

# **CCOHM** WIRE WOUND CEMENT RESISTORS

## 承認書 (APPROVAL SHEET) .....

|                      |                             |
|----------------------|-----------------------------|
| 客戶名稱<br>Client       |                             |
| 品 名<br>Description   | 水泥電阻 <b>CR-M(SQM)</b> 系列承認書 |
| 規 格<br>Specification |                             |
| 料 號<br>Part No       |                             |
| 備 注<br>Remark        |                             |

|                 |                 |                    |
|-----------------|-----------------|--------------------|
| 核 準<br>Approval | 校 對<br>Check By | 主 辦<br>Prepared By |
| 林鐵軍             | 林峰              | 彭東林                |

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| 公<br>司<br>章 |  |
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# CCOHM WIRE WOUND 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 CERMET TYPE WIREWOUND RESISTOR.

## 2. 額定 (RATING)

### 2-1 額定電力 (RATING POWER)

額定電力是規定周圍溫度(參照表一)以下可連續使用之負載電力的最大數值。

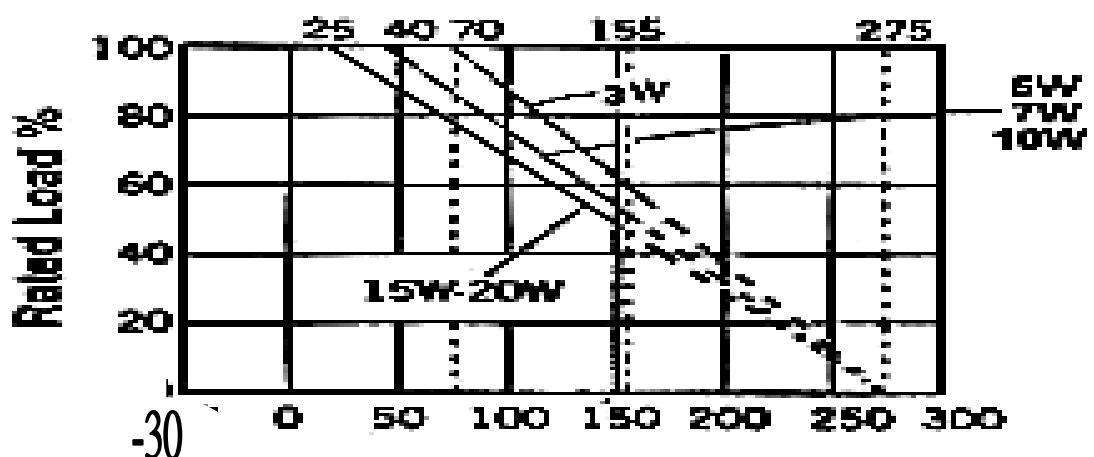
RATING POWER MEANS THE MAX. POWER VALUE OF CONTINUOUS USAGE UNDER THE SPECIFIED AMBIENT TEMPERATURE. (REFER TO TABLE I)

表一

|                               |                  |
|-------------------------------|------------------|
| 額定電力<br>(RATING POWER)        | W                |
| 周圍溫度<br>(AMBIENT TEMPERATURE) | □ 25°C<br>■ 70°C |

且應能應用於其它特性,又當周圍溫度超越上述溫度時,依圖一電力遞減曲線而定。

IN OTHER APPLICATIONS THAT THE AMBIENT TEMPERATURE MAY HAVE GONE OVER THE SPECIFIED VALUE, PLEASE REDUCE THE POWER LOADING ACCORDING TO FIG .I.



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## 2-2 額定電壓 (RATING VOLTAGE)

額定電壓是在額定電力下直流電和交流電相互對應所產生的電壓

$$\text{額定電壓} = \sqrt{\text{額定電力 (W)} * \text{電阻值 } (\Omega)}$$

依公司求出超越最大連續使用電壓時,以最大連續使用電壓為額定電壓

RATING VOLTAGE MEANS THE VOLTAGE RESTRICTED BY VARIOUS DIRECT CURRENT OR ALTERNATIVE CURRENT UNDER THE RATING POWER

FORMULA  $E = \sqrt{P * R}$

E: RATING VOLTAGE (V)

P: RATING POWER (W)

R: NOMINAL RESISTANCE ( $\Omega$ )

## 2-3 電阻值 (RESISTANCE)

電阻值是公稱電阻值(指電阻而言),以 $\Omega$ ,K $\Omega$ 為單位。

RESISTANCE VALUE MEANS NOMINAL RESISTANCE VALUE (INDICATE ON RESISTOR)

## 2-4 溫度使用範圍 (APPLICABLE TEMPERATURE RANGE)

-30  $^{\circ}\text{C}$  ~ + 155  $^{\circ}\text{C}$

## 3 機械特性 (MECHANICAL CHARACTERISTIC)

### 3-1 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  $3 \pm 0.5$  秒,然後拿出使其自然冷卻  $25.4 \pm 6.4$  秒后,再將溶劑洗去,經上述步驟后,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  $3 \pm 0.5$  SECONDS.

THEN PULL IT OUT WITHIN  $25.4 \pm 6.4$  SECONDS, COOL IT IN AIR THEN WASH THE FLUX AWAY. THE LEAD WIRE SHOULD MEET FOLLOWING CONDITIONS AFTER REMOVE THE FLUX.

(a) TERMINAL SHOULD BE NEW SMOOTH.

(b) PIN HOLE DOES NOT NEED TO CONCENTRATE IN ONE PLACE, BUT THE TOTAL AREA SHOULD NOT OVER 10%

### 3-2 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.

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## (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 WTIGHT FROM RANDOM DIRECTION WITHIN 60 SECONDS THE BENDING ANGLE WILL BE WITHIN 5 DEGREE.

## 4 具不燃性 (NON-INFLAMMABILITY)

### 4-1 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,然后再燒 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.

### 4-2 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

## 5.電氣特性 (ELECTRICAL CHARACTERISTIC)

### 5-1 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.

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

R : 試驗後 Ω 值

T : 試驗溫度 (°C)

R<sub>0</sub>: 試驗前 Ω 值

T<sub>0</sub> : 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

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

R<sub>0</sub>: RESISTANCE (Ω) IN BASE TEMP.(2nd STAGE).

R: RESISTANCE IN EVERY TESTING TEMP.STAGE.

T<sub>0</sub>: BASE TEMP. (2nd STAGE).

T: TESTING TEMP. (°C).

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THE TEMP.COEFFICIENT SHOULD BE WITHIN  $\pm 260$  ppm IN ALL STAGES.

表 5-1 (Table 5-1)

單位  $^{\circ}\text{C}$

| 第 1 階段<br>1st | 第 2 階段<br>2st | 第 3 階段<br>3rd | 第 4 階段<br>4th | 第 5 階段<br>5th |
|---------------|---------------|---------------|---------------|---------------|
| $-30\pm 2$    | $25\pm 2$     | $65\pm 2$     | $105\pm 2$    | $180\pm 2$    |

## 5-2 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  $2\%\pm 0.05$  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  $(2\% + 0.05\Omega)$ .

## 5-3 耐溫性 (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  $3\%\pm 0.05\Omega$ .

## 5-4 耐久性 (額定負載)(DURABILITY (RATING LOAD))

溫度  $70\pm 3^{\circ}\text{C}$  (15W 以上,須  $25\pm 3^{\circ}\text{C}$ )的恆溫槽中,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 VARIANE OF VALUE SHALL BE WITHIN  $\Omega$ .NO PROMINENT CHANGES IN APPEARANCE.

## 5-5 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.

## 5-6 熱衝擊 (THERMAL SHOCK)

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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 1 HOUR. THE VARIANCE OF VALUE SHOULD BE WITHIN  $2\%\pm 0.05$ . NO PROMINENT CHANGES IN APPEARANCE.

## 5-7 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 $\Omega$  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  $\Omega$ .

## 5-8 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.

## 5-9 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<br>(CONDITION)          | 項目<br>(ITEM) | 銲錫溫度<br>SOLDERING<br>TEMP. $^{\circ}\text{C}$ | 浸入時間<br>DIP TIME<br>SECONDS |
|----------------------------|--------------|-----------------------------------------------|-----------------------------|
| 自動焊錫<br>(AUTO SOLDERING)   |              | $260\pm 5^{\circ}\text{C}$                    | $10\pm 1$ 秒(SEC)            |
| 人工焊錫<br>(MANUAL SOLDERING) |              | $350\pm 10^{\circ}\text{C}$                   | $3\pm 1$ 秒(SEC)             |

## 5-10 額定負載 (RATING LOAD)

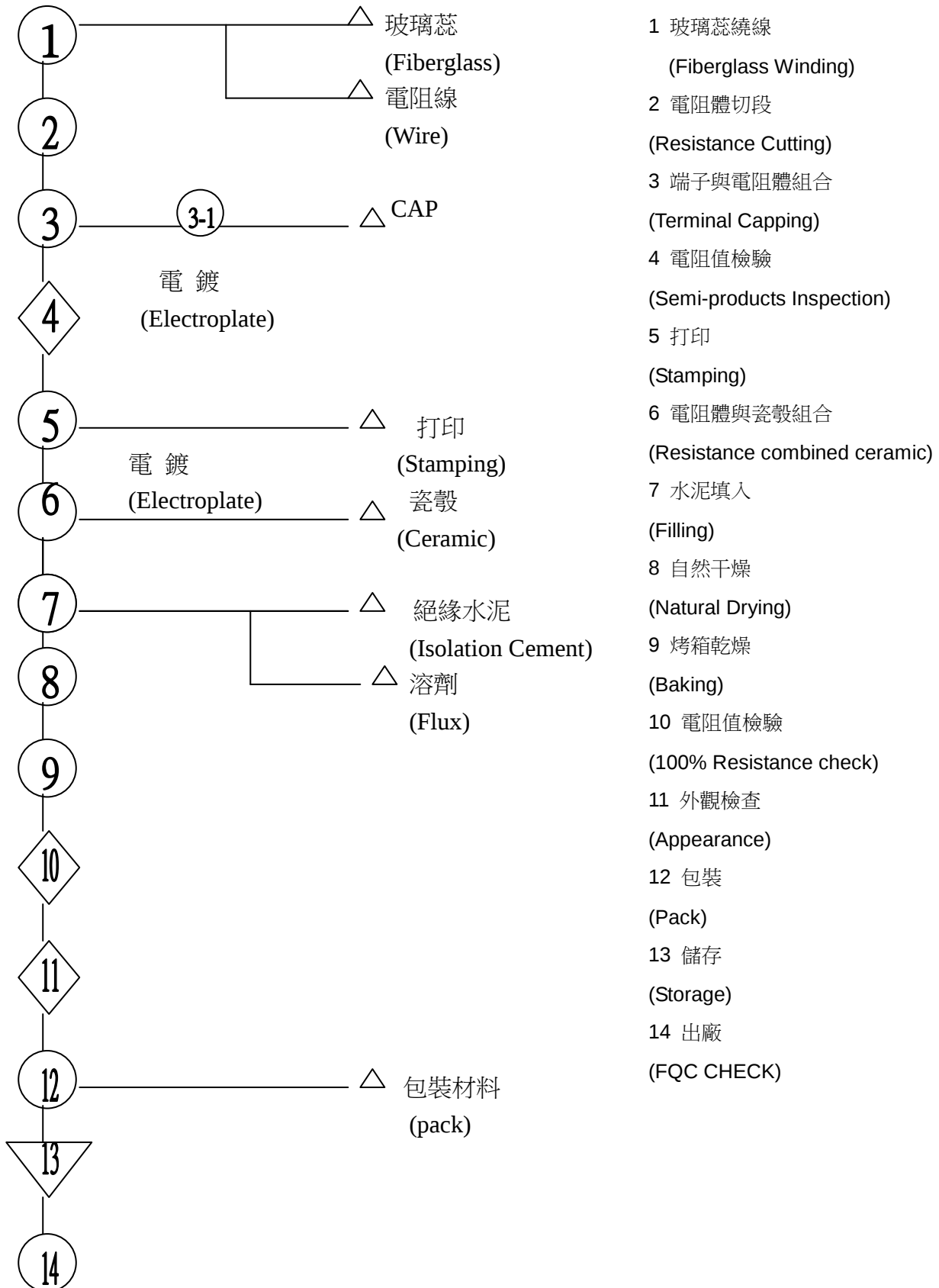
加額定電力 30 分鐘,並在無負載狀態下 2 小時以后,其阻值變化率應在  $2\%\pm 0.05\Omega$  以內, APPLY RATING POWER TO RESISTOR FOR 30 MIN. THE VARIANCE OF RESISROR VALUE,AFTER 2 HOURS IN ZERO LOAD CONDITION,SHOULD BE WITHIN  $\pm 2\% 0.05 \text{ OHM}$ .

## 5-11 耐熱性 (TEMPERATURE DURABILITY)

電阻置於  $275^{\circ}\text{C}$  的恆溫槽中 2 小時以后,其外觀不得損傷

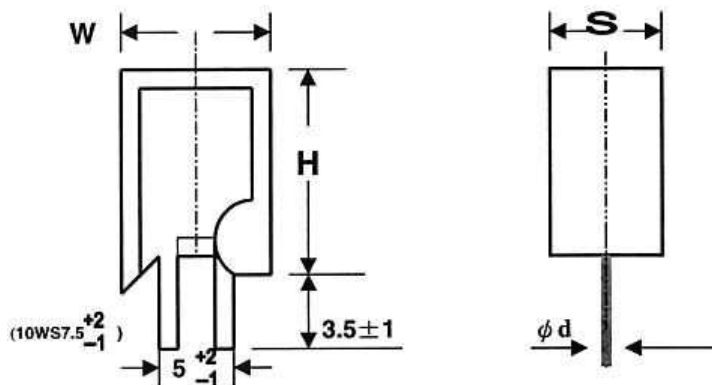
PUT RESISTOR IN  $275^{\circ}\text{C}$  CONSTANTLY FOR 2 HOURS. NO PROMINENT CHANGES IN APPEARANCE.

## PRODUCTION FLOW CHART



# CCOHM WIRE WOUND CEMENT RESISTORS

## SQM Series Cement Wire Wound Resistors



### DIMENSIONS (mm) :

| STYLE | DIMENSION (mm) |                |                |                  |
|-------|----------------|----------------|----------------|------------------|
| SQM   | H              | W              | S              | $\phi d \pm 1.0$ |
| 2W    | 20.5 $\pm$ 1.0 | 11.5 $\pm$ 1.0 | 7.5 $\pm$ 1.0  | 0.6              |
| 3W    | 25 $\pm$ 1.0   | 12 $\pm$ 1.0   | 8.5 $\pm$ 1.0  | 0.8              |
| 5W    | 25 $\pm$ 1.0   | 13 $\pm$ 1.0   | 9.5 $\pm$ 1.0  | 0.8              |
| 7W    | 38 $\pm$ 1.5   | 13 $\pm$ 1.0   | 9.5 $\pm$ 1.0  | 0.8              |
| 10W   | 52 $\pm$ 2.0   | 13 $\pm$ 1.0   | 9.5 $\pm$ 1.0  | 0.8              |
| 10WA  | 36 $\pm$ 2.0   | 16 $\pm$ 1.0   | 11.5 $\pm$ 1.0 | 0.8              |

### ELECTRICAL CHARACTERISTICS:

| Style \ Power Rating 70°C               | SQM-2W            | SQM-3W             | SQM-5W             | SQM-7W             | SQM-10W            |
|-----------------------------------------|-------------------|--------------------|--------------------|--------------------|--------------------|
| Operating Temp. Range                   | -55°C ~ +155°C    |                    |                    |                    |                    |
| Max. Working Voltage                    | 250V              | 350V               | 350V               | 500V               | 500V               |
| Max. Overload Voltage                   | 500V              | 700V               | 700V               | 1000V              | 1000V              |
| Dielectric Withstanding Voltage (AC)    | 500V              | 700V               | 700V               | 1000V              | 1000V              |
| Value Range $\pm$ 5% (Ceramic core)     | 0.1 ~ 47 $\Omega$ | 0.1 ~ 100 $\Omega$ | 0.1 ~ 180 $\Omega$ | 0.1 ~ 470 $\Omega$ | 0.1 ~ 680 $\Omega$ |
| Value Range $\pm$ 5% (Metal Oxide Film) | 48 ~ 100K         | 101 ~ 100K         | 180 ~ 100K         | 471 ~ 10K          | 681 ~ 10K          |
| Temp. Coefficient                       | $\pm$ 300ppm/°C   |                    |                    |                    |                    |

承 認 林鐵軍 複 核 林峰 作 成 彭東林  
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