中国认可
国际互认
检测
TESTING
CNAS L6478

检测报告
TEST REPORT

报告编号/ Report No.	:	WTF23F04074085R1C
委托方/ Applicant	:	合肥丰祥热缩材料科技有限公司 Hefei Fengxiang Heat shrinkable Material Technology Co., LTD
地址/ Address	:	安徽省合肥市双凤工业区 Shuangfeng Industrial Zone, Hefei City, Anhui Province
样品名称/ Sample Name	:	热缩管：黑色 Heat-shrinkable tube: black
样品接收日期/ Date of Receipt sample	:	2023-04-10
检测周期/ Testing period	:	2023-04-10 ~ 2023-04-13
报告日期/ Date of Issue	:	2023-04-14
检验结果/ Test Result	:	参见报告下页/ Refer to next page (s)

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Signed for and on behalf of
Waltek Testing Group (Foshan) Co., Ltd.

梁志聪/ Swing.Liang

检测要求/ Test Requested.....	:	根据欧盟RoHS指令2011/65/EU及其修订指令(EU) No.2015/863，测试样品中10种限制物质的含量。 In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863, to determine the 10 restricted substances content in the submitted sample.
检测方法/ Test Method	:	1) 参考IEC 62321-2:2021，样品的拆卸、拆解和机械拆分 With reference to IEC 62321-2:2021, disassembly, disjunction and mechanical sample preparation 2) 参考IEC 62321-3-1:2013，使用X射线荧光光谱仪对电子产品中的铅、汞、镉、总铬和总溴进行筛选 With reference to IEC 62321-3-1:2013, screening – Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry 3) 参考IEC 62321-4:2013+AMD1:2017 CSV，使用电感耦合等离子体发射光谱仪（ICP-OES）检测汞含量 With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES 4) 参考IEC 62321-5: 2013，使用电感耦合等离子体发射光谱仪（ICP-OES）检测铅、镉含量 With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES 5) 参考IEC 62321-7-2: 2017和IEC 62321-7-1:2015，使用紫外可见分光光度计（UV-Vis）检测六价铬含量 With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1:2015, determination of Hexavalent Chromium by UV-Vis 6) 参考IEC 62321-6: 2015，使用气相色谱质谱联用仪（GC-MS）检测多溴联苯及多溴二苯醚含量 With reference to IEC 62321-6: 2015, determination of PBBs and PBDEs by GC-MS 7) 参考IEC 62321-8:2017，使用气相色谱质谱联用仪（GC-MS）检测4种邻苯二甲酸酯的含量 With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.
检测结论/ Test Conclusion.....	:	**符合** (根据客户提供的样品，测试结果符合RoHS指令2011/65/EU及其修订指令(EU) No.2015/863的要求) **Pass** (Based on the performed tests on the submitted samples, the results comply with the requirement of EU RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)

样品图片/ Sample Photo:

测试结果/ Test Results:

1. 铅、镉、汞、六价铬、多溴联苯和多溴二苯醚

Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs

部件编号 Part No.	测试部件描述 Testing Part Description	XRF测试结果 Result of XRF					湿化学测试结果(毫克/千克) Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	白印黑色热缩套管 Black heat-shrinkable tube with white printing	BL	BL	BL	BL	BL	NA

备注/ Remark:

(1) EDXRF所得的测试结果只作初步筛选，如果XRF结果超出IEC 62321-3-1: 2013所规定的警戒范围，建议客户用更精确的化学测试方法测试，如: 用ICP 测试Cd、Pb、Hg，用UV-VIS测试Cr^{6+}，用GS/MS测试PBBs和PBDEs（单位:mg/kg）。

Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr^{6+}) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg).

元素 Element	聚合物 Polymer	金属 Metal	复合材料 Composite Materials
Cd	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	LOD < IN < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Hg	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Cr	BL ≤ (700-3σ) < IN	BL ≤ (700-3σ) <IN	BL ≤ (500-3σ) < IN
Br	BL ≤ (300-3σ) < IN	--	BL ≤ (250-3σ) < IN

BL=低于限值/ Below Limit OL= 高于限值/ Over Limit LOD =检测极限值/ Limit of Detection

-- =未规定/ Not Regulated

(2) “IN” 表示为未确定区域，需进一步化学测试判断是否符合RoHS指令的要求.

“IN” expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.

(3) XRF筛选测试RoHS元素 – 物质的不均一性导致测试结果和实际值可能存在差异.

The XRF screening test for RoHS elements – the reading may be different to the actual content in the sample be of non-uniformity composition.

(4) mg / kg =毫克每千克(milligram per kilogram) =百万分之一(ppm), μg/cm^2=微克每平方厘米(Micrograms per square centimetre).

(5) 不适用, XRF筛选测试的结果低于限值或通过XRF扫描直接判定测试结果大于限值,不需要进行化学测试.

NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.

(6) LOQ =定量限。
LOQ = Limit of quantitation.

测试项目 Test Items	Pb	Cd	Hg	Cr^{6+}		PBB	PBDE
单位 Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu g/cm^2$	mg/kg	mg/kg
定量限 LOQ	2	2	2	8	0.1	5	5

对于单一化合物的PBB和PBDE，LOQ为5mg/kg。对于聚合物和复合样品的Cr^{6+}，LOQ为8mg/kg。对于金属样品的Cr^{6+}，LOQ为0.1μg/cm^2。
The LOQ for single compound of PBBs and PBDEs is 5mg/kg, LOQ of Cr^{6+} for polymer and composite sample is 8mg/kg and LOQ of Cr^{6+} for metal sample is 0.1μg/cm^2.

(7) RoHS要求
RoHS Requirement

限制物质 Restricted Substances	限值 Limits
镉 (Cd) Cadmium (Cd)	0.01% (100 mg/kg)
铅 (Pb) Lead (Pb)	0.1% (1000 mg/kg)
汞 (Hg) Mercury (Hg)	0.1% (1000 mg/kg)
六价铬 (Cr^{6+}) Chromium (VI) (Cr^{6+})	0.1% (1000 mg/kg)
多溴联苯 (PBBs) Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
多溴二苯醚 (PBDEs) Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

(8) 根据IEC 62321-7-1:2015电子电器产品中限用物质含量的测定程序，金属样品中的Cr^{6+}用沸水萃取方法来测定，其测试结果显示为阳性/阴性。
沸水萃取：
阴性 = 表示涂层不存在Cr^{6+}，即在沸水萃取溶液中六价铬浓度小于0.10ug/cm^2
阳性 = 表示涂层存在Cr^{6+}，即在沸水萃取溶液中六价铬浓度大于0.13ug/cm^2
关于金属样品的保存条件和生产日期将不能被采用，其测试结果只能证明当下方法测试下样品是否存在/不存在Cr^{6+}。
According to IEC 62321-7-1:2015, determined of Cr^{6+} on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.
Boiling water extraction:
Negative = Absence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is less than 0.10ug/cm^2.
Positive = Presence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/cm^2.
Information on storage conditions and production date of the tested sample is unavailable and thus Cr^{6+} results represent status of the sample at the time of testing.

(9) 英文字符含义:
“Pb”表示铅，“Cd”表示镉，“Hg”表示汞，“Cr”表示铬，“Cr (VI)”表示六价铬，“Br”表示溴，“PBBs”表示总多溴联苯，“PBDEs”表示总多溴二苯醚。
Abbreviation:
“Pb” denotes Lead, “Cd” denotes Cadmium, “Hg” denotes Mercury, “Cr” denotes Chromium, “Cr (VI)” denotes Hexavalent Chromium, “Br” denotes Bromine, “PBBs” denotes Total Polybrominated Biphenyls, “PBDEs” denotes Total Polybrominated Diphenyl Ethers.

2.邻苯二甲酸酯/ Phthalates:

序列号 Serial No.	部件编号 Part No.	测试结果（毫克/千克）/ Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	ND	ND	ND	ND

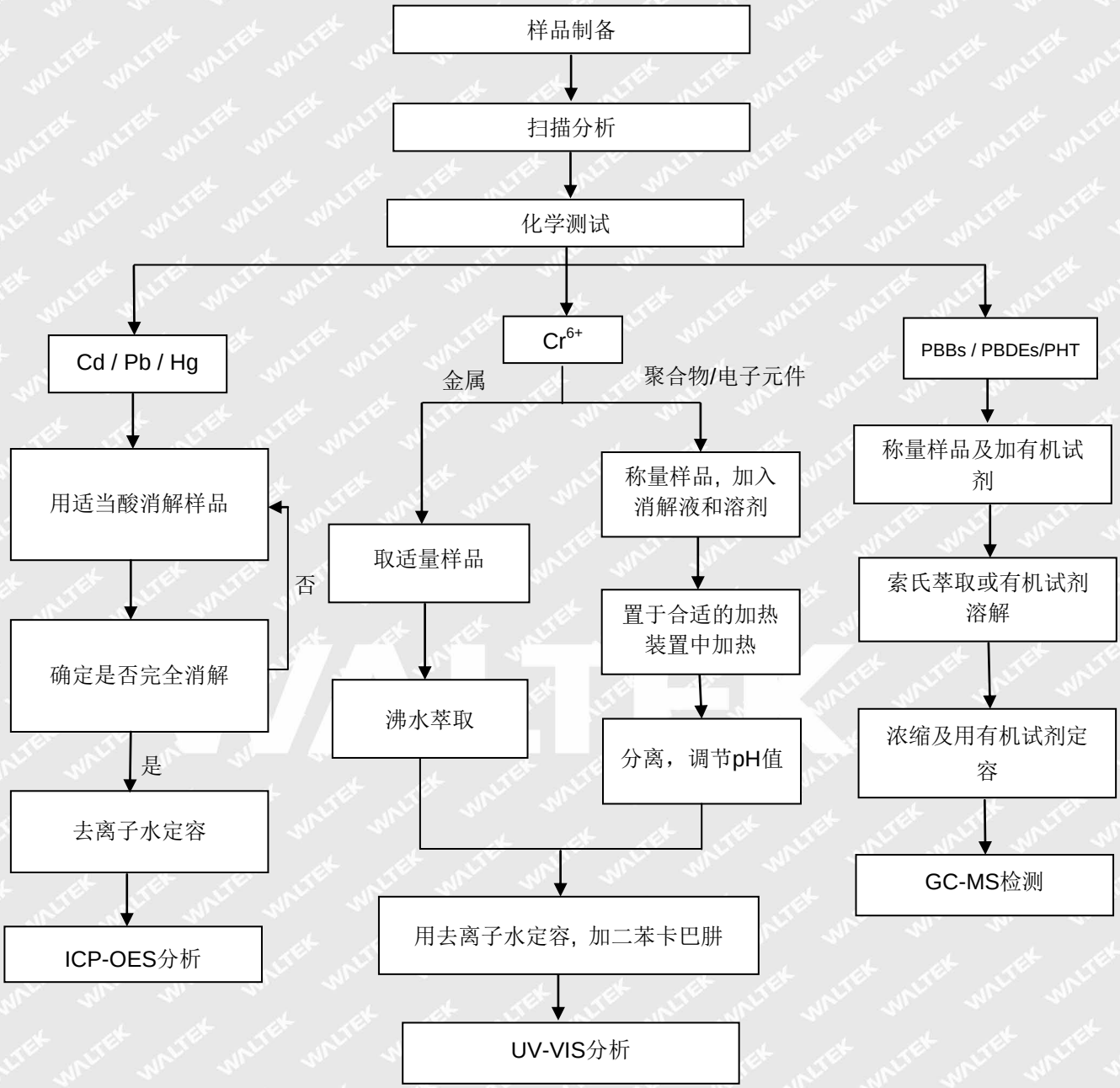
备注/ Remark:
(1) mg/kg =毫克每千克(milligram per kilogram) =百万分之一(ppm)
(2) 未检出=检测值小于定量限。
ND = Not Detected or lower than limit of quantitation.
(3) LOQ =定量限。
LOQ = Limit of quantitation.

测试项目 Test Items	DBP	BBP	DEHP	DIBP
单位 Units	mg/kg	mg/kg	mg/kg	mg/kg
定量限 LOQ	50	50	50	50

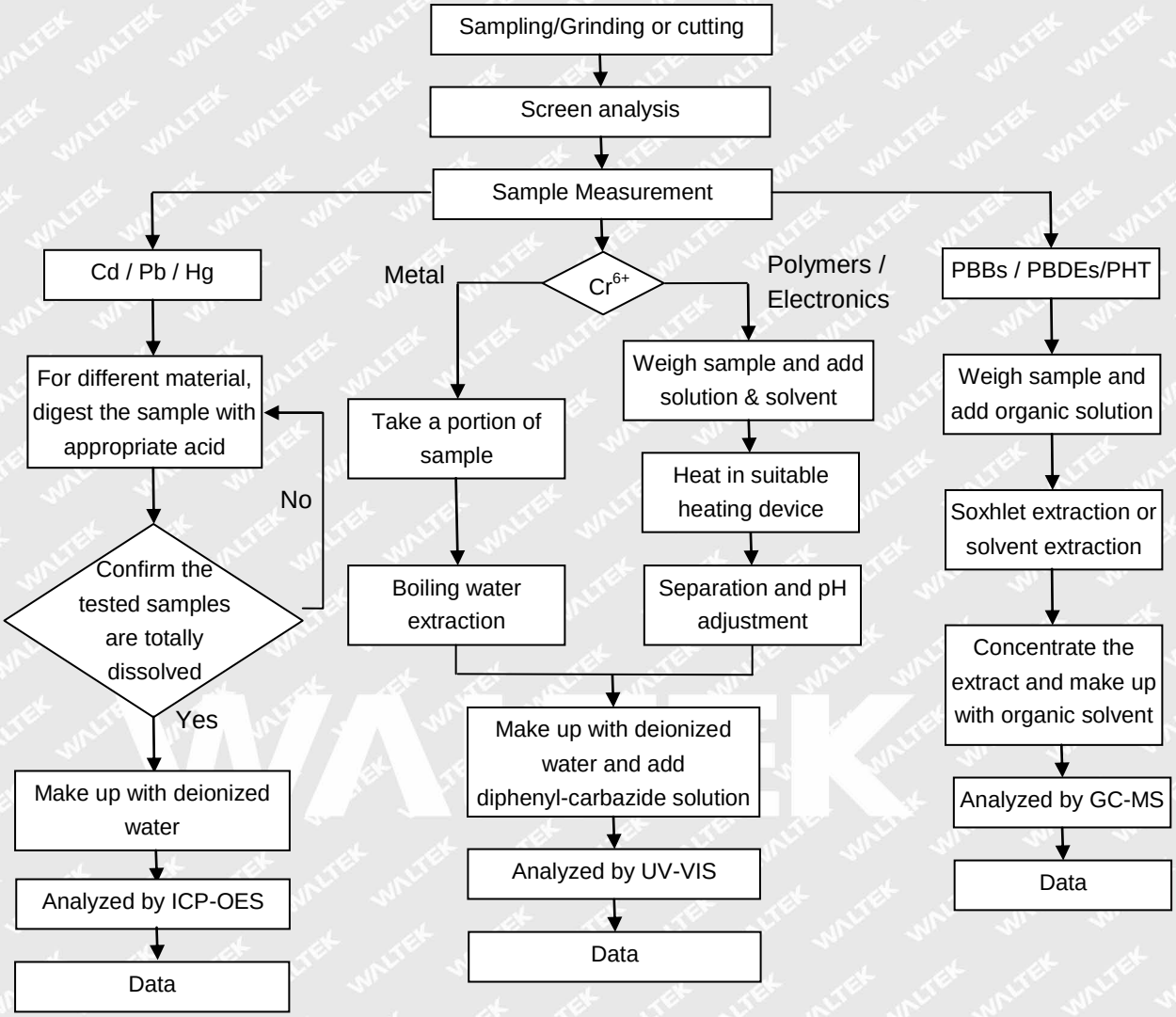
(4) 英文字符含义:
“DBP”表示邻苯二甲酸二丁酯，“BBP”表示邻苯二甲酸丁苄酯，“DEHP”表示邻苯二甲酸二(2-乙基己基)酯，“DIBP”表示邻苯二甲酸二异丁酯，“PHT”表示邻苯二甲酸酯。
Abbreviation:
“DBP” denotes Dibutyl phthalate, “BBP” denotes Benzyl butyl phthalate (BBP), “DEHP” denotes Bis(2-ethylhexyl)-phthalate, “DIBP” denotes Diisobutyl phthalate, “PHT” denotes Phthalates.
(5) RoHS要求
RoHS requirement

限制物质 Restricted Substances	限值 Limits
邻苯二甲酸二丁酯 Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
邻苯二甲酸丁苄酯 Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
邻苯二甲酸二(2-乙基己基)酯 Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
邻苯二甲酸二异丁酯 Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

测试流程图:


样品制备
扫描分析
化学测试
Cd / Pb / Hg
Cr6+
PBBs / PBDEs/PHT
金属
聚合物/电子元件
用适当酸消解样品
否
确定是否完全消解
是
去离子水定容
ICP-OES分析
取适量样品
沸水萃取
称量样品，加入消解液和溶剂
置于合适的加热装置中加热
分离，调节pH值
用去离子水定容，加二苯卡巴肼
UV-VIS分析
称量样品及加有机试剂
索氏萃取或有机试剂溶解
浓缩及用有机试剂定容
GC-MS检测

Measurement Flowchart:



备注/ Remarks:

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