DC1290V for a minute T-C:(Terminal-Cade) Apply AC2100V for a minute.	No abnormality.
3-3	Tolerance on Capacitance.	Checking spot is temperature 20±2℃ and frequency 1kHz±200Hz	K:±10% / M:±20% Within Spec
3-4	Insulation resistance (T-T)	Capacitors are subjected D.C potential of 100V for a period of one min.	30,000MΩ↑
3-5	Dielectric loss tangent	Checking spot is temperature 20±2℃ and frequency 1kHz±200Hz	1kHz : 10.0% ↓
3-6	Heat resistance	Test temperature shall be 85±2℃	1) C: Within ±5% of the value before test 2) R: Within -5% ~ +1% of the value before test 3) IR: 3,000MΩ↑
3-7	Cold resistance	Test temperature shall be -40±3℃	1) C: Within ±10% of the value before test 2) R: Within ±10% of the value before test
3-8	Moisture resistance loading	Capacitors shall be subjected the temperature at 40±2℃ and relative, humidity at 90 to 95% for a period of 500^{+24}_{-0} hours. A rated A.C Voltage shall be applied to the capacitors under test, It will be measured after removed from the humidity chamber and exposed under room condition for about 2~3hours.	1) C: Within ±10% of the value before test 2) R: Within ±8% of the value before test 3) tanδ : (1kHz)less than 11% 4) IR: 10,000MΩ↑

No	Item	Test method	Performance
3-9	High temperature loading	Voltage of (Rated voltage times 1.25) Vrms at 50Hz shall be applied for 1000$^{+48}_{-0}$ hours in a constant temperature tank of 85±2℃ (Moreover, AC1000Vrms pulse shall be applied for 0.1 second once an hour) and than after cooling to room temperature and measured, the following requirements shall be satisfied.	1) C: Within ±10% of the value before test 2) R: Within ±10% of the value before test 3) tanδ: (1kHz) less than 11% 4) IR: 15,000MΩ↑
3-10	Robustness of terminations	1) Pull test lead diameter(mm) / load(N) / time(sec) 0.5 < d ≤ 0.8 / 10 / 10±1 0.8 < d ≤ 1.25 / 20 / 10±1 2) Bend test (2 cycle) lead diameter(mm) / load(N) / (kg) 0.5 < d ≤ 0.8 / 5 / 0.51 0.8 < d ≤ 1.25 / 10 / 1.00	No visible damage
3-11	solderability	1) Solder specimen : H60A or H63A 2) Solder temp : 235±5℃ 3) Dipping time : 2±0.5sec	At least 90% of the circumference of the surface up to the immersed shall be covered with new solder.
3-12	Resistance to soldering heat	Temperature of solder shall be 270±5℃ Dipping time shall be 3±0.5sec.	1) C: Within ±3% of the value before test 2) No abnormality
3-13	Vibration proof	The test shall be conducted for 2 hrs in each direction of any given three directions perpendicular to each other, 6.0hours in total, and 30min before the test is finished, the connection of element shall be investigated.	1) No abnormality 2) No electrical short circuit or disconnection of no less than 0.5ms shall appearance in the element. Stable connecting condition of the element.

PRODUCTION FLOW CHART

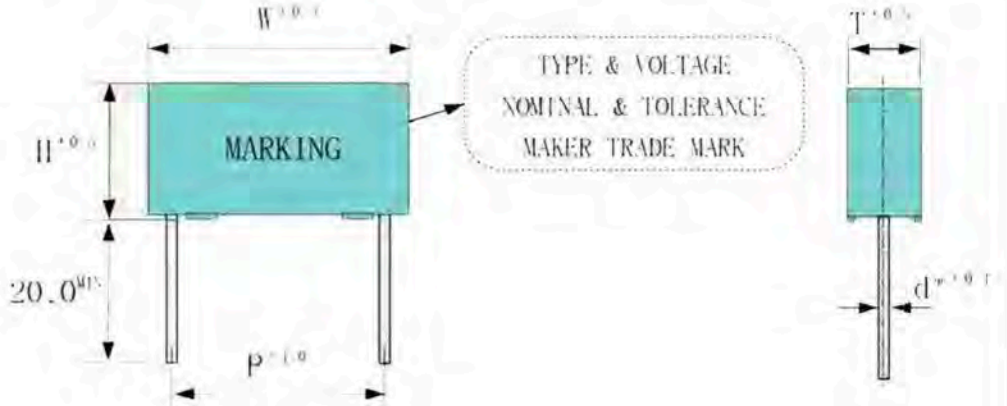
Q.C PROCESS CONTROL	DESCRIPTION	METALLIZED POLYPROPYLENE FILM & RESISTER CAPACITOR (CMPR)	REVISION DATE	2016. 08. 25.

SPECIFICATION						CONTROL SPECIFICATION				
		RUNNING MATERIAL		M/C & GAUGE	M/C CONDITION	MANAGEMENT CONTROL POINT				
SECTION	FLOW	MATERIAL	TYPE			CATEGORY	CHARACTERISTIC	TIMES/ Q'TY	MEASUREMENT METHOD	CONTROL METHOD
WINDING		METALLIZED POLYPROPYLENE FILM	MPF	AUTO ELEMENT WINDING M/C	TEMP. : 25±5℃ HUMIDITY : 30-65%	CAPACITANCE, ELEMENT STATUS	CAPACITANCE, APPEARANCE	PER LOT N = 5	CAPACITANCE - METER, EYE, VERNIER CALIPERS	RECORD, CHECK SHEET
PRE-PRESS				AUTO PRE-PRESS MACHINE	PARTS FEEDER & LINEAL FEEDER ADJUSTING	PRESSURE	APPEARANCE		NAKED EYE	
PRESS				HYDRAULIC PRESS M/C SILICON RUBBER	T : 110±5℃ P : 40-50kg/CM2 80-100kg/CM2 T : 2-5 MINUTES	TEMP, PRESSURE, TIME, Q'TY	APPEARANCE	TWICE PER DAY, EVERY LOT,	THERMOMETER, PRESSURE GAUGE, TIMER, BALANCE	RECORD, CHECK SHEET
MASKING		TAPING		MASKING M/C	TAPE WIDTH (12, 13, 18, 22MM)	GAP	APPEARANCE	EVERY LOT	NAKED EYE	CHECK
METALLICON		TIN-ZN ALLOY (1.6φ)	TIN-ZN ALLOY	METALLICON M/C, DUST COLLECTOR	PRESSURE : 4-6kg/CM2 VOLTAGE : 12-24VDC TIMES : SS-4, 4 TIMES	THICKNESS OF METALLICON	APPEARANCE	TWICE PER DAY	VERNIER-CALIPERS, STAINLESS PLATE	RECORD, CHECK SHEET
DEMASKING				DEMASKING MACHINE, CTN 60S	MOTOR REVOLUTION SPEED : 6-8	APPEARANCE	APPEARANCE	EVERY LOT	NAKED EYE	CHECK
DEBURRING				DEBURRING M/C	REVOLUTION SPEED : 4-5 TIME : 40-60 SECONDS	APPEARANCE	APPEARANCE	EVERY LOT	NAKED EYE	CHECK
LEAD WELDING		LEAD WIRE RESISTER	0.6-0.8MM	AUTO WELDING M/C, NIPPER, BALANCE WEIGHT (490g)	WELDING OUTPUT SET, CYCLE TIME SET, HEAD PRESSURE SET LEAD CENTER PITCH ADJUST	WELDING OUTPUT, CYCLE, PRESSURE, WELD STRENGTH	LEAD WIRE ATTACHED TENSION	PER LOT 1ea/5 EVERY CONVERSION N=5	NAKED EYE, PUSH-PULL GAUGE BALANCE WEIGHT	RECORD, CHECK SHEET
SELF HEALING				AUTOMATIC SELF HEALING MACHINE	1ST CHARGE CONDENSER CAPACITANCE : 4.8,12 uF, 1ST FILM u × 50V, 2ND FILM u × 100V	CAPACITANCE	CAPACITANCE	PER LOT N=5	REC CHECKER	CHECK
CASE INSERTING		PBT CASE	CASE	AUTOMATIC WELDING / ASSEMBLY MACHINE	①CASE SUPPLY FEEDER JIG ADJUST & EXCHANGE ②ELEMENT TRANSIT LEVEL, DISTANCE ADJUST	LEAD CENTER, CASE CENTER	APPEARANCE	PER LOT	VERNIER CALIPERS, NAKED EYE, GAUGE	CHECK
PRIMARY EPOXY FILLING		EPOXY RESIN	EPOXY	AUTOMATIC EPOXY INSERTING MACHINE	EPOXY DE-AERATION, NOZZLE SELECTION, RESIN AMOUNT SET	APPEARANCE	APPEARANCE	PER LOT	NAKED EYE	CHECK
DRYING				AUTOMATIC DRYING MACHINE	TEMP : 100℃ ±5℃ TIME : 60 MIN	TEMP, TIME	APPEARANCE	PER LOT	THERMOMETER, TIMER	CHECK
SECONDARY EPOXY FILLING		EPOXY RESIN	EPOXY	AUTOMATIC EPOXY INSERTING MACHINE	EPOXY DE-AERATION, NOZZLE SELECTION, RESIN AMOUNT SET	APPEARANCE	APPEARANCE	PER LOT	NAKED EYE	CHECK
DRYING				AUTOMATIC DRYING MACHINE	TEMP : 100℃ ±5℃ TIME : 60 MIN	TEMP, TIME	APPEARANCE	PER LOT	THERMOMETER, TIMER	CHECK
APPEARANCE INSPECTION				LIMITED SAMPLE		PIN HOLE, EPOXY ATTACH, PRO-TUBULENCE	APPEARANCE	TOTAL Q'TY	NAKED EYE	RECORD, CHECK, PALETO'S HISTOGRAM
AUTO MARKING		INK	INK	AUTO MARKING PRINT M/C	TYPE, SPEC, VOLTAGE, TOLERANCE, MFG DATE	MARKING CONDITION	INDICATION	TOTAL Q'TY	NAKED EYE	CHECK
ELECTRICAL INSPECTION				AUTO SORTING M/C AB-462(KOHAN) TCS-810-PS-M	CD tan δ TV IR C	CD tan δ TV IR C	Do tan δ TV IR C	TOTAL Q'TY	AUTO SORTING	RECORD, CHECK, PALETO'S HISTOGRAM
PACKING		POLY BAG INNER BOX			OUT Q'TY : 100-500 S/TQ'TY : 100-500	DIMENSION, Q'TY, PACKING CONDITION	DIMENSION	PER LOT N=5 ALL LOT, TOTAL Q'TY	VISCOMETER, BALANCE, EYE INSPECTION	CHECK, LABEL
FINAL INSPECTION					DIMENSION TV, IR C, tan δ	DIMENSION, TV, IR C, tan δ		AQL=0.65% AQL=0.65% AQL=0.65% AQL=0.65% AQL=0.65%	VERNIER CALIPERS PUNCHER TESTER IR METER C METER REC CHECKER	RECORD, FINAL INSPECTION SHEET, PC

DIMENSION(85℃ CMPR)

[STYLE]

Capacitor ↓



* Forming pitch and lead length dimension are subject to change customers request

CODE NO. Designation

CMPR AC250V 103 K +120ΩK 15 S

- [Lead type] S :Straight
  C :Straight Cutting
- [Lead Pitch] : 15.0mm
- [Resistor] : 120Ω ±10%
- [Capacitance Tolerance]: K(±10%)
- [Capacitance Value] : 0.1μF
- [Rated Voltage] :250VAC
- [Capacitor's type name]: CMPR
  X2- C-R CAPACITOR

CODE NO	VOLT	CAP(μF)	W±0.5	H±0.5	T±0.5	P±1.0mm	D±0.1
CMPR AC250V/AC300V103K/M+120Ω15S5	AC250V/AC300V	0.010	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V103K/M+120Ω15S6	AC250V/AC300V	0.010	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V123K/M+120Ω15S5	AC250V/AC300V	0.012	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V123K/M+120Ω15S6	AC250V/AC300V	0.012	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V153K/M+120Ω15S5	AC250V/AC300V	0.015	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V153K/M+120Ω15S6	AC250V/AC300V	0.015	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V183K/M+120Ω15S5	AC250V/AC300V	0.018	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V183K/M+120Ω15S6	AC250V/AC300V	0.018	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V223K/M+120Ω15S5	AC250V/AC300V	0.022	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V223K/M+120Ω15S6	AC250V/AC300V	0.022	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V273K/M+120Ω15S5	AC250V/AC300V	0.027	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V273K/M+120Ω15S6	AC250V/AC300V	0.027	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V333K/M+120Ω15S5	AC250V/AC300V	0.033	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V333K/M+120Ω15S6	AC250V/AC300V	0.033	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V333K/M+120Ω17.5S5	AC250V/AC300V	0.033	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V333K/M+120Ω17.5S6	AC250V/AC300V	0.033	22.0	18.0	8.5	17.5	0.6
CMPR AC250V/AC300V333K/M+120Ω22.5S5	AC250V/AC300V	0.033	26.0	18.5	8.5	22.5	0.6
CMPR AC250V/AC300V393K/M+120Ω15S5	AC250V/AC300V	0.039	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V393K/M+120Ω15S6	AC250V/AC300V	0.039	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V393K/M+120Ω17.5S5	AC250V/AC300V	0.039	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V393K/M+120Ω17.5S6	AC250V/AC300V	0.039	22.0	18.0	8.5	17.5	0.6
CMPR AC250V/AC300V393K/M+120Ω22.5S5	AC250V/AC300V	0.039	26.0	18.5	8.5	22.5	0.6
CMPR AC250V/AC300V473K/M+120Ω15S5	AC250V/AC300V	0.047	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V473K/M+120Ω15S6	AC250V/AC300V	0.047	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V473K/M+120Ω17.5S5	AC250V/AC300V	0.047	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V473K/M+120Ω17.5S6	AC250V/AC300V	0.047	22.0	18.0	8.5	17.5	0.6
CMPR AC250V/AC300V473K/M+120Ω22.5S5	AC250V/AC300V	0.047	26.0	18.5	8.5	22.5	0.6
CMPR AC250V/AC300V563K/M+120Ω15S5	AC250V/AC300V	0.056	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V563K/M+120Ω15S6	AC250V/AC300V	0.056	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V563K/M+120Ω17.5S5	AC250V/AC300V	0.056	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V563K/M+120Ω17.5S6	AC250V/AC300V	0.056	22.0	18.0	8.5	17.5	0.6
CMPR AC250V/AC300V563K/M+120Ω22.5S5	AC250V/AC300V	0.056	26.0	18.5	8.5	22.5	0.6
CMPR AC250V/AC300V683K/M+120Ω15S5	AC250V/AC300V	0.068	18.0	15.0	6.0	15.0	0.6
CMPR AC250V/AC300V683K/M+120Ω15S6	AC250V/AC300V	0.068	18.0	18.0	10.0	15.0	0.8
CMPR AC250V/AC300V683K/M+120Ω17.5S5	AC250V/AC300V	0.068	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V683K/M+120Ω17.5S6	AC250V/AC300V	0.068	22.0	18.0	8.5	17.5	0.8
CMPR AC250V/AC300V683K/M+120Ω22.5S5	AC250V/AC300V	0.068	26.0	18.5	8.5	22.5	0.8
CMPR AC250V/AC300V823K/M+120Ω15S5	AC250V/AC300V	0.082	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V823K/M+120Ω15S6	AC250V/AC300V	0.082	18.0	18.0	10.0	15.0	0.8
CMPR AC250V/AC300V823K/M+120Ω17.5S5	AC250V/AC300V	0.082	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V823K/M+120Ω17.5S6	AC250V/AC300V	0.082	22.0	18.0	8.5	17.5	0.8
CMPR AC250V/AC300V823K/M+120Ω22.5S5	AC250V/AC300V	0.082	26.0	18.5	8.5	22.5	0.8
CMPR AC250V/AC300V104K/M+120Ω15S5	AC250V/AC300V	0.100	18.0	15.0	8.5	15.0	0.6
CMPR AC250V/AC300V104K/M+120Ω15S6	AC250V/AC300V	0.100	18.0	18.0	10.0	15.0	0.8
CMPR AC250V/AC300V104K/M+120Ω17.5S5	AC250V/AC300V	0.100	22.0	15.0	6.0	17.5	0.6
CMPR AC250V/AC300V104K/M+120Ω17.5S6	AC250V/AC300V	0.100	22.0	18.0	8.5	17.5	0.8
CMPR AC250V/AC300V104K/M+120Ω22.5S5	AC250V/AC300V	0.100	26.0	18.5	8.5	22.5	0.8
CMPR AC250V/AC300V124K/M+120Ω15S5	AC250V/AC300V	0.120	18.0	18.0	10.0	15.0	0.8
CMPR AC250V/AC300V124K/M+120Ω17.5S6	AC250V/AC300V	0.120	22.0	18.0	8.5	17.5	0.8
CMPR AC250V/AC300V124K/M+120Ω22.5S5	AC250V/AC300V	0.120	26.0	18.5	8.5	22.5	0.8
CMPR AC250V/AC300V154K/M+120Ω15S5	AC250V/AC300V	0.150	18.0	18.0	10.0	15.0	0.8
CMPR AC250V/AC300V154K/M+120Ω17.5S5	AC250V/AC300V	0.150	22.0	18.0	8.5	17.5	0.8
CMPR AC250V/AC300V154K/M+120Ω22.5S5	AC250V/AC300V	0.150	26.0	18.5	8.5	22.5	0.8
CMPR AC250V/AC300V184K/M+120Ω15S5	AC250V/AC300V	0.180	18.0	19.0	11.0	15.0	0.8
CMPR AC250V/AC300V184K/M+120Ω17.5S5	AC250V/AC300V	0.180	22.0	19.0	11.0	17.5	0.8
CMPR AC250V/AC300V184K/M+120Ω22.5S5	AC250V/AC300V	0.180	26.0	19.0	10.0	22.5	0.8
CMPR AC250V/AC300V224K/M+120Ω15S5	AC250V/AC300V	0.220	18.0	19.0	11.0	15.0	0.8
CMPR AC250V/AC300V224K/M+120Ω17.5S5	AC250V/AC300V	0.220	22.0	19.0	11.0	17.5	0.8
CMPR AC250V/AC300V224K/M+120Ω22.5S5	AC250V/AC300V	0.220	26.0	19.0	10.0	22.5	0.8

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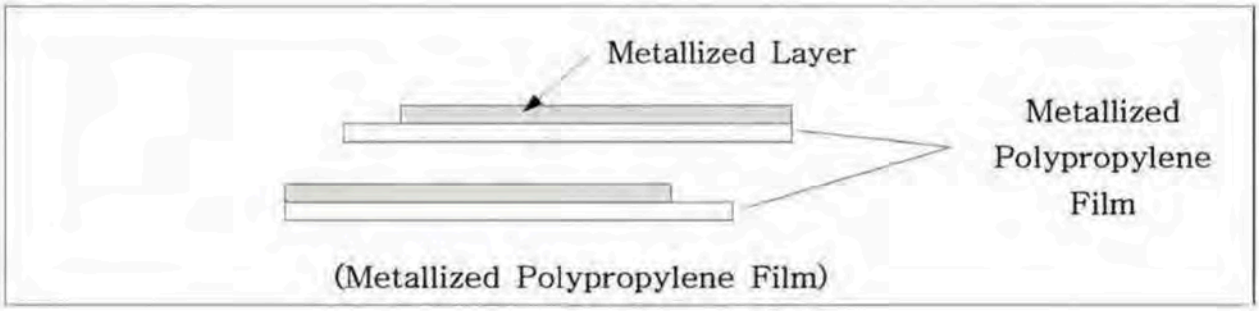
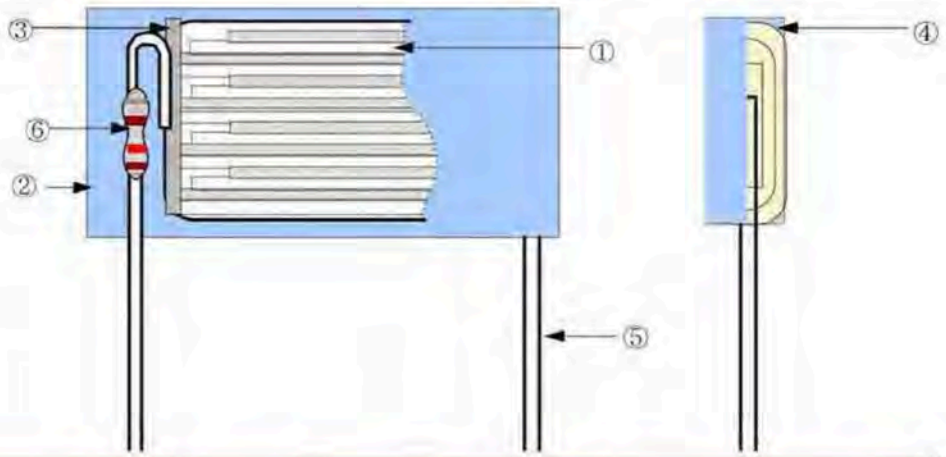
CONSTRUCTION			DR-AWN		CH-ECKED		APPR-OVED		1/1
DEPT	Q.C DEPT		ENACTMENT	16. 08. 25.		REVISION			
SUB	CMPR capacitor					REVISION			
						REVISION			

♠ Section View



♠ Construction



NO.	Type	Quantity	Material	Production process
1	Electrode	1	Metallized polypropylene film	winding
2	CASE	1	PLASTIC CASE (UL 94V-0)	CASE INSERTING
3	Solder (Pb-Free)	2	Tin-Zn Alloy	Spray
4	FILLING	1	EPOXY RESIN (UL 94V-0)	EPOXY FILLING
5	Lead - wire (Pb-Free)	2	Lead-wire	spot-welding
6	CARBON RESISTOR	1	0.5W or 1.0W 120Ω	spot-welding

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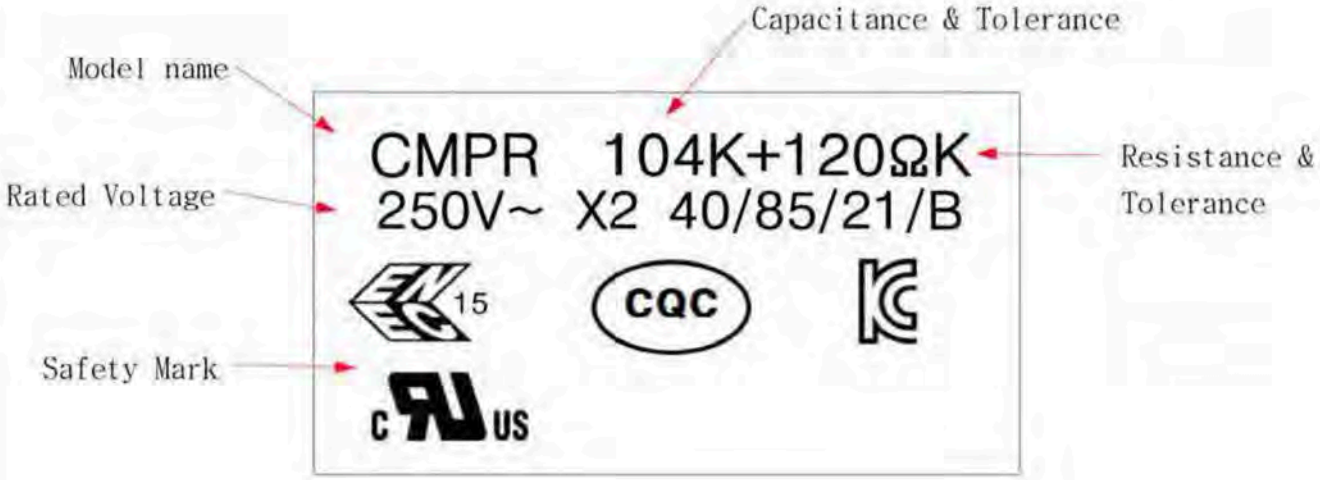
MARKING X_2-CAP (CMPR TYPE)	DRAWN		CHEC -KED		APPR -OVED		1/1



Climatic Category, flammability category

40 / 85 / 21

[Damp heat, steady state] :56days

[Maximum using Temp] :+105℃

[Minimum using Temp] :-40℃

SURGE	DRAWN	CHEC-KED	APPR-OVED	1/1

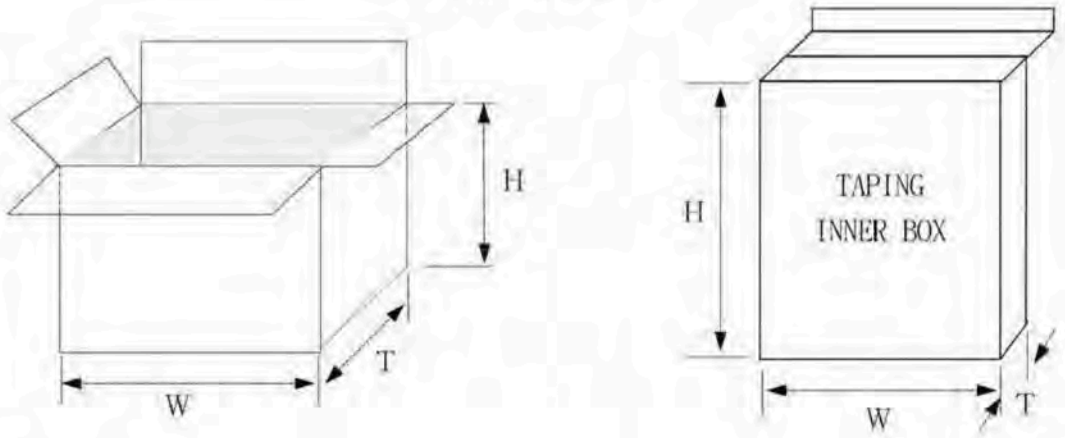
(DEPT)	Q .A		(ENACTMENT)	16. 08. 25.	REVISION 1	
SUB	PACKING STANDARD SPEC.				REVISION 2	
					REVISION 3	

1. SCOPE

This standard specifies film capacitors for packing standard.

2. PACKING

[BOX TYPE]



3. SIZE

3.1 BULK TYPE

ITEMS	SIZE W(mm) × T(mm) × H(mm)
INNER BOX	350 × 200 × 275
OUT BOX	580 × 220 × 370

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TEST M/C LIST

PART NO	TEST M/C NAME	Holding No.	MAKER	Calibration laboratory	Date or cal
SI-01	LCR METER :4284A	1	Agilent Technologies	Agilent Technologies	15.08.25
SI-02	LCR METER :4263B	7	Agilent Technologies	Agilent Technologies	16.03.26
SI-08	CAPACITANCE COMPATATOR :JK-9B	12	JKS	HCT	16.03.26
SI-20	DIGITAL C CHECKER :AX-325N	5	ADEX	HCT	16.03.26
SI-25	DIGITAL C-Tanδ CHECKER :AX333A	1	ADEX	HCT	16.03.26
SI-26	PUNCTURE TESTER :HPT-50100A	1	HAN IL	HCT	16.03.26
SI-27	PUNCTURE TESTER :SJP-5002	3	SUN JIN	HCT	16.03.26
SI-30	AC VOLTMETER :2013	1	YOKOGAWA	HCT	16.03.26
SI-31	WITHSTANDING VOLTAGE TESTER :TOS8700	1	KIKUSUI	HCT	16.03.26
SI-32	SUPER MEGOHMMETER :SM-5E	2	TOA	HCT	16.03.26
SI-34	SUPER MEGOHMMETER :SM-8215	1	TOA	HCT	16.03.26
SI-37	RLC DIGIBRIDGE :112M	1	SHINWOO	HCT	16.03.26
SI-40	RLC DIGIBRIDGE :TM7	2	TAE YANG	HCT	16.03.26
SI-41	CAPACITANCE COMPATATOR :JK-1039	1	JKS	HCT	16.03.26
SI-42	RLC DIGIBRIDGE :1689M	1	GenRad	HCT	16.03.26
SI-43	PUNCTURE TESTER AC :ACTV-3000	1	NONE	HCT	16.03.26
SI-44	RLC DIGIBRIDE :SK-608	1		HCT	16.03.26
SG-01 외	DIGITAL CALIPERS	11	MITUTOYO	HCT	16.03.26
SG-12 외	DIGITAL CALIPERS	8	KONEX	HCT	16.03.26
SG-04	DIGITAL MICROMETER	1	MITUTOYO	HCT	16.03.26
SM-01	Constant temp. & humidity chamber	2		HCT	16.03.26
SM-04	THERMOMETER	1	KONICS	HCT	16.03.26