



验证报告

Verification Report

报告编号 A2230027369102E
Report No. A2230027369102E

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CENTRE TESTING INTERNATIONAL



报告抬头公司名称 无锡百祺电子科技有限公司
Company Name WUXI BETTERI ELECTRONIC TECHNOLOGY CO.,LTD
shown on Report
地 址 江苏省无锡光电新材料科技园金山四支路 11 号 5-1
Address WUXI OPTOELECTRONIC MATERIALS SCIENCE&TECHNOLOGY PACK 5-1,#11,JINSHAN RD.BRANCH#4,WUXI,CHINA

结论 Conclusion

测试样品 Tested Sample	依据标准/指令 According to standard/directive	结果 Result
提交样品 Submitted Sample	欧盟 RoHS 指令 2011/65/EU 及其修订指令(EU) 2015/863 RoHS Directive 2011/65/EU with amendment (EU) 2015/863	符合 PASS

“符合”表示检测结果满足欧盟RoHS指令2011/65/EU及其修订指令(EU) 2015/863要求的限值。

PASS means that the results shown on the report comply with the limits set by RoHS Directive 2011/65/EU with amendment (EU) 2015/863.



批准
Approved by

宋岩

宋岩
技术经理 Technical Manager

日 期
Date

2023.02.17

苏州市华测检测技术有限公司
Inspection & Testing Services
Centre Testing International(Suzhou) Co.,Ltd

No. R403801564
江苏省苏州市相城区澄阳路 3286 号
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以下测试之样品及样品信息由申请者提供并确认

The following sample(s) and sample information was/were submitted and identified by/on the behalf of the applicant

产品名称	光伏直流连接器
Product Name	Photovoltaic DC connector
产品型号	BC03A、BC03B、BC03C、BC03D
Product Part No.	BC03A、BC03B、BC03C、BC03D
样品接收日期	2023.02.01
Sample Received Date	Feb. 1, 2023
样品检测日期	2023.02.01-2023.02.17
Testing Period	Feb. 1, 2023 to Feb. 17, 2023

检测要求

参考欧盟 RoHS 指令 2011/65/EU 及其修订指令(EU) 2015/863, 对所提交样品中的铅(Pb)、镉(Cd)、汞(Hg)、六价铬(Cr(VI))、多溴联苯(PBBs)、多溴二苯醚(PBDEs)和邻苯二甲酸酯【邻苯二甲酸二正丁酯(DBP)、邻苯二甲酸丁基苄酯(BBP)、邻苯二甲酸二(2-乙基己基)酯(DEHP)和邻苯二甲酸二异丁酯(DIBP)】进行验证测试。

Test Requested

With reference to RoHS Directive 2011/65/EU with amendment (EU) 2015/863, to conduct verification test for Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), Polybrominated Biphenyls (PBBs), Polybrominated Diphenyl Ethers (PBDEs) and Phthalates (Dibutyl phthalate (DBP), Benzylbutyl phthalate (BBP), Di-2-ethylhexyl phthalate (DEHP), Diisobutyl phthalate (DIBP)) in the submitted samples.

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检测依据 Test Method

A. IEC 62321-3-1:2013 对管控元素的筛选限值

Screening limits for regulated elements according to IEC 62321-3-1:2013 (单位 Unit: mg/kg)

测试元素 Element(s)	聚合物 Polymers	金属 Metals	合成材料 Composite material
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$
Br	$BL \leq (300-3\sigma) < X$	N/A	$BL \leq (250-3\sigma) < X$

B. 邻苯二甲酸酯的筛选限值 Screening limits for Phthalates

测试项目 Test Item(s)	筛选限值 Screening limits (单位 Unit: mg/kg)
邻苯二甲酸二正丁酯 Dibutyl phthalate(DBP)	$BL \leq 600 < X$
邻苯二甲酸丁基苄酯 Benzylbutyl phthalate(BBP)	$BL \leq 600 < X$
邻苯二甲酸二(2-乙基己基)酯 Di-2-ethylhexyl phthalate(DEHP)	$BL \leq 600 < X$
邻苯二甲酸二异丁酯 Diisobutyl phthalate(DIBP)	$BL \leq 600 < X$

C. 化学测试 Chemical Test

测试项目 Tested Item(s)	测试方法 Test Method	测试仪器 Measured Equipment(s)	方法检出限 MDL	限值 Limit
铅 Lead (Pb)	IEC 62321-5:2013	ICP-OES	10 mg/kg	1000 mg/kg
	参考 IEC 62321-5:2013 Refer to IEC 62321-5:2013		10 mg/kg	
镉 Cadmium (Cd)	IEC 62321-5:2013	ICP-OES	10 mg/kg	100 mg/kg
	参考 IEC 62321-5:2013 Refer to IEC 62321-5:2013		10 mg/kg	
汞 Mercury (Hg)	IEC 62321-4:2013+AMD1:2017 CSV	ICP-OES	10 mg/kg	1000 mg/kg
	参考 IEC 62321-4:2013+AMD1:2017 CSV Refer to IEC 62321-4:2013+AMD1:2017 CSV		10 mg/kg	
六价铬 Hexavalent Chromium (Cr(VI))	IEC 62321-7-1:2015	UV-Vis	0.10 µg/cm ² (LOQ)	1000 mg/kg
	IEC 62321-7-2:2017		20 mg/kg	
多溴联苯 Polybrominated Biphenyls (PBBs)	IEC 62321-6:2015	GC-MS	100mg/kg	1000 mg/kg
多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)	IEC 62321-6:2015	GC-MS	100mg/kg	1000 mg/kg
邻苯二甲酸酯 Phthalates (DBP, BBP, DEHP, DIBP)	IEC 62321-8:2017	GC-MS	50 mg/kg	单项 1000 mg/kg 1000 mg/kg for each

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备注 Remark:

- BL = 低于筛选限值 Under the screening limit
- OL = 高于筛选限值 Above the screening limit
- X = 需要做进一步测试的范围 The range of needing to do further testing
- 3σ = 表明分析仪器的重现性 The reproducibility of analytical instruments
- N/A = 不适用 Not applicable
- LOD = 方法检出限 Detection limit
- LOQ = 定量限，六价铬的定量限为 $0.10 \mu\text{g}/\text{cm}^2$ Limit of Quantification, The LOQ of Hexavalent chromium is $0.10 \mu\text{g}/\text{cm}^2$

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检测结果 Test Result(s)

CTI 样品 ID CTI Sample ID	同材质 序号 Same material No.	样品描述 Sample Description	测试项目 Tested Items	XRF 扫描 结果 XRF Screening Test	邻苯二甲酸 酯筛选结果 Phthalates Screening Test	化学测试 结果 Chemical Test (mg/kg)	结论 Conclusion	样品提交/再 次提交日期 Sample Received/ Resubmitted Date
1.1	1.2, 2.1, 2.2, 3.1, 3.2, 3.3, 4.1, 4.2, 4.3	黑色塑料 Black plastic	Pb	BL	/	/	符合 PASS	2023.02.01 Feb. 1, 2023
			Cd	BL	/	/		
			Hg	BL	/	/		
			Cr(Cr(VI))	BL	/	/		
			Br(PBBs&PBDEs)	BL	/	/		
			DBP	N/A	BL	/		
			BBP	N/A	BL	/		
			DEHP	N/A	BL	/		
1.3	1.4, 2.3, 2.4	黑色塑料 Black plastic	Pb	BL	/	/	符合 PASS	2023.02.01 Feb. 1, 2023
			Cd	BL	/	/		
			Hg	BL	/	/		
			Cr(Cr(VI))	BL	/	/		
			Br(PBBs&PBDEs)	BL	/	/		
			DBP	N/A	BL	/		
			BBP	N/A	BL	/		
			DEHP	N/A	BL	/		
1.5	1.6, 2.5, 2.6, 3.4, 3.5, 4.4, 4.5	灰色橡胶 Grey rubber	Pb	BL	/	/	符合 PASS	2023.02.01 Feb. 1, 2023
			Cd	BL	/	/		
			Hg	BL	/	/		
			Cr(Cr(VI))	BL	/	/		
			Br(PBBs&PBDEs)	BL	/	/		
			DBP	N/A	BL	/		
			BBP	N/A	BL	/		
			DEHP	N/A	BL	/		
			DIBP	N/A	BL	/		

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CTI 样品 ID CTI Sample ID	同材质 序号 Same material No.	样品描述 Sample Description	测试项目 Tested Items	XRF 扫描 结果 XRF Screening Test	邻苯二甲酸 酯筛选结果 Phthalates Screening Test	化学测试 结果 Chemical Test (mg/kg)	结论 Conclusion	样品提交/再 次提交日期 Sample Received/ Resubmitted Date
1.7	2.7, 3.6, 4.6	银色金属 Silvery metal	Pb	BL	/	/	符合 PASS	2023.02.01 Feb. 1, 2023
			Cd	BL	/	/		
			Hg	BL	/	/		
			Cr(Cr(VI))	IN	/	N.D.▼		
			Br(PBBs&PBDEs)	N/A	/	/		
			DBP	N/A	/	/		
			BBP	N/A	/	/		
			DEHP	N/A	/	/		
			DIBP	N/A	/	/		

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备注 Remark:

- N.D. = 未检出 (小于方法检出限或定量限) Not Detected (<MDL or LOQ)
- MDL = Method Detection Limit
- mg/kg = ppm = 百万分之一 parts per million
- 1000 mg/kg = 0.1%
- / = 未检测 Not tested
- IN = 不确定, 需要进一步化学测试确认 Uncertain, Further chemical test
- N/A = 不适用 Not applicable
- BL = 低于筛选限值 Under the screening limit
- OL = 高于筛选限值, 需进一步化学测试确认 Further chemical test will be conducted while the result is above the screening limit
- ▼六价铬浓度小于 $0.10 \mu\text{g}/\text{cm}^2$, 样品未检出六价铬。The sample is negative for Cr(VI) – The Cr(VI) concentration is below $0.10 \mu\text{g}/\text{cm}^2$. The coating is considered a non-Cr(VI) based coating.
- 对于多溴联苯 (PBBs) 和多溴二苯醚 (PBDEs), XRF 筛选时其结果显示的是总溴含量; 对于六价铬, XRF 筛选时其结果显示的是总铬含量。When conducting the test for PBBs&PBDEs, XRF was introduced to screen Br Exclusively; When conducting the test for Hexavalent Chromium, XRF was introduced to screen Chromium exclusively.
- 豁免清单请见官网 <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32011L0065>
Exemption list please see the official website
<https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32011L0065>
- 根据客户声明, “同材质序号” 列样品与 “CTI 样品 ID” 列样品为同材质。
According to the client's statement, the samples in the column “Same material No.” are of the same as the “CTI Sample ID”.

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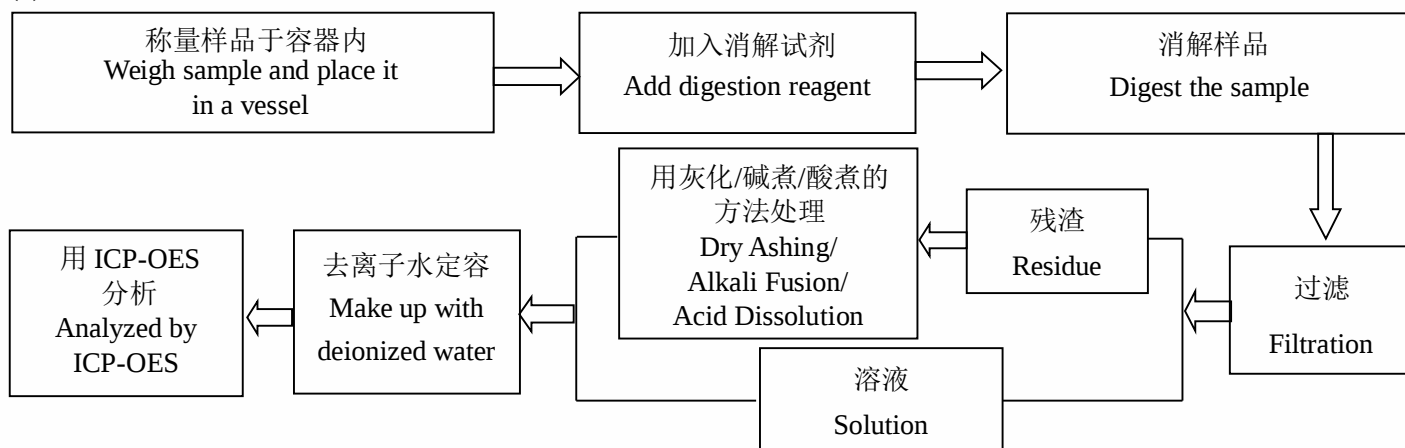
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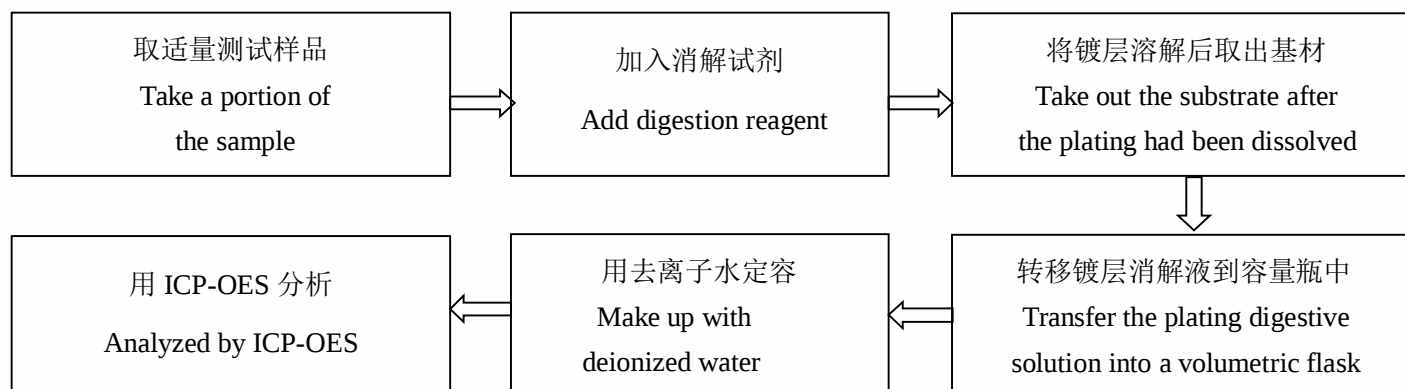
检测流程 Test Process

1. 铅 Lead (Pb), 镉 Cadmium (Cd)

(1) IEC 62321-5:2013

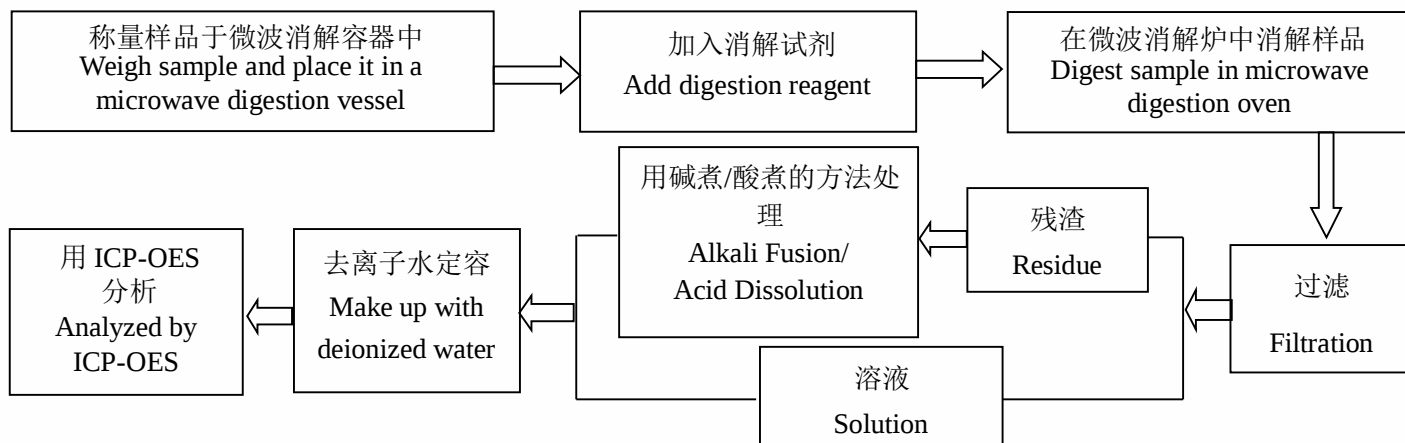


(2) 参考 Refer to IEC 62321-5:2013



2. 汞 Mercury(Hg)

(1) IEC 62321-4:2013+AMD1:2017 CSV



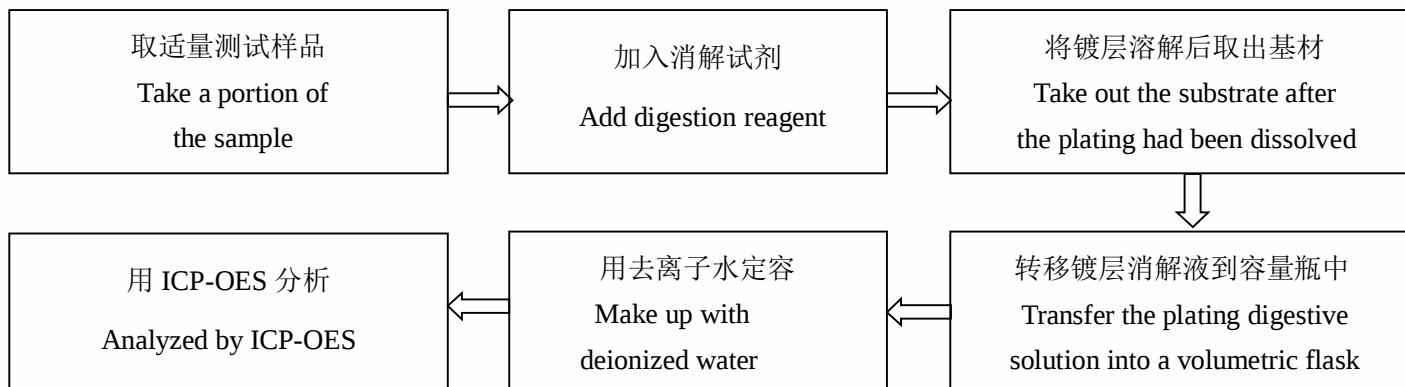
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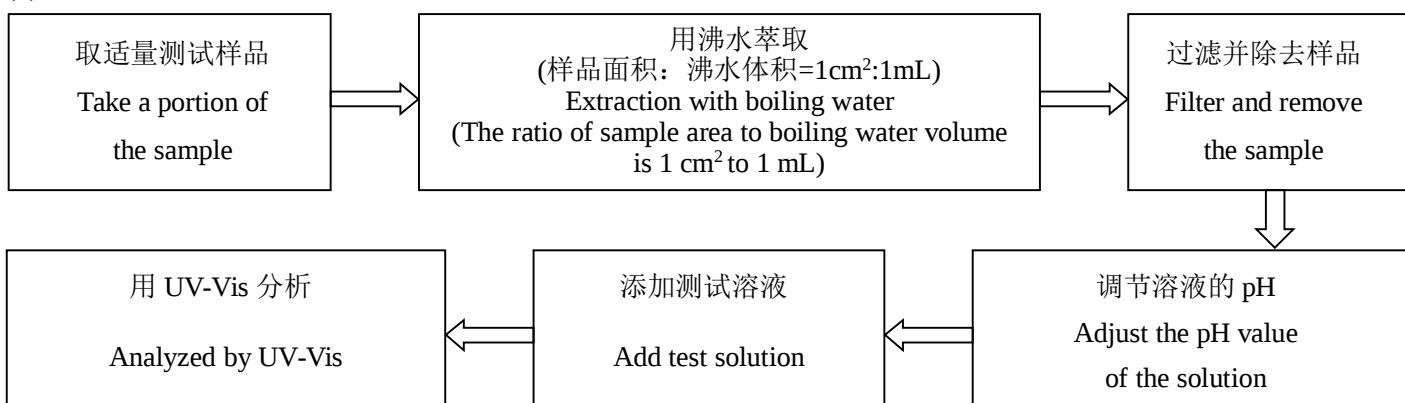
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(2) 参考 Refer to IEC 62321-4:2013+AMD1:2017 CSV

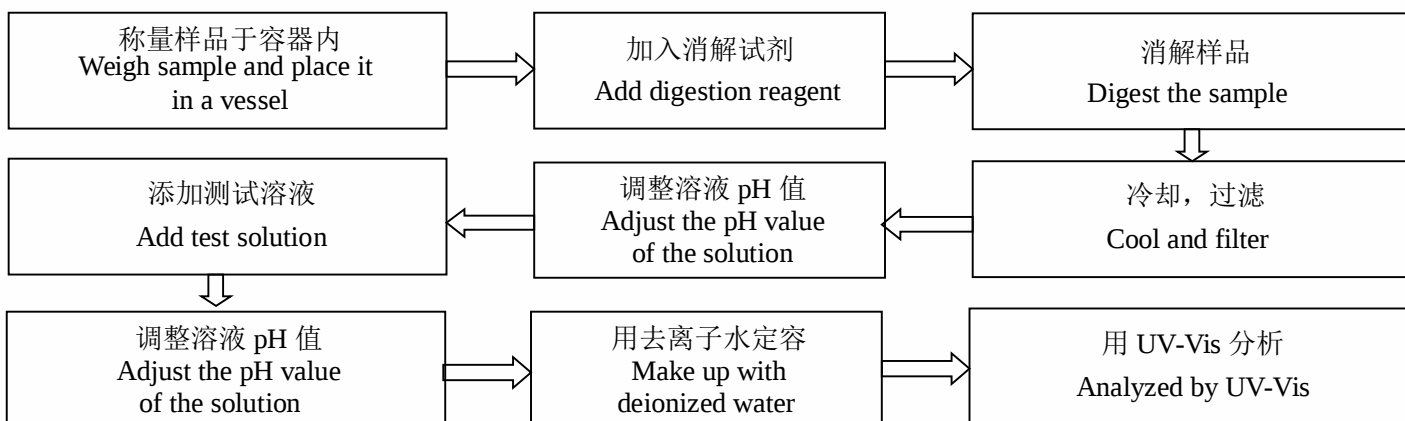


3. 六价铬 Hexavalent Chromium (Cr(VI))

(1) IEC 62321-7-1:2015



(2) IEC62321-7-2:2017

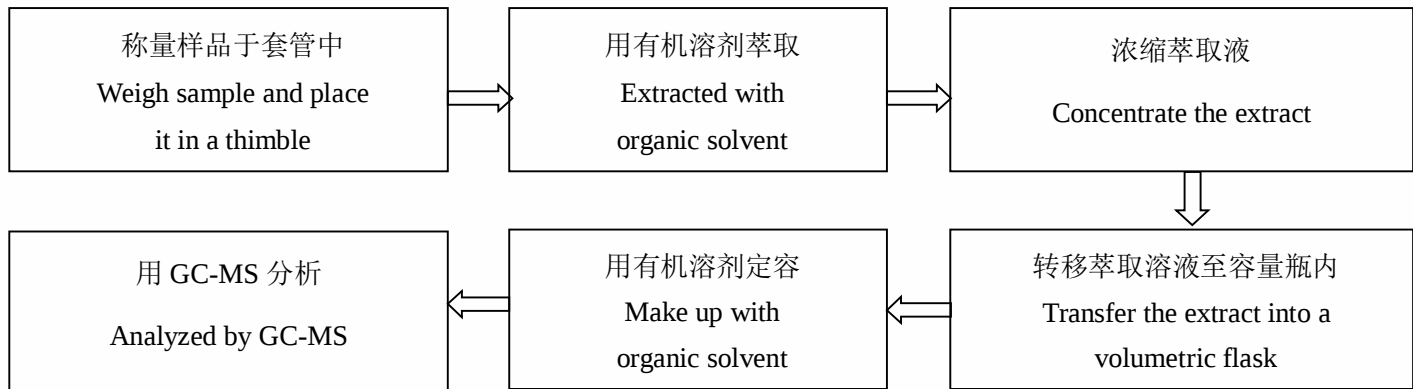


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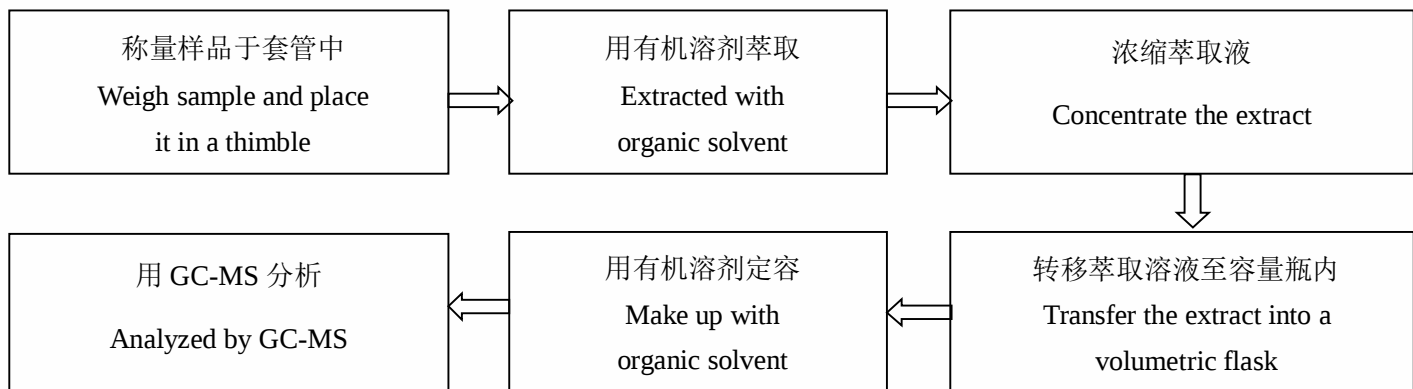
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4. 多溴联苯 Polybrominated Biphenyls (PBBs), 多溴二苯醚 Polybrominated Diphenyl Ethers (PBDEs)



5. 邻苯二甲酸酯 Phthalates(DBP, BBP, DEHP, DIBP)



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样品图片 Photo(s) of the sample(s)

成品 Final Product



成品（客户参考图片（非测试样品））

Final Product (Client Reference Photo(Non-tested sample))



成品（客户参考图片（非测试样品））

Final Product (Client Reference Photo(Non-tested sample))



成品（客户参考图片（非测试样品））

Final Product (Client Reference Photo(Non-tested sample))



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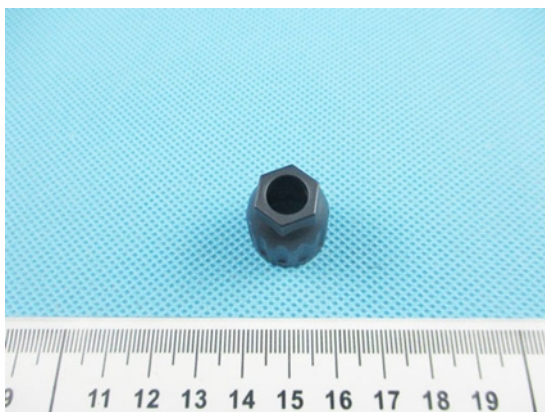
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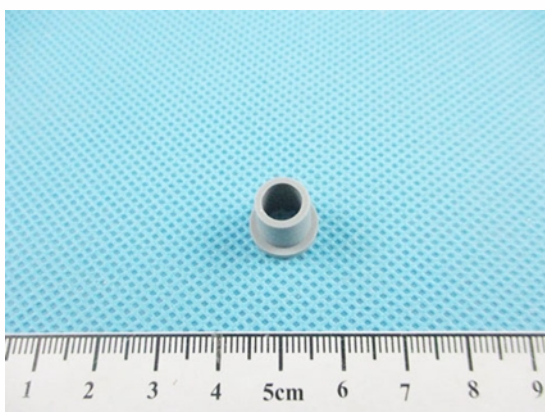
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1.3



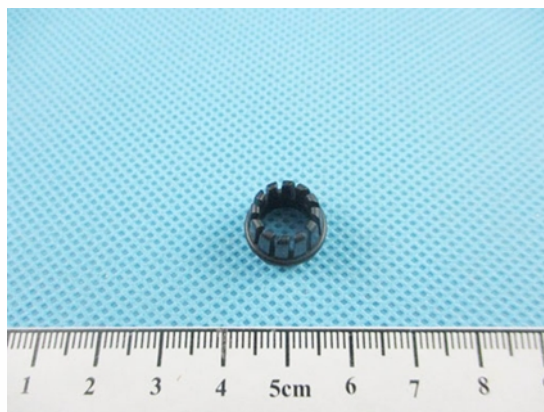
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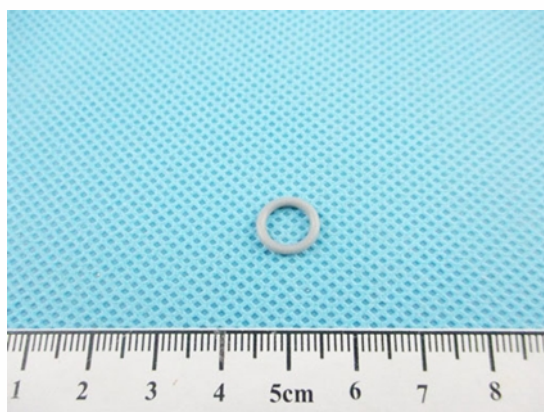
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Client Reference Photo(Non-tested sample))



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1.6(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



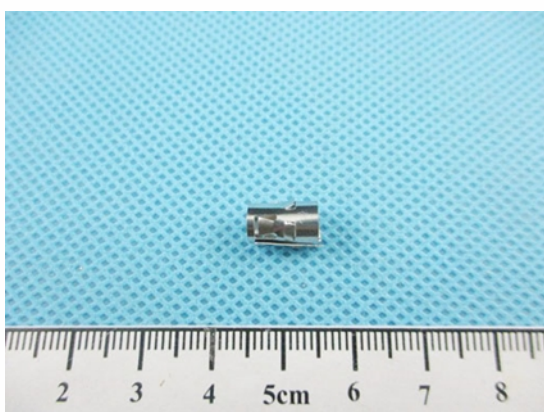
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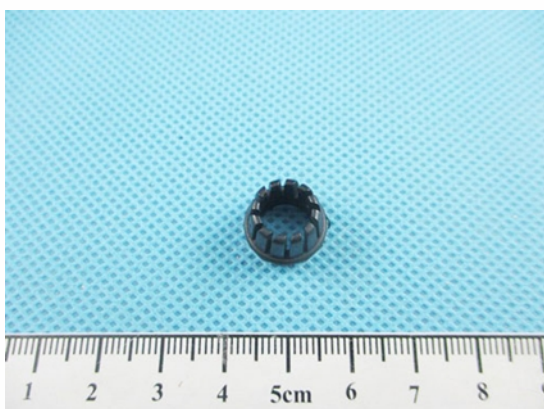
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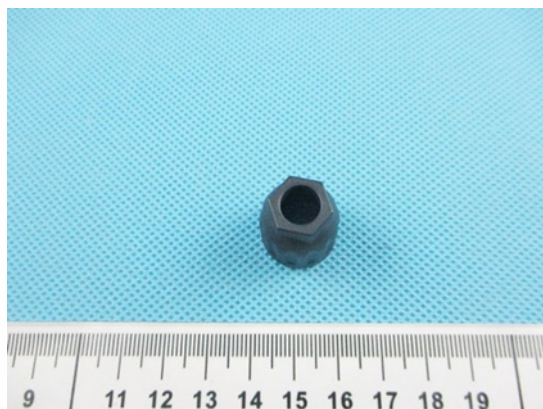
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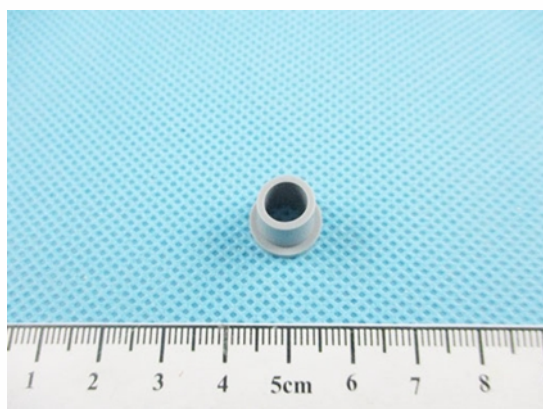
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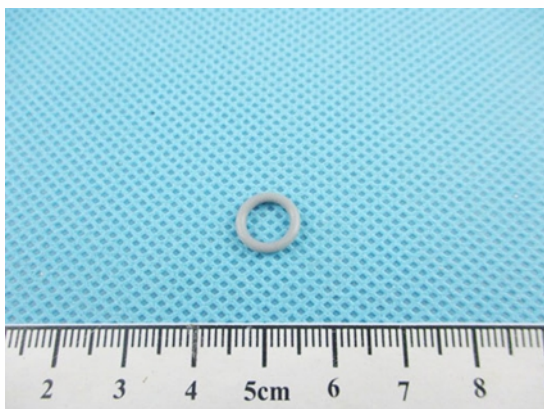


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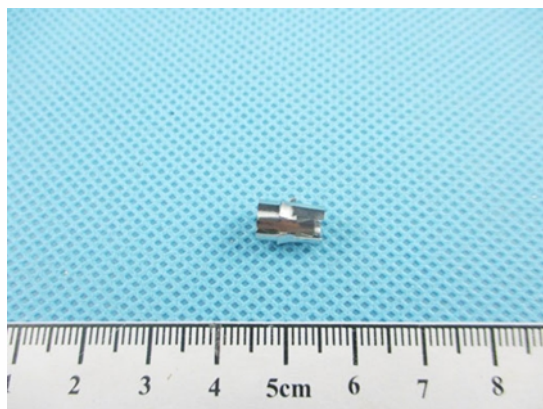
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Client Reference Photo(Non-tested sample))



2.7(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



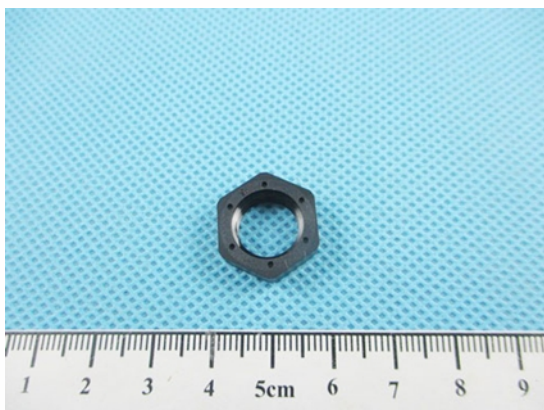
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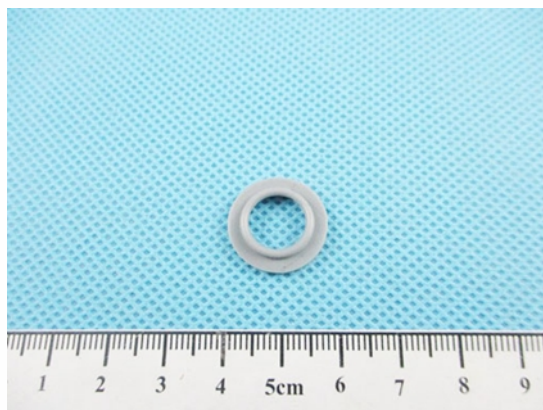
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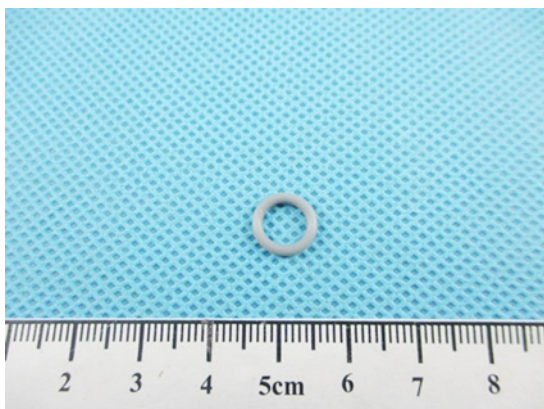


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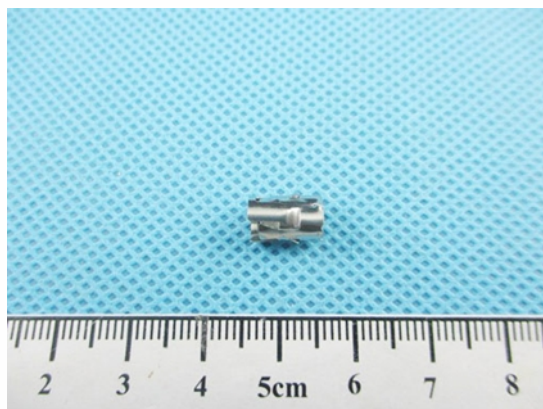
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3.5(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



3.6(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



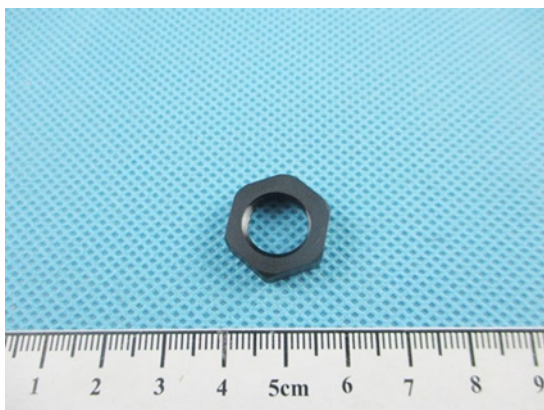
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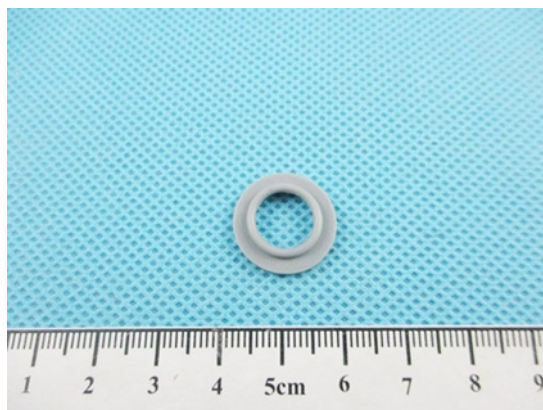
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Client Reference Photo(Non-tested sample))



4.3(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



4.4(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))

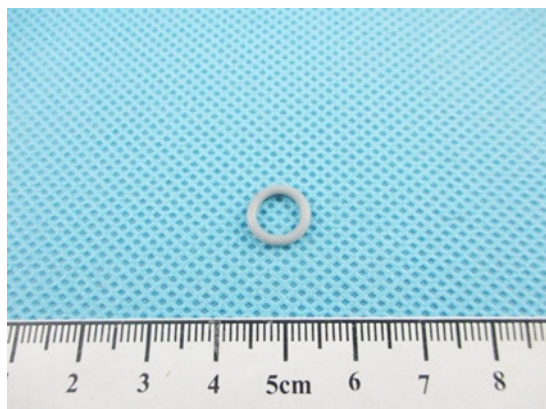


验证报告 Verification Report

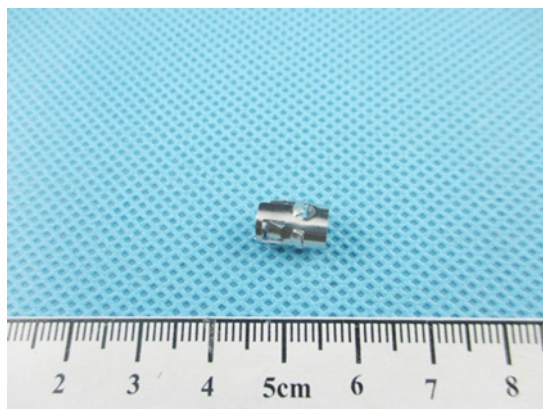
报告编号 A2230027369102E
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4.5(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



4.6(客户参考图片 (非测试样品))
Client Reference Photo(Non-tested sample))



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