



功得電子工業股份有限公司  
CONQUER ELECTRONICS CO.,LTD.

# 規格書

## Specification For Approval

Spec. No. SFA028

品名： **SET** 系列 慢速型瓷管保險絲

Type： **SET** *Slow Blow Square Ceramic Surface Mount Fuse*

[www.conquer.com.tw](http://www.conquer.com.tw)

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## History of Change

REV.	Description	Date	Drawn	Designed	Checked	Approved
1	(1) Issue	2010.08.18	林威廷	邱俊傑	蔡進義	蔡其湖
2	(1) 新增規格3.15A (2) 新增PSE安規	2013.08.08	林威廷	邱俊傑	蔡進義	蔡其湖
3	(1) 冷阻值表示方式由中心值改為範圍 (2) 新增建議焊接參數、曲線圖及信賴性測試規範	2015.05.21	林威廷	邱俊傑	蔡進義	蔡其湖

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~ 筒管狀保險絲 ~

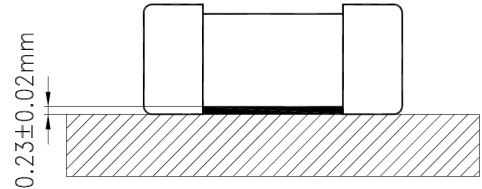
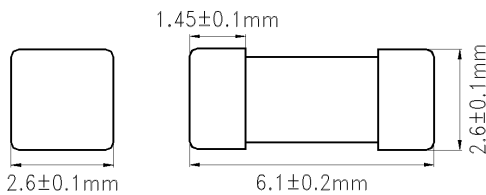
Fuses for Instrument, Power and Telephone (Non-indicating)

1 適用範圍 Available Range:

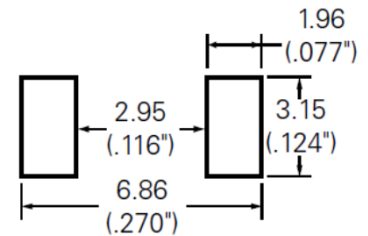
本標準適用於保護儀器、電源供應器和電話機用之筒管式熔斷保險絲。  
For protecting instruments, power supplies and telephone sets.

2 形狀及尺寸如下圖 單位: mm

Shape & Size as following illustrations.



建議點膠位置示意圖



2.1 構造形狀 Structure & Shape : 如上圖 As shown in figure above

2.2 額定電壓 Rated Voltage: 125V

2.3 額定電流 Rated Current: 200mA~7A

3 材料 Material:

3.1 筒管本體: 不透明瓷管不可破裂或變形。

Tube (Body): Non-Transparent ceramic tube fuse. No breaking or deformation is allowed.

3.2 兩端銅帽: 需以導電率良好之黃銅為材料(銅帽部份鍍銀)。

Two brass end caps: Made of brass of good conductivity.(Silver Plating)

3.3 銅合金線: 可熔體保險絲線。

Copper Alloy: Fuse element.

NO.	Part Name 部品名稱	Volume 數量
A	Square Cap 方型銅帽 - Silver Plating - 鍍銀	2
B	Square Ceramic Tube 方型瓷管 - Non-Transparent Ceramic - 不透明瓷管	1
C	Fuse Element 可熔體	1



#### 4 電氣特性 Electrical Characteristics:

##### 4.1 負載容量 Loading Capacity:

通過額定電流值 100 % (亦即  $1.0 \times I_n A$ )，能繼續通電至少 4 小時無任何熔化現象。

Loading 100% Rated Current (i.e.  $1.0 \times I_n A$ ) for flowing, and it's available to let current keep on flowing at least 4 hour without any melting. (Can keep 4 Hour minimum)

##### 4.2 溫度特性 Temperature:

通過額定電流值 100% (亦即  $1.0 \times I_n A$ ) 1.5 小時，繼續維持原加之電流，每隔十分鐘測試一次，連續測三次，溫度不得升高，若使用熱偶式測量方法，(Thermocouple method) 則本體溫升在  $75^\circ C$  以下。

Loading the 100 % ( $1.0 \times I_n A$ ) for 1.5 hours, keep testing it with the original current every 10 minutes. Continue to test it for 3 times. The temperature is not allowed to be higher. The main temperature rise is below  $75^\circ C$  by way of thermocouple method.

##### 4.3 過載熔斷: 請參照下表。

Melting due to overloading: Details as follows Table.

※最大熔斷時限 Operating Characteristics

安培數 Rating	100% Rating		200% Rating		300% Rating		800% Rating	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
200mA~7A	4 Hrs		1 sec	60 sec	0.2 sec	3 sec	0.02sec	0.1 sec

#### 5 機械特性 Mechanical Properties:

##### 拉力強度 Terminal Strength:

當施加軸拉力 720g/cm 於兩端附腳(或銅帽)，無鬆動或損壞現象發生。

Leads and/or caps are soldered (adhered) to withstand axial pulling force of 720g/cm without loosening or any harmfulness to firmly attachment.

#### 6 突波實驗 Pulse Test:

為適應電感或電容性電路所產之暫態電流，本品於 10 倍額定電流的熔斷時間最少為 10ms。  
In order to stand transient current caused by inductive or capacitive, the fuses are designed to have minimum clearing time of 10 millisecond at 1000% rated current.

#### 7 脈波實驗 Cycle Test (On-Off Test):

本實驗乃保證產品之壽命與可靠度，施加 60% 額定電流之脈波，1 分鐘 ON，2 分鐘 OFF，1000 次以後，本品不熔斷且內阻變化 20% 以下。

This test is designed to assure a reliable fuse, controls are set giving 60% of rated ampere.

1 minute ON, 2 minutes OFF per time, the fuse will not open before 1000 times and the internal resistance change will be below 20%.

#### 8 高溫效應 Derating Test:

本品置於  $70^\circ C$  之高溫中，4.1 之負載容量將降至室溫之 80% (For UL Listed)。

In an air circulating oven at  $70^\circ C$ , the carry capacity will be derated to 80% of current specified in item 4.1 (For UL Listed).

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9 遮斷能力 Interrupting rating:  
50 amperes at 125V AC / DC  
300 amperes at 32V DC

10 包裝 Packing:

1000 pcs (7'')/盒

內盒印明下列標示:料號、額定(電壓、電流、遮斷能力)及安規名稱。

包裝材料均符合RoHS或者HF的環保要求,且包裝材料不會和零件發生化學反應,造成不良。

1000 pcs (7'') in an inner box.

The following items indicated on the box.

Mark: Catalog number; ratings (voltage, current, interrupting capacity) and safety mark.

The packing material conforms to RoHS or the HF environmental protection request.

And the packing material can't have the chemical reaction with the components.

11 其他 Other:

11.1 除非另有指定,上述機械、電器特性,係於常溫,標準狀況下測試之。

Unless otherwise, specified, all tests to be performed at 25±5°C and 35-75% RH.

11.2 於標準狀況下儲放一年,本品乃確保上述機械與電氣之特性。

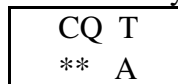
After one year's storage under normal condition, this item is guaranteed to meet the requirements mentioned above.

11.3 使用於此產品之材料中,使用高溫熔化型之焊錫,此焊錫成份中鉛含量大於85%,故此產品符合RoHS指令(2002/95/EC)要求之焊錫含鉛量超過85%之排除條款規範。

Because the materials used in these fuses include high melting temperature type solder and this solder contains more than 85% lead (Pb), so these products can conform to the exempts of the requirements of RoHS Directive (2002/95/EC).

12 標記/安規認證 Mark / Safety certification:

印字方式--->



\*\*請自行填入安培數 Ampere Rating : 200mA~7A

Mark Approvals				Nominal Resistance Cold Ohms
200 mA	*	*		1.1026 - 2.0476
250 mA	*	*		0.8810 - 1.6361
300 mA	*	*		0.8758 - 1.6266
350 mA	*	*		0.6556 - 1.2176
375 mA	*	*		0.3662 - 0.6802
400 mA	*	*		0.3605 - 0.6695
450 mA	*	*		0.3506 - 0.6512
500 mA	*	*		0.2304 - 0.4278
700 mA	*	*		0.1854 - 0.3442
750 mA	*	*		0.1120 - 0.2080
1 A	*	*	*	0.0763 - 0.1417

Mark Approvals				Nominal Resistance Cold Ohms
1.5 A	*	*	*	0.0377 - 0.0699
2 A	*	*	*	0.0373 - 0.0693
2.5 A	*	*	*	0.0201 - 0.0373
3 A	*	*	*	0.0160 - 0.0296
3.15 A	*	*	*	0.0157 - 0.0291
3.5 A	*	*	*	0.0144 - 0.0267
4 A	*	*	*	0.0098 - 0.0182
5 A	*	*	*	0.0091 - 0.0169
6 A	*	*	*	0.0063 - 0.0117
7 A	*	*	*	0.0056 - 0.0104

\*: 有安規認證 Have safety certify

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13 系列品名列表 Series Model List :

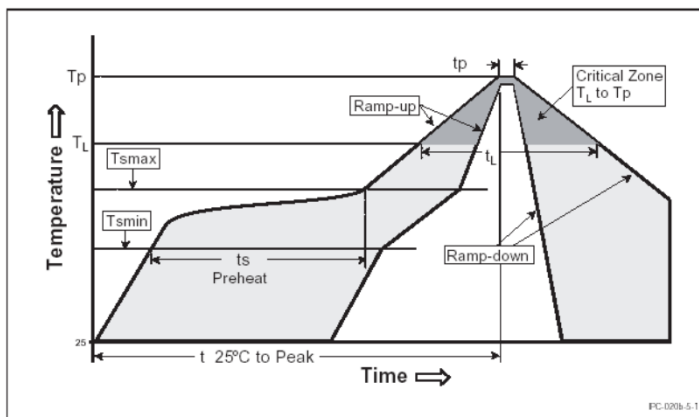
品名	安培數
SET ___A ___V	200mA~7A

例:     **SET**       **A**       **V**  
          **1**        **2**        **3**

- 1 系列品名 Series Model : SET
- 2 安培數 Ampere Rating : 200mA~7A
- 3 伏特數 Voltage : 125V

14 建議生產參數(無鉛焊錫使用及回流焊) :

Recommended Process Parameters(for the action to Lead-free solder alloy and reflow soldering) :

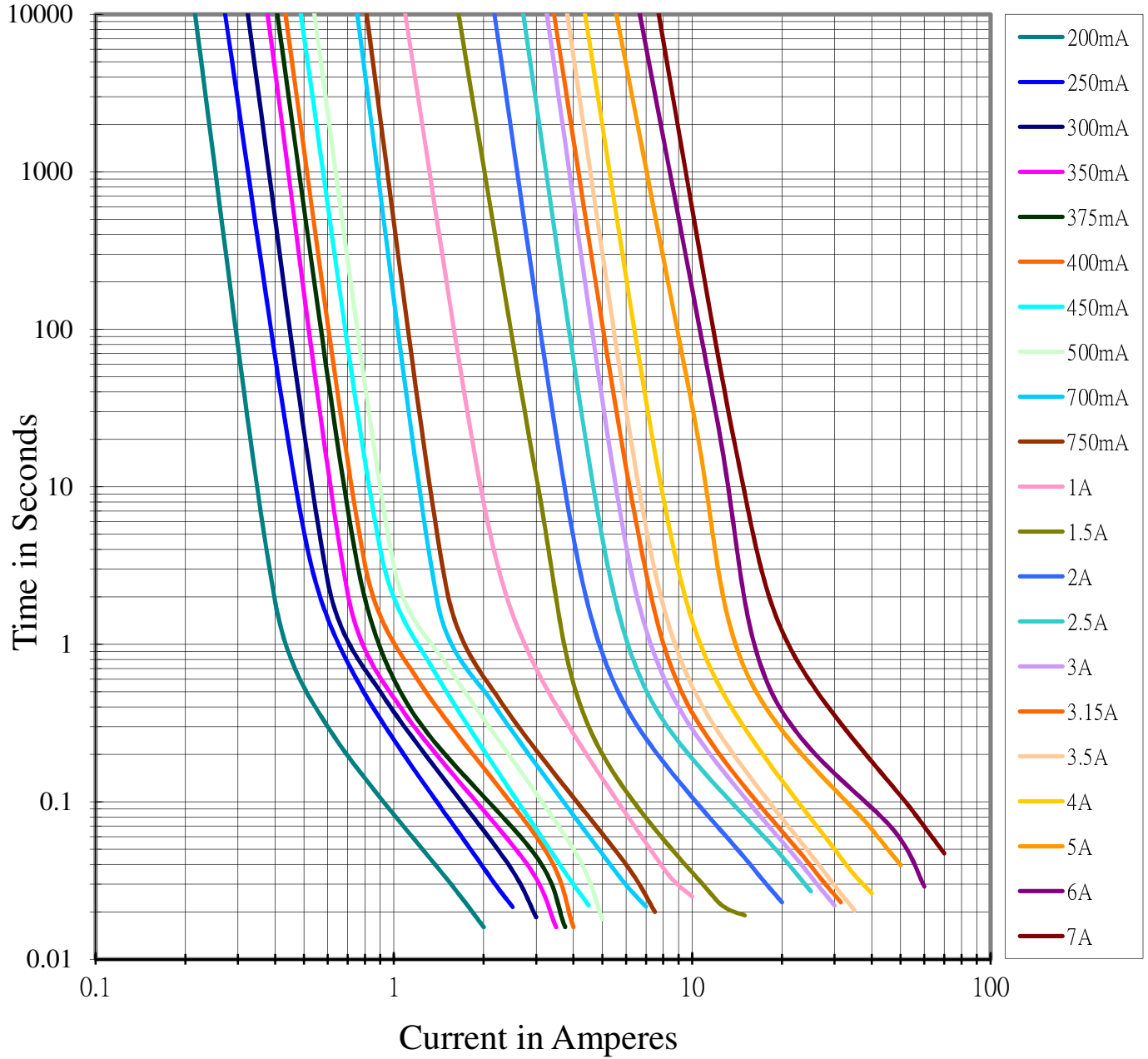


Reflow Condition		Pb-free assembly
Pre-Heat	Temperature Min. ( $T_{s(min)}$ )	150°C
	Temperature Max. ( $T_{s(max)}$ )	200°C
	Time (Min to Max) ( $t_s$ )	60 - 180 sec
Average Ramp-up Rate (Liquidus Temp ( $T_L$ ) to peak)		3°C / sec max
$T_{s(max)}$ to $T_L$ -Ramp-up Rate		5°C / sec max
Reflow	Temperature ( $T_L$ ) (Liquidus)	217°C
	Time ( $t_L$ )	60 - 150 sec
Peak Temperature ( $T_p$ )		260 +0/-5°C
Time within 5°C of actual peak Temperature ( $t_p$ )		10 - 30 sec
Ramp-down Rate		6°C / sec max
Time 25°C to peak Temperature ( $t_{25°C \text{ to peak}}$ )		8 min max
Do not exceed		260°C

**Soldering Method**     \*Reflow Soldering : 260°C, 30Sec. max.  
                                  \*Wave Soldering : 260°C, 10Sec. max.  
                                  \*Hand Soldering : 350°C, 3Sec. max.



15 電流與時間曲線圖 IT Curve:



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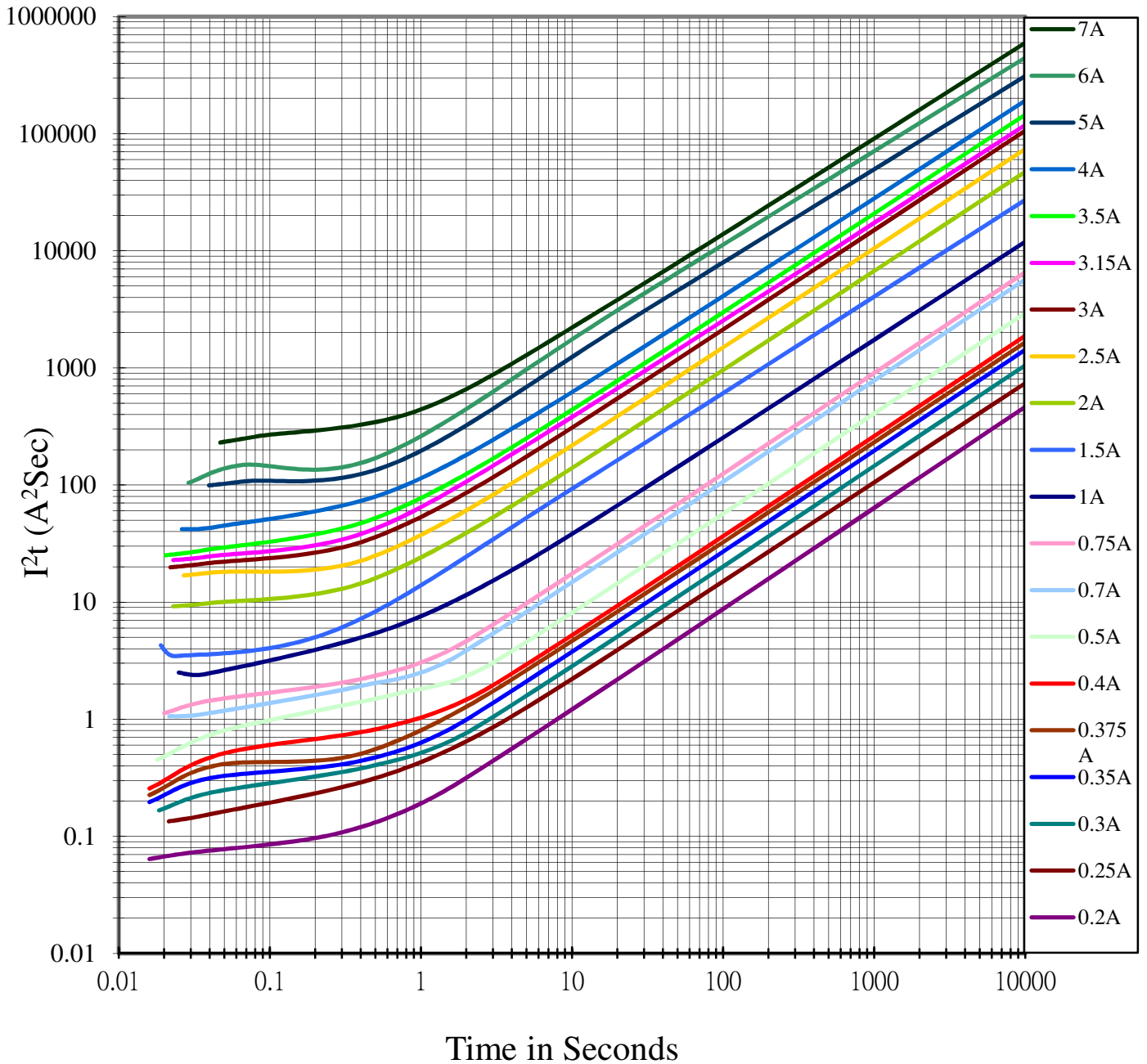
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16 熔化熱能值與時間曲線圖  $I^2t$  Curve:



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17 信賴性作業規定 Product Characteristics & Reliability Tests:

Test item	Test Description & Reference
Humidity unload test	MIL-STD-202G , Method 103B , Test Condition A Heat (40±0.5°C) & High Humidity (95±1% RH), 240 hours , ΔR<15%
Thermal shock test	MIL-STD-202G, Method 107g , Test Condition B Temperature setup : 25°C ~ -65°C ~ 25°C ~ 125°C Time setup : -65°C (30min)~25°C (5min)~125°C (30min)~ 25°C (5min) 5 cycles , ΔR<15%
Vibration test	MIL-STD-202G , Method 201A Frequency setup : 10 ~ 55 ~ 10 Hz Time setup : 1 Minutes/cycle (X-Y-Z,120 Cycles) 6hrs, ΔR<15%
Salt spray Test	MIL-STD-202G , Method 101E , Test Condition A Salt spray concentration : 5 ± 1% Test liquid temperature : 35 ± 0.5°C 96hrs, ΔR<15%
Solderability test	Reference IEC 60068-2-58 Temperature setup : 250 ± 5°C, 3 ± 0.3 sec After test terminal electrode wetting area must be greater than 95%
Resistance to Solder Heat Test	Reference IEC 60068-2-58 Temperature setup : 260± 5°C, 10± 1 sec ΔR<15%

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