

CEMENT RESISTORS

承認書 (APPROVAL SHEET)

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客戶名稱 Client	
品 名 Description	CR-L(SQP) SERIES
規 格 Specification	
料 號 Part No	
備 注 Remark	

核 準 Approval	校 對 Check By	主 辦 Prepared By
林鐵軍	林峰	彭東林

核 準 Approval	校 對 Check By	主 辦 Prepared By

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CEMENT RESISTORS

1.適用範圍 (APPLICABLE RANGE)

此基準是供應家電、電腦、資訊用之不燃性水泥型繞線電阻器之規格。

THIS SPECIFICATION APPLY TO NON – INFLAMMABILITY CEMENT RESISTOR.

2.型号名称 Part Number

2-1	2-2	2-3	2-4	2-5
CR	L	5W	1R	J
種類	端子形狀	額定電力	公稱電阻值	容差
Type	Terminal Form	Rate Wattage	Nominal Resistance	Tolerance

2-1.種類 Type

不燃性水泥绕线电阻器以“CR”表示。

CR ---Copper wire product

NCR ---Copper wire Non-inductive product

CP-CR ---CP wire product

CP-NCR ---CP wire Non-inductive product

2-2.端子形狀 Terminal Form

視端子區分為L形。

Upon the shape of terminal, it has L form

2-3.額定電力 Rated Wattage

額定電力(W)以數字表示，如 5W, 10W, 15W、.....50W。

Shown by “W”、such as 5W、10W、15W、.....50W。

2-4.公稱電阻值 Nominal Resistance:

R,K Ω 為單位,依據 E-24 Series, 例如 1R, 0R1, 0R47, 1K。

R,K Ω are its unit which is in accordance with E-24 series, such as 1R, 0R1, 0R47, 1K.

2-5.電阻值及容許誤差 Tolerance

在室溫中依檢測器測量,應在指定電阻值之容許誤差以內。

It is measured by Bridge-method at room temperature and expressed by a capital letter.

J \pm 5%, G \pm 2%, F \pm 1%

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3. 額定功率 Rating Power

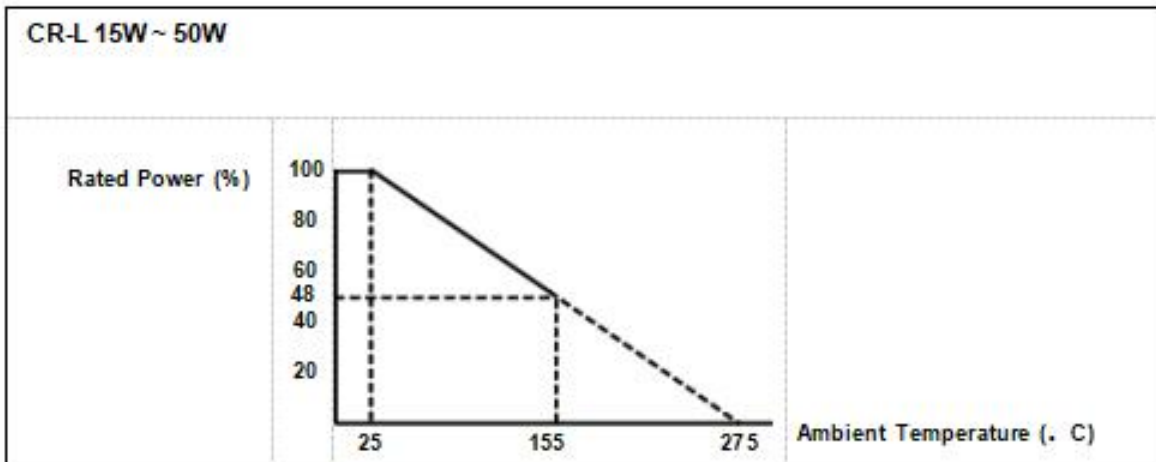
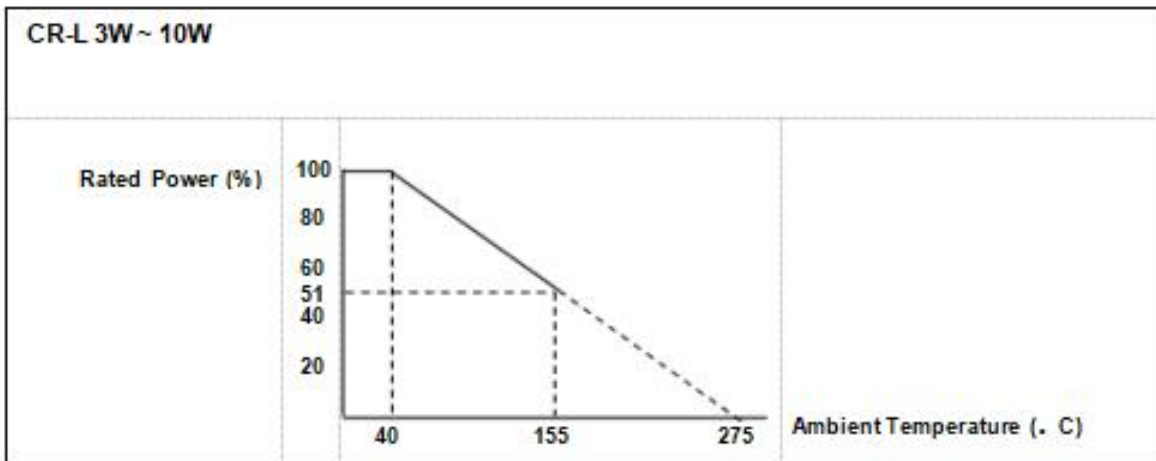
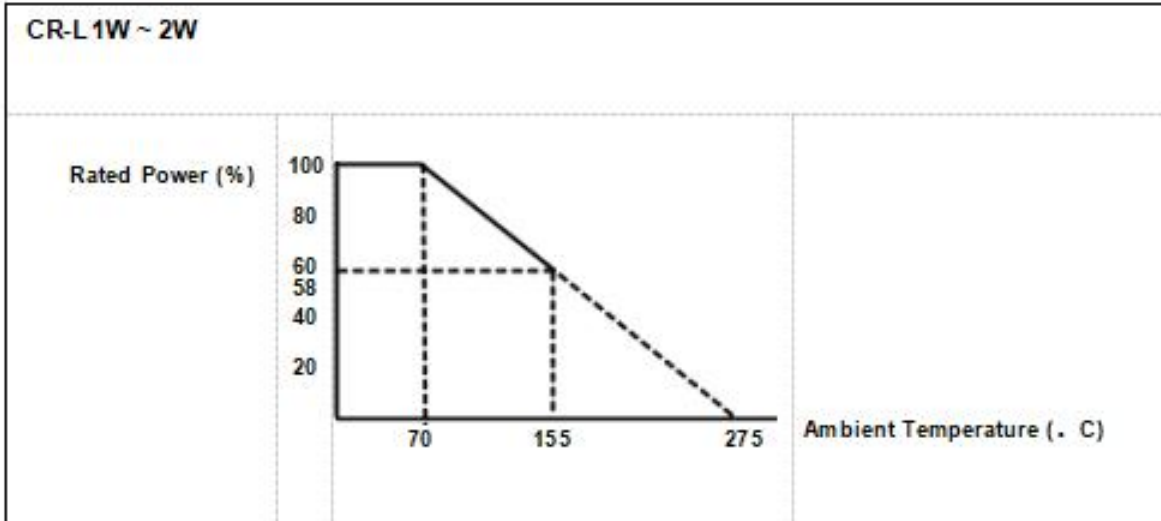
Style \ Power Rating 70°C	CR-L-1W	CR-L-2W	CR-L-3W	CR-L-5W	CR-L-7W
Operating Temp. Range	-30°C ~ +155°C				
Max. Working Voltage	200V	250V	350V	350V	500V
Max. Overload Voltage	500V	500V	700V	700V	1000V
Dielectric Withstanding Voltage (AC)	500V	500V	700V	700V	1000V
Value Range $\pm 5\%$ (Ceramic core)	0.1 ~27 Ω	0.1 ~36 Ω	0.1 ~68 Ω	0.1 ~680 Ω	0.1 ~680 Ω
Value Range $\pm 5\%$ (Film)	30 ~47K	39 ~100K	75 ~100K	681 ~820K	681 ~820K
Temp. Coefficient	± 300 ppm/°C				

Style \ Power Rating 70°C	CR-L-10W	CR-L-15W	CR-L-20W	CR-L-25W	CR-L-30W
Operating Temp. Range	-30°C ~ +155°C				
Max. Working Voltage	500V	500V	500V	1000V	1000V
Max. Overload Voltage	1000V	1000V	1000V	2000V	2000V
Dielectric Withstanding Voltage (AC)	1000V	1000V	1000V	2000V	2000V
Value Range $\pm 5\%$ (Ceramic core)	0.1 ~680 Ω	0.1 ~680 Ω	0.1 ~680 Ω	0.1 ~680 Ω	0.1 ~680 Ω
Value Range $\pm 5\%$ (Film)	681 ~820K	681 ~820K	681 ~820K	681 ~820K	681 ~820K
Temp. Coefficient	± 300 ppm/°C				

Style \ Power Rating 70°C	CR-L-40W	CR-L-50W
Operating Temp. Range	-30°C ~ +155°C	
Max. Working Voltage	1000V	1000V
Max. Overload Voltage	2000V	2000V
Dielectric Withstanding Voltage (AC)	2000V	2000V
Value Range $\pm 5\%$ (Ceramic core)	0.1 ~1K Ω	0.1 ~1K Ω
Temp. Coefficient	± 300 ppm/°C	

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DERATING CURVE



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4.機械特性 (MECHANICAL CHARACTERISTIC)

4-1 端子浸錫性 (TERMINAL SOLDER ABILITY)

將端子前端 7mm 處浸入溶劑 5-10 秒,並調整焊錫溫度到 $230 \pm 5^{\circ}\text{C}$,然後溶解溶劑,使溶液完全燃燒,再拭去端子上的溶劑殘渣,再將端子前端 5mm 處浸入溶劑 3 ± 0.5 秒,然後拿出使其自然冷卻 25.4 ± 6.4 秒後,再將溶劑洗去,經上述步驟後,導線需符合下列情形:

- (a) 端子必須至少 95%以上焊著,且表面清潔光滑.
- (b) 端子孔不必集中一處,但總面積亦不可超過 10%

DIP THE TERMINAL WITHIN 7mm FROM THE EDGE INTO FLUX FOR 5 TO 10 SECONDS THEN ADJUSTING THE SOLDERING TEMPERATURE TO $230 \pm 5^{\circ}\text{C}$,WIPE THE SOLDERING DREGS AND BURNED FLUX FROM THE MELTED SOLDER,NEXT DIP THE TERMINAL 5mm FROM THE EDGE,DIP TIME 3 ± 0.5 SECONDS. THEN PULL IT OUT WITHIN 25.4 ± 6.4 SECONDS,COOL IT IN AIR THEN WASH THE FLUX AWAY.THE LEAD WIRE SHOULD MEET FOLLOWING CONDITIONS AFTER REMOVE THE FLUX.

- (a) TERMINALS SHOULD BE NEW SMOOTH.
- (b) PIN HOLE DOES NOT NEED TO CONCENTRATE IN ONE PLACE, BUT THE TOTAL AREA SHOULD NOT OVER 10%

4-2 端子拉力強度 (TERMINAL INTENSITY)

(a) 加壓 (STRESS)

將電阻體的端子固定於一端,直接加重 4.5 公斤以內的重量,異常現象不會發生.

ABNORMAL PHENOMENON WILL NOT OCCUR WITHIN 4.5 KG NET WEIGHT FROM THE DIRECTION OF THE FIXING TERMINAL OF THE RESISTOR.

(b) 彎曲 (BEND)

端子在 60 秒以內能受力 500 公克的重量,且彎角在 5 度以內,異常現象不會發生.

BENDING PHENOMENON WILL NOT OCCUR WITHIN 500 g NET WEIGHT FROM RANDOM DIRECTION WITHIN 60 SECONDS THE BENDING ANGLE WILL BE WITHIN 5 DEGREE.

5.具不燃性 (NON-INFLAMMABILITY)

5-1 燃燒試驗 (UL-492,第 278 項)(BURN TEST) (UL-492,ITEM 278)

將電阻用火燒 15 秒,移開火焰於熱度散失前,大約 10 秒內,然後再燒 15 秒,如此步驟重複 5 次,循環完成后,其外觀不得損傷.

PUT RESISTOR OVER TESTING FLAME FOR 15 SECONDS, AND THEN REMOVE THE FLAME OR ANOTHER 15 SECONDS, THUS CYCLE 5 TIMES AFTER THE TEST.HEAT SHOULD BE DISMISSED WITHIN 10 SECONDS AFTER COMPLETION OF FULL CYCLE TEST, NO COLOUR CHANGE OR CRACK BREAKAGE.

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5-2 超負載試驗 (OVERLOADING TEST)

加 120%的額定電力一分鐘,沒有臭味和煙產生.

APPLY 120% OF RATING POWER, LASTING 1 MINUTE NO SMELL AND NO SMOKE

6. 電氣特性 (ELECTRICAL CHARACTERISTIC)

6-1 溫度係數 (參照表 5-1) TEMPERATURE RESISTANCE (PLEASE REFER TO TABLE 5-1)

將電阻置入每一試驗溫度下約 30~45 分鐘測定之,然後使用下列公式計算溫度係數,各階段試驗的溫度係數應在±260PPM 以內.

$$\text{溫度係數} = \frac{R - R_0}{R_0} \times \frac{1}{T - T_0} \times 10^6 \text{ (PPM/}^\circ\text{C)}$$

R : 試驗後 Ω 值

T : 試驗溫度 (°C)

R₀: 試驗前 Ω 值

T₀ : 室 溫 (°C)

KEEP THE RESISTOR IN THE EVERY STAGE TEMPERATURE AROUND 30 TO 40 MIN.
BY USING THE FORMULA BELOW.

AND ALSO THE TEMP. RESISEANCE COEFFICIENT WILL BE CALCULATED.

* TEMPERATURE RESISRANCE COEFFICIENT

$$=(R - R_0 / R_0) \times (1/T - T_0) \times 10^6 \text{ (PPM/}^\circ\text{C)}$$

R₀: RESISTANCE (Ω) IN BASE TEMP.(2nd STAGE).

R: RESISTANCE IN EVERY TESTING TEMP.STAGE.

T₀: BASE TEMP. (2nd STAGE).

T: TESTING TEMP. (°C).

THE TEMP.COEFFICIENT SHOULD BE WITHIN ±260 ppm IN ALL STAGES.

表 5-1 (Table 5-1)

單位 °C

第 1 階段 1st	第 2 階段 2st	第 3 階段 3rd	第 4 階段 4th	第 5 階段 5th
-30±2	25±2	65±2	105±2	180±2

6-2 短時間超負載 (TRANSIENT OVERLOAD)

加十倍的額定電力(W)於電阻器 5 秒鐘,不生火燄或燒焦等現象,

回復常溫 30 分鐘后,其阻值變化率應在 2%±0.05 以內.

APPLY VOLTAGE 10 TIMES OVER RATING POWER FOR 5 SECONDS,NO CHANGE IN MECHANICAL APPEARANCE THEN PUT IN ROOM CONDITION FOR 30 MIN.THE VARIANCE OF VALUE SHOULD BE WITHIN (2%+0.05 Ω).

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6-3 耐濕性 (正常狀態)(TEMPERATURE SENSITIVITY (NORMAL STATE))

將電阻器放入溫度 $40 \pm 2^\circ\text{C}$ 及濕度 90~95% 之恆溫恆濕, 其端子加正極, 金屬板加負極, 以直流電 100V 加壓 1000 小時后, 其阻值變化率應在 3% 以內.

PUT RESISTOR IN THE STATE OF TEMP. $40 \pm 2^\circ\text{C}$ CONSTANT, RELATIVE HUMIDITY 90~95% CONSTANT, CONNECT RESISTOR AS ANODE, CONNECT METAL PLATE AS CATHODE, APPLY 100V DC FOR 1,000 HOURS, THE VARIANCE OF VALUE SHOULD BE WITHIN $3\% \pm 0.05 \Omega$.

6-4 耐久性 (額定負載)(DURABILITY (RATING LOAD))

溫度 $70 \pm 3^\circ\text{C}$ (15W 以上, 須 $25 \pm 3^\circ\text{C}$) 之恆溫槽中, 加額定電壓 1.5 小時, 切斷 0.5 小時, 如此連續循環 1000 小時后, 再置於室溫下 1 小時, 其阻值變化率應在 $3\% \pm 0.05 \Omega$ 以內, 其外觀不得損傷.

UNDER CONSTANT TEMP. $70 \pm 3^\circ\text{C}$. (IN CASE OVER 15W, $25 \pm 3^\circ\text{C}$), APPLYING RATING VOLTAGE FOR 1.5 HOURS, THEN DISCONNECTING FOR 0.5 HOUR, RECYCLING FOR 1,000 HOURS, PUT RESISTOR IN ROOM CONDITION AND ZERO LOADING FOR 1 HOUR THE VARIANCE OF VALUE SHALL BE WITHIN Ω . NO PROMINENT CHANGES IN APPEARANCE.

6-5 耐濕性 DURABILITY (HUMIDITY)

在溫度 $40 \pm 2^\circ\text{C}$ 及濕度 90~95% 之恆溫恆濕槽中, 加額定的直流電壓 1.5 小時, 切斷 0.5 小時, 如此連續循環 1000 小時后, 置於室溫下約置 1 小時, 其阻值變化率應在 3% 以內, 其外觀不得損傷.

CONSTANT TEMP. $40 \pm 2^\circ\text{C}$, RELATIVE HUMIDITY 90~95%, APPLYING O F RATING VOLTAGE) DC FOR 1.5 HOUR, DISCONNECT FOR 0.5 HOUR, CYCLING FOR 1,000 HOURS THEN RETURNED TO ROOM CONDITION AND ZERO LOADING FOR I HOUR, THE VARIANCE OF VALUE SHOULD BE WITHIN $3\% \pm 0.05$. NO PROMINENT CHANGES IN APPEARANCE.

6-6 熱衝擊 (THERMAL SHOCK)

在室溫中加額定電力 30 分鐘后, 於 8~12 秒內, 放入溫度 $-30 \pm 5^\circ\text{C}$ 的空氣中 15 分鐘以上, 然後再置於室溫中 1 小時, 其阻值變化率在 2% 以內, 其外觀不得損傷

APPLY RATING POWER IN ROOM TEMP. FOR 30 MIN. BRING RESISTOR IMMEDIATELY IN 8~12 SECONDS TO THE AIR OF $-30 \pm 5^\circ\text{C}$ OR OVER 15 MIN. THEN RETURN TO ROOM TEMP. AND KEEP IT FOR I HOUR. THE VARIANCE OF VALUE SHOULD BE WITHIN $2\% \pm 0.05$. NO PROMINENT CHANGES IN APPEARANCE.

6-7 絕緣電阻 (ISULATION RESISTANCE)

以電阻金屬板與端子合為兩極, 以 DC500V 測之, 應在 1000MEG Ω 以上

PUT RESISTOR ON FLAT METAL PLATE, CONNECTING BETWEEN ONE OF TERMINAL AND THE PLATE, THST UNDER 500V DC, THE VALUE SHALL OVER 10,000 MEG Ω .

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6-8 耐電壓 (VOLTAGE DURABILITY)

如 5-7 項二端加入 AC 1000V 約 1 分鐘,其外觀不得損傷.

PUT RESISTOR IN THE SAME STATE WITH ITEM 5-7, APPLYING AC SIN WAVE 1,000V FOR 1 MIN. IN BETWEEN TERMINAL AND PLATE. NO DAMAGE OCCURS.

6-9 焊錫耐熱性(SOLDERING TEMP. DURABILITY)

將端子前端 $5.0 \pm 0.8\text{mm}$ 處浸入如附圖的時間與溫度后,置於常溫下 24 小時,其阻值變化率應在 $2\% \pm 0.05$,其外觀不得損傷.

DIP THE TERMINAL OF THE RESISROR $5.0 \pm 0.8\text{mm}$ FROM THE EDGE ACCORDING TO THE CONDITIONS STATED IN TABLE I, THE PUT IN NORMAL TEMP. FOR 24 NO PROMINENT CHANGES IN APPEARANCE.

(附圖)

條件 (CONDITION)	項目 (ITEM)	錫溫度 SOLDERING TEMP. °C	浸入時間 DIP TIME SECONDS
	自動焊錫 (AUTO SOLDERING)	$260 \pm 5^\circ\text{C}$	10 ± 1 秒(SEC)
	人工焊錫 (MANUAL SOLDERING)	$350 \pm 10^\circ\text{C}$	3 ± 1 秒(SEC)

6-10 額定負載 (RATING LOAD)

加額定電力 30 分鐘,並在無負載狀態下 2 小時以后,其阻值變化率應在 $2\% \pm 0.05 \Omega$ 以內, APPLY RATING POWER TO RESISTOR FOR 30 MIN. THE VARIANCE OF RESISROR VALUE,AFTER 2 HOURS IN ZERO LOAD CONDITION,SHOULD BE WITHIN $\pm 2\% 0.05 \text{ OHM}$.

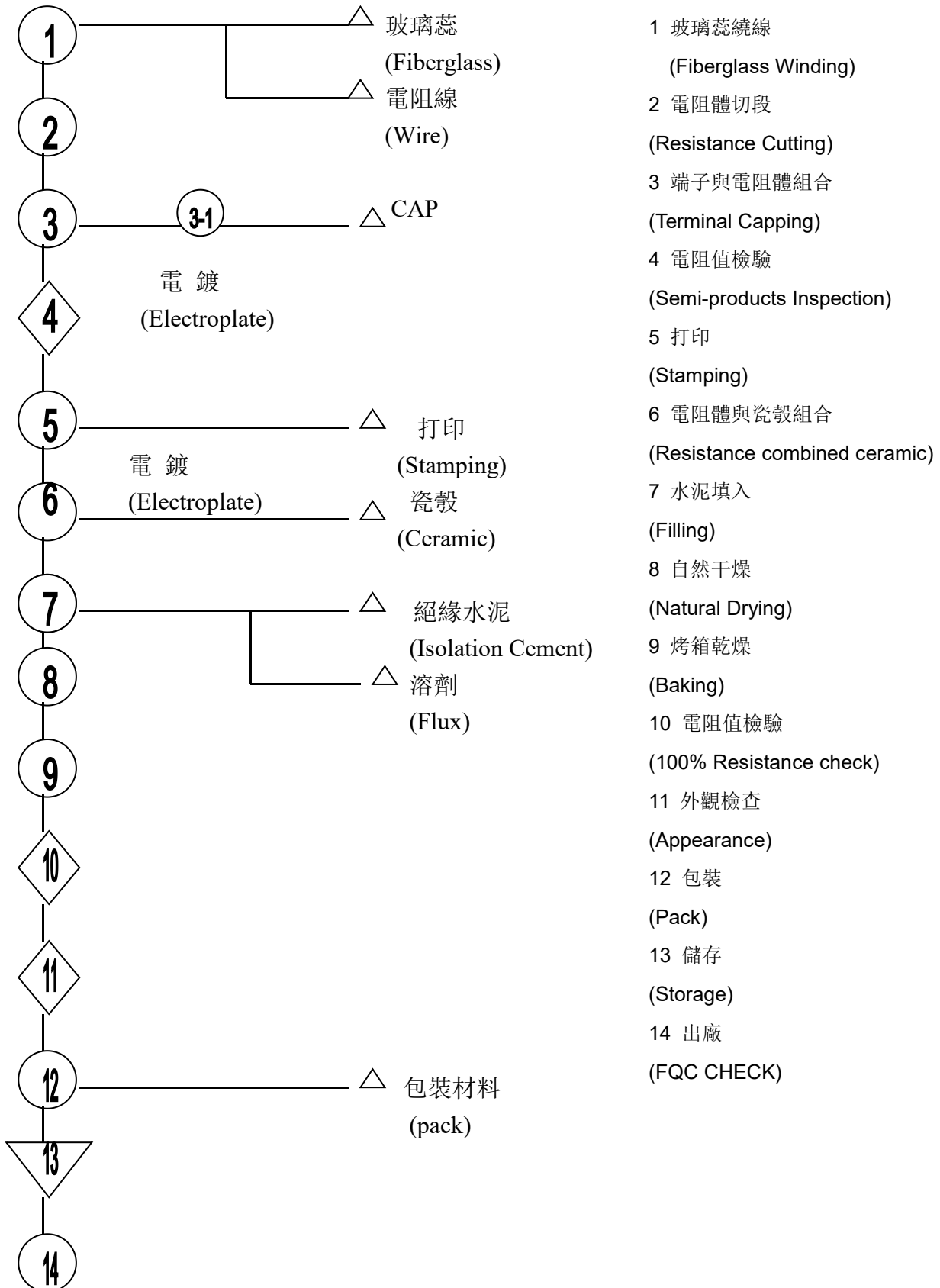
6-11 耐熱性 (TEMPERATURE DURABILITY)

電阻置於 275°C 的恆溫槽中 2 小時以后,其外觀不得損傷

PUT RESISTOR IN 275°C CONSTANTLY FOR 2 HOURS. NO PROMINENT CHANGES IN APPEARANCE.

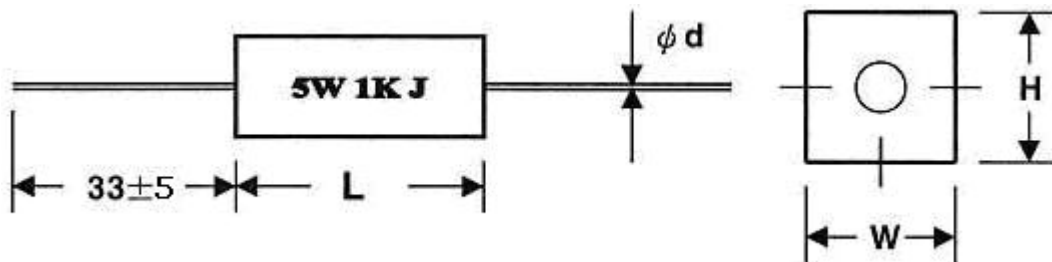
CEMENT RESISTORS

PRODUCTION FLOW CHART



CEMENT RESISTORS

CR - L Series Cement Resistors



DIMENSIONS (mm) :

style	DIMENSIONS (mm) :			
CR-L-L	Normal	Normal	Normal	$\phi d \pm 0.1$
	L	W	H	
1W	13.5±1.0	6.0±1.0	6.0±1.0	0.60
2W	18±1.0	7.0±1.0	7.0±1.0	0.60
3W	22±1.5	8.0±1.0	8.0±1.0	0.60
5W	22±1.5	9.5±1.0	9.5±1.0	0.75
5WA	25±1.5	6.5±1.0	6.5±1.0	0.75
7 W	35±1.5	9.5±1.5	9.5±1.0	0.75
10W	48±1.5	9.5±1.5	9.0±1.0	0.75
15W	48±1.5	13±1.2	13±1.2	0.75
20W	60±2.0	13±1.2	13±1.2	0.75
30W	75±2.5	19±1.2	17±1.2	0.75
40W	89±2.5	19±1.2	19±1.2	0.75
50W	89±2.5	19±1.2	19±1.2	0.75