



承 认 书

PRODUCT SPECIFICATION

No:HW2307240020

客 户：立创电子科技（江苏）有限公司 日 期：2023-7-26

CUSTOMER:

DATE:

品名：固态铝电解电容器 Conductive Polymer Aluminum Electrolytic Capacitors

型号/规格： PE - 6.3V-500 μ F 5.45 \times 9

用户承认 User

Approved by

注：RoHS 指令(2011/65/EU)已对应完毕

对此承认书确认后，在用户承认栏注明确认印，返传一份与敝公司

常州华威电子有限公司




CHANGZHOU HUAWEI ELECTRONICS CO.,LTD

地址：江苏常州西郊邹区镇

ADD: Zouqu District, West Suburbs of Changzhou Jiangsu

电话(TEL): 86-519-69896666 传真(FAX): 86-519-83637987

邮编(ZIP CODE): 213144 E-mail: huaweiec@public.cz.js.cn

拟 制 Prepared	审 核 Checked	批 准 Approved
		

文件内容修改历史记录
RECORD OF REVISION

生效版本 REV. NO.	变更原因 REASON	修改内容 CONTENTS	承认时间 DATE OF APPROVAL	拟制 Prepared	备注 REMARKS
1		新版发行	2023-7-26	钱卢苏蒙	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

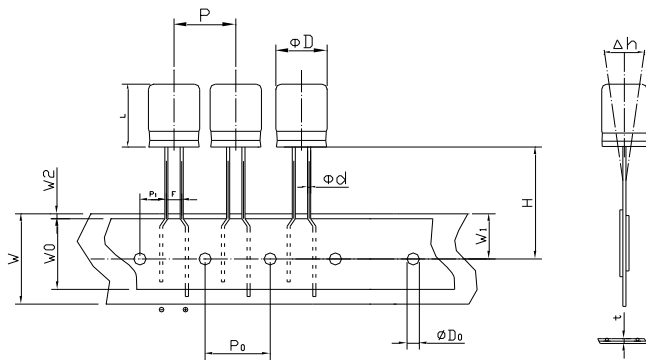
一、概述 SCOPE

本产品规格书适用于常州华威电子有限公司 PE 型固态铝电解电容器产品。

The product specification is adapted to series PE Conductive Polymer Aluminum Electrolytic Capacitors of CHANGZHOU HUAWEI ELECTRONIC CO., LTD.

二、外形示意图及尺寸表 Case size table

单位 unit:mm



$\Phi D \pm 0.5$ (Max)	5.45	$W_1 \pm 0.5$	9.0
$L \pm 1.0$ (Max)	9	W_2	≤ 1.5
$\phi d \pm 0.05$	0.5	W_0	≥ 12
$P \pm 1.0$	12.7	$H \pm 0.75$	18.5
$p_0 \pm 0.2$	12.7	$H_0 \pm 0.5$	-
$p_1 \pm 0.5$	5.1	$D_0 \pm 0.2$	$\Phi 4.0$
$F \begin{matrix} +0.3 \\ -0.2 \end{matrix}$	2.5	$t \pm 0.2$	0.6
$W \pm 0.5$	18.0	Δh	≤ 2.0

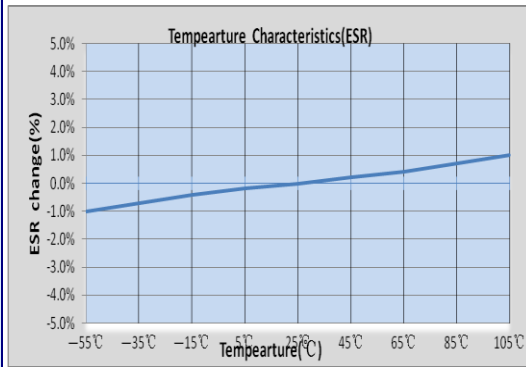
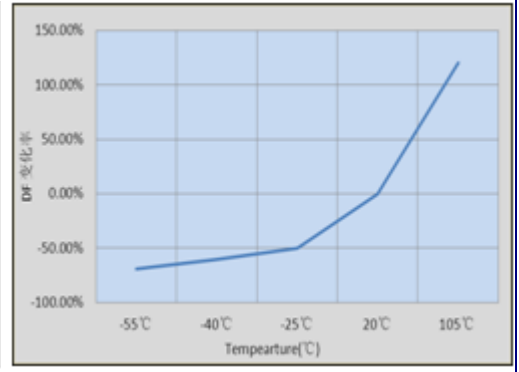
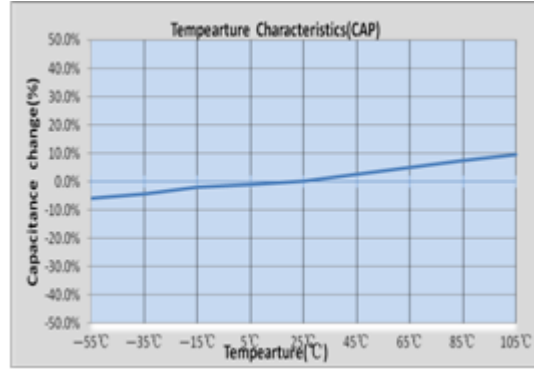
三、技术性能 Specifications

1	系列号(SERIES)	PE 系列(PE SERIES)	
2	额定电压 (rated voltage)	2.5V~25V	
3	工作温度范围 Operating temperature range operating	工作温度范围是指电容器在额定电压下能持续工作的所允许外部环境的温度范围 operating temperature range is the range of ambient temperature at which the capacitor can be operated continuously at rated voltage SPEC:-55~+105℃	
4	电容容量 capacitance	测量等效电路图 measuring circuit equivalent series circuit	
		测量温度 20℃	measuring temperature
		测量频率 120HZ	measuring frequency
		测量电压 0.5Vrms	measuring voltage
标称电容容量允许偏差: ±20% MAX		Nominal Capacitance Tolerance: ±20% MAX	

5	损耗角正切 tangent of the loss angle	<p>损耗角正切的测量应要和测量电容容量一样的条件下进行</p> <p>Measurement should be made under the same conditions as those given for the measurement of capacitance</p> <p>SPEC:</p> <table border="1" data-bbox="427 454 1465 611"> <tr> <td>损耗角</td> <td>U_R (V)</td> <td>2.5</td> <td>4</td> <td>6.3</td> <td>6.8</td> <td>7.5</td> <td>10</td> <td>12</td> <td>14</td> <td>16</td> <td>20</td> <td>25</td> </tr> <tr> <td>正切</td> <td>tanδ</td> <td colspan="11">参考目录规格</td> </tr> </table>	损耗角	U _R (V)	2.5	4	6.3	6.8	7.5	10	12	14	16	20	25	正切	tanδ	参考目录规格										
损耗角	U _R (V)	2.5	4	6.3	6.8	7.5	10	12	14	16	20	25																
正切	tanδ	参考目录规格																										
6	漏电流 leakage current	<p>将额定电压加在电容和 1000±100Ω 的保护电阻上。在充电 2 分钟后，按下列等式计算漏电流</p> <p>the rated voltage shall be applied across the capacitor and its protective resistor which shall be 1000±100Ω. The leakage current shall be then measured after an electrifications period of (A)min. The leakage current shall be calculated by the following equation</p> <p>在加上额定电压一定时间后，应满足下列要求：LC≤0.2CV or 200 μ A Which is greater(取较大者) (20℃, 2 分钟)</p> <p>SPEC: The following specifications shall be satisfied when the rated voltage is applied for the required time.</p>																										
7	等效串联阻抗 Equivalent Series Resistance (ESR)	<p>测量等效电路图 measuring circuit equivalent series circuit</p> <table border="1" data-bbox="414 1120 1476 1373"> <tr> <td>测量温度 20℃</td> <td>measuring temperature</td> </tr> <tr> <td>测量频率 100KHZ</td> <td>measuring frequency</td> </tr> <tr> <td>测量电压 0.5Vrms</td> <td>measuring voltage</td> </tr> </table>	测量温度 20℃	measuring temperature	测量频率 100KHZ	measuring frequency	测量电压 0.5Vrms	measuring voltage																				
测量温度 20℃	measuring temperature																											
测量频率 100KHZ	measuring frequency																											
测量电压 0.5Vrms	measuring voltage																											
8	允许最大纹波电 流 Maximum permissible ripple current	<p>在规定的某一频率下的最大交流电流，在该电流下电容器连续工作。即使在测过耐久性后，此要求仍要满足。在此，DC 电压加上最大纹波电压小于等于额定电压。</p> <p>The maximum sinusoidal alternating current of a frequency specified below, at which the capacitor can be operated continuously. This requirement shall be satisfied even after the measurement electrical endurance Where (DC voltage +peak ripple voltage) ≤rated voltage</p> <table border="1" data-bbox="427 1630 1460 1731"> <tr> <td>Frequency</td> <td>120Hz≤freq.<1KHz</td> <td>1KHz≤freq.<10KHz</td> <td>10KHz≤freq.<100KHz</td> <td>100KHz≤freq.<1000KHz</td> </tr> <tr> <td>Coefficient</td> <td>0.05</td> <td>0.3</td> <td>0.7</td> <td>1</td> </tr> </table>	Frequency	120Hz≤freq.<1KHz	1KHz≤freq.<10KHz	10KHz≤freq.<100KHz	100KHz≤freq.<1000KHz	Coefficient	0.05	0.3	0.7	1																
Frequency	120Hz≤freq.<1KHz	1KHz≤freq.<10KHz	10KHz≤freq.<100KHz	100KHz≤freq.<1000KHz																								
Coefficient	0.05	0.3	0.7	1																								

9

温度特性
Temperature
Characteristics

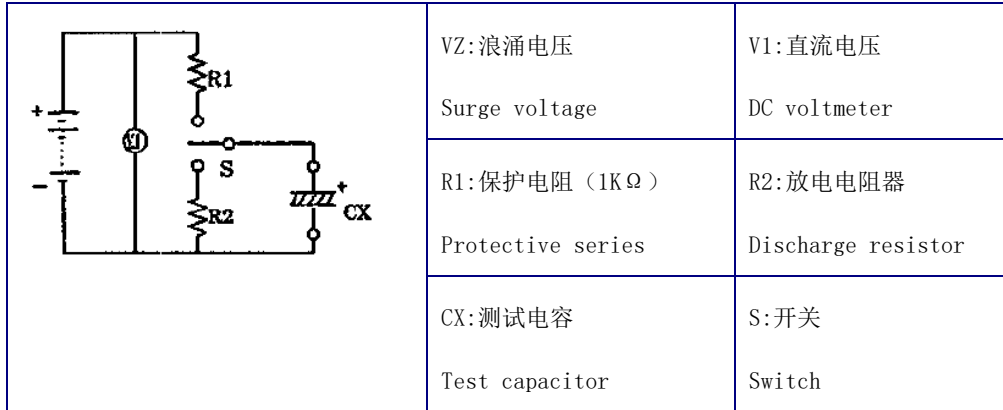


四、试验方法及要求 Tests

在规定温度下，循环测试 1000 次，每次充电 30 ± 5 秒，在放电大约 5 分 30 秒。在标准温度条件下存放使其稳定，然后测试。

The capacitor shall be subjected to 1000cycles at a temperature specified below, each consisting of a charge period of 30 ± 5 sec, followed by a discharge period of approx. 5min30sec. And the capacitor shall be stored under standard conditions thermal to obtain stability, after which measurements shall be made.

measurement circuit(测试电路图)



浪涌测试
Surge test

SPEC: 1) 电容量变化 Change in capacitance: $\pm 10\%$ 初始值以内 Within $\pm 10\%$ of the initial value

2) 损耗角正切 tangent of the loss angle: 小于等于初始规定值 The initial specified value or less

3) ESR (equivalent series resistance): 小于等于初始规定值 The initial specified value or less

4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less

电压设定

RATED	2.5	4	6.3	6.8	7.5	10	12	14	16	20	25
SURGE	2.9	4.6	7.2	7.8	8.6	11.5	13.8	16.1	18.4	23	28.75

端子强度
Terminal strength

1) 拉力(tensile)

d(mm)	[N]	Duration time
$0.3 < d \leq 0.5$	5	10±1sec(秒)
$0.5 < d \leq 0.8$	10	

2) 抗弯强度 (Bending)

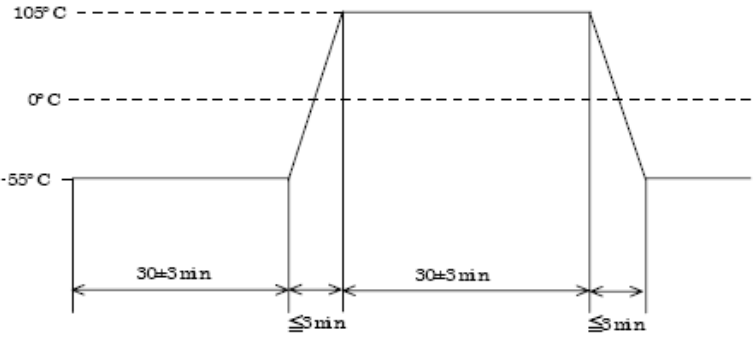
端子应该在每一方向上折弯一次，总共两次

The terminal shall be subjected to 1 bend in each direction to give a total 2 bends.

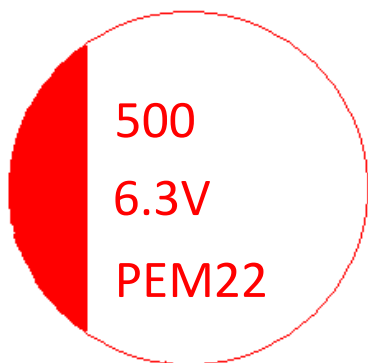
d(mm)	[N]
$0.3 < d \leq 0.5$	2.5 (0.25KG)
$0.5 < d \leq 0.8$	5.0 (0.51KG)

端子没有破损或松动 SPEC: No breaking and loosening of terminal

3	可焊性 solderability	<p>焊料(Solder) : H60A. H60S or(或)H63A</p> <p>焊接温度(Solder temperature) : 245±2°C</p> <p>浸入时间(Immersion time) : 2±0.5sec(秒)</p> <p>浸入深度(Immersion depth) : 离本体 1.5~2mm</p> <p>熔化: 松香在酒精的浓度是 25%</p> <p>Flux: 25% by weight of rosin in ethanol</p> <p>从含浸处到顶部, 至少要有 95%的部分覆盖有新焊料</p> <p>SPEC:1)95% of the circumference of the surface up to the immersed shall be covered with new solder.</p>
4	耐焊接热 Resistance to soldering heat	<p>焊料(Solder) : H60A. H60S or(或)H63A</p> <p>焊槽温度(Solder temperature) : 260±5°C(or 或 350±10°C</p> <p>浸入时间(Immersion time) : 10±1sec(秒) (or 或 3.5±0.5sec)</p> <p>绝热屏蔽板的厚度 (Thickness of heat shunt:1.6mm) : 1.6mm</p> <p>SPEC: 1) 电容量变化 Change in capacitance: ±10%初始值以内 Within±10% of the initial value</p> <p>2) 损耗角正切 tangent of the loss angle: 小于等于初始规定值 The initial specified value or less</p> <p>3) ESR (equivalent series resistance) : 小于等于初始规定值 The initial specified value or less</p> <p>4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less</p>
5	标志耐溶剂性	<p>试剂 The reagent:异丙醇 Isopropyl alcohol</p> <p>试验温度 Test temperature:20~25°C</p> <p>浸入时间 Test time:30±5S</p> <p>标志应清晰可见 Signs should be clearly visible</p>
6	高温高湿 Dampheat, steady state	<p>电容器要在温度 60±2°C, 相对湿度 90%到 95%条件下存放 240±8 个小时。然后在标准条件下放 1 到 2 小时后进行测量。</p> <p>the capacitor shall be stored at a temperature of 60±2°C and relative humidity of 90 to 95% for 240±8hours. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2hours, after which measurements shall be made</p> <p>SPEC: 1) 电容量变化 Change in capacitance: ±10%初始值以内 Within±10% of the initial value</p> <p>2) 损耗角正切 tangent of the loss angle: ±150%初始规定值以内 within ±150%of the initial value</p> <p>3) ESR (equivalent series resistance) : ±150%初始规定值以内 within ±150%of the initial value</p> <p>4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less</p>
7	高温贮存 shelf life	<p>在+105°C温度下不外加电压贮存, 电容器存放 1000 小时。然后在标准条件下放 1 到 2 小时后进行测量, 并且在测漏电流前, 必须满足下列条件。</p> <p>The capacitor shall be stored at +105°C temperature specified below for1000hours.During which time no voltage shall be applied. And then the capacitor shall be subjected to standard atmospheric conditions for 1 to2hours, after which measurements shall be made, Prior to the measurement of leakage current, following conditioning may be made.</p> <p>SPEC: 1) 电容量变化 Change in capacitance: ±20%初始值以内 Within±20% of the initial value</p>

		<p>2) 损耗角正切 tangent of the loss angle: $\pm 150\%$初始规定值以内 within $\pm 150\%$of the initial value</p> <p>3) ESR (equivalent series resistance): $\pm 150\%$初始规定值以内 within $\pm 150\%$of the initial value</p> <p>4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less</p>
8	<p>耐久性 load life</p>	<p>+105°C±2°C施加额定电压 2000 小时后，待温度恢复到 20°C后进行测试，电容器应满足以下要求： After applying rated voltage for 2000 hours at 105°C±2°C, and then being stabilized at +20°C, the capacitor shall meet the following requirement:</p> <p>SPEC: 1) 电容量变化 Change in capacitance: $\pm 20\%$初始值以内 Within $\pm 20\%$ of the initial value</p> <p>2) 损耗角正切 tangent of the loss angle: $\pm 150\%$初始规定值以内 within $\pm 150\%$of the initial value</p> <p>3) ESR (equivalent series resistance): $\pm 150\%$初始规定值以内 within $\pm 150\%$of the initial value</p> <p>4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less</p>
9	<p>温度循环试验 Rapid temperature change</p>	<p>电容器要图一的温度循环要求下保持 5 个循环。然后在标准条件下放 1 到 2 小时后进行测量。 The characteristics of a capacitor kept under the temperature cycle indicated in Figure1 for 5 cycles . And then the capacitor shall be subjected to standard atmospheric conditions for 1to 2hours, after which measurement shall be made.</p>  <p style="text-align: right;">Figure.1</p> <p>SPEC: 1) 电容量变化 Change in capacitance: $\pm 10\%$初始值以内 Within $\pm 10\%$ of the initial value</p> <p>2) 损耗角正切 tangent of the loss angle: \leq初始规定值 The initial specified value or less</p> <p>3) ESR (equivalent series resistance): \leq初始规定值 The initial specified value or less</p> <p>4) 漏电流 leakage current: \leq初始规定值 The initial specified value or less</p>
10	<p>低温试验 Low temperature test</p>	<p>电容器要在温度-55°C条件下存放 72±2 个小时。然后在标准条件下放 1 到 2 小时后进行测量。 the capacitor shall be stored at a temperature of -55°C for 72±2hours。 And then the capacitor shall be subjected to standard atmospheric conditions for 1 to 2hours, after which measurements shall be made</p> <p>SPEC: 1) 电容量变化 Change in capacitance: $\pm 10\%$初始值以内 Within $\pm 10\%$ of the initial value</p> <p>2) 损耗角正切 tangent of the loss angle: 小于等于初始规定值 The initial specified value or less</p> <p>3) ESR (equivalent series resistance): 小于等于初始规定值 The initial specified value or less</p> <p>4) 漏电流 leakage current: 小于等于初始规定值 The initial specified value or less</p>

五、标志 Marking



500 represent rated capacitance, the unit is μF .
6.3 represent rated voltage, the unit is V.
PEM22 represent series/DC
On the left side of the red area represent cathode

六、寿命推算公式

$$L_x = L_0 \times 10^{\left(\frac{T_0 - T_x}{20}\right)}$$

L_x --估算寿命,

L_0 —额定温度/电压下的寿命;

T_0 —额定温度,

T_x —环境温度,

七、铝电解电容器的使用注意事项 Guidelines For Using Aluminum Electrolytic Capacitor

为使您获得电解电容器的最佳性能和延长电解电容器的使用寿命，在使用电解电容器前，请务必阅读本注意事项。

Upon using Aluminum Electrolytic Capacitors, please proper handing and observing to following important points will insure optimum capacitor performance and long life.

1. 直流电解电容器是有极性的 DC electrolytic capacitors are polarized.

确定极性，极性标志在电容器的基体上。以免因极性反可能引起电路短路或电容器损坏，当极性不固定或不确定的，使用双极性电容器。注意直流电解电容器不能使用于交流。

Make sure of the polarity. The polarity is marked on the body of the capacitor .Application of the reversed voltage cause a short circuit or damage to the capacitor. Use bipolar capacitors when the polarity is not determined or unknown. Note that DC electrolytic capacitors can not be used for AC application.

2. 使用电压不要大于额定电压 Do not apply voltage greater than rated voltage.

使用电压大于额定电压，漏电流会增大，可能损坏电容器。建议工作电压为额定电压的百分之七十~八十，电容器在建议的工作电压下使用可延长电容器的寿命。

If a voltage exceeding the rated voltage is applied, the leakage current will increase, which damage the capacitor. Recommended working voltage is 70 to 80 percent of tatted voltage. Using capacitors at recommended working voltage prolongs capacitor life.

3. 不要使过量的纹波电流通过电容器 Do not allow excessive ripple current through the capacitor.

流过电容器的纹波电流超过许可值，将会引起电容器发热，电容量减少，损害电容器。通过电容器的纹波电流不要大于允许值。

The flow of ripple current over permissible ripple current will cause heat of the capacitor, which may decrease the capacitance and damage the capacitor. Ripple current on the capacitor must be at or bellow allowable level.

4. 快速的充放电电路中，使用专门设计的电容器 ‘

Use specially designed capacitors for the circuits where charge and discharge are frequency repeated.

在经受快速的周期性充放电电路中，电容器可能受损害，它的寿命因容量下降、温升等原因而缩短，在这种电路中，一定要使用专门设计的电容器。

In the circuit subjected to rapid charge cycles, capacitors may be damaged, its life may be shortened by capacitance decrease, heat rise, ect. Be sure and use special capacitors in these applications.

5. 工作温度范围 Operating temperature range.

电容器的特性随工作温度而变化，在温度较高的情况下，容量、漏电流增大，损耗减少；在低温情况下，容量和漏电流下降，损耗增大。电容器在较低的温度下使用会确保延长寿命。

The characteristics of capacitors change with the operating temperature. The capacitance and leakage current increase and $\tan\delta$ decrease at higher temperatures. The capacitance and leakage current decrease and $\tan\delta$ at increase lower temperature. Usage at lower temperature will ensure longer life.

6. 核对工作频率 Check operating frequency.

电解电容器的容量通常是在 100Hz 或 120Hz 下测得的。然而要记住容量随频率的升高而下降， $\tan \delta$ 随频率的升高而增大，并使周围温度升高。

The capacitance of electrolytic capacitors is usually measured at 100Hz or 120Hz. However, remember that capacitance decrease and $\tan\delta$ increase as the applied frequency becomes higher whereas the ambient temperature becomes higher.

7. 长时间存放的电容器，在使用前加额定直流电压处理（期限：一年）

Capacitors stored for a long time should be treated with rated DC voltage before use (with a shelf life of one year)

长时间的存放，实际对电容器的容量和 $\tan \delta$ 没有多大的影响，然而往往会使漏电流增大，耐压降低。长时间存放后的电容器处理，首先逐渐施加直流电压至额定电压，然后再使用。

Long periods of storage have virtually no effect on a capacitor's capacitance and $\tan\delta$. Such periods tend however, to increase leakage current and decrease withstand voltage. After removing capacitors from long-duration storage, first apply a gradually increasing DC voltage to rated voltage and then use them.

8. 电容器外壳与阴极端是不绝缘的 The capacitor case is not insulated from the cathode terminal.

电容器外壳与阴极端是通过电解液连接的，如果电容器的外壳必须与线路绝缘，则电容器的安装位置处，一定要采取绝缘措施。

The capacitor's case and cathode terminal connect through the electrolyte. If the case is to be completely insulated, that insulation must be at the capacitor's mounting point.

9. 电容器的端子或引线上不要施加过大的力

Do not apply excessive force to the terminals and leads.

过大的力施加到端子和引线上，可能引起引线的断裂或端子分裂，转而会引起内部连接的破坏。

The excessive strong force applied to the terminals and lead wires may cause leads to break or terminals to separate and, in turn, cause the internal contact to fail.

八、有害物质管理目录表 List of Hazardous Substance Management Catalogues

物质名称(中文名)	物质名称 (英文名)	含量标准 (化学精密法)		含量标准(XRF)
铅以及它的化合物	Lead and its compounds	<40PPM (非金属类) <80PPM (金属类)		<90PPM (非金属类) <450PPM (金属类)
镉以及它的化合物	Cadmium and its compounds	<5PPM		<50PPM
汞及其化合物	Mercury and its compounds	禁止使用		<100PPM
六价铬以及它的化合物	Hexavalent chromium and its compounds	禁止使用		Cr<350PPM
聚溴联苯	Polybrominated biphenyls	禁止使用		
聚溴二苯醚 (包含十溴联苯醚)	Polybrominated diphenylethers	禁止使用		
邻苯二甲酸酯	DEHP,BBP,DBP,DIBP Phthalates	总和<1000ppm 所有材料 (除金属、陶瓷材料外)		
溴	Bromine(Br)	700PPM	1000	<350PPM
氯(PVC 套管不适用)	Chlorine(Cl) (PVC sleeve not applicable)	700PPM	PPM	<600PPM
高度关注物质	REACH SVHC Substances of High Concern 以欧盟化学品管理局官网 https://echa.europa.eu/candidate-list-table 公布的 SVHC 授权清单为准	<1000PPM		

Note.

- 原则上按照公司的《HW207005 环境管理物质技术标准》管理规定，但由管理总部提出按根据 Buyer 等交易商的要求制定的另行有害物质管理目录来执行的要求时，应优先按照管理总部的管理目录来记载。
- 确认合作企业现在是否在使用这类物质，应记录使用与否。