

## 测试报告

No. CANEC2119679802

日期: 2021年11月08日 第1页,共23页

建滔积层板控股有限公司  
香港新界沙田安耀街三号汇达大厦二十三楼

以下测试之样品是由申请者所提供及确认: KB-3152

SGS工作编号: CP21-055248 - GZ  
型号: KB-3152  
客户参考信息: KB-3152C, KB-3152S, KB-3153, KB-2150G, KB-2150GC  
样品接收日期: 2021年10月25日  
测试周期: 2021年10月25日 - 2021年11月04日  
测试要求: 根据客户要求测试  
测试方法: 请参见下一页  
测试结果: 请参见下一页

测试结果概要:

测试要求	结论
RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863	符合
卤素	见测试结果
元素分析	见测试结果
四溴双酚-A	见测试结果
红磷	见测试结果
邻苯二甲酸盐(或酯)	见测试结果
六溴环十二烷(HBCDD)	见测试结果
全氟辛酸(PFOA)及其盐 & 全氟辛烷磺酸 (PFOS)及其衍生物	见测试结果
有机锡	见测试结果
欧盟POPs法规(EU) 2019/1021-短链氯化石蜡 (SCCPs)	符合
AfPS GS 2019:01 PAK- 多环芳香烃	见测试结果
美国环保署有毒物质控制法 (TSCA) 第6 (h)节规定的持久性、生物累积性和毒性 (PBT) 化学物质	符合



SGS-CSTC Standards Technical Services Co., Ltd.  
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## 测试报告

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日期: 2021年11月08日 第2页,共23页

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批准签署人

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日期: 2021年11月08日 第3页,共23页

测试结果:

### 测试样品描述:

样品编号	SGS样品ID	描述
SN1	CAN21-196798.001	棕色单面覆铜板(取用无红色"KB"印字部分测试)

备注:

- (1) 1 mg/kg = 0.0001%
- (2) MDL = 方法检测限
- (3) ND = 未检出 (< MDL)
- (4) "-" = 未规定

### RoHS指令2011/65/EU附录II的修正指令(EU) 2015/863

测试方法: 参考IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015 和 IEC 62321-8:2017, 采用 ICP-OES, UV-Vis 和 GC-MS 进行分析.

测试项目	限值	单位	MDL	001
镉 (Cd)	100	mg/kg	2	ND
铅 (Pb)	1000	mg/kg	2	ND
汞 (Hg)	1000	mg/kg	2	ND
六价铬(Cr(VI))	1000	mg/kg	8	ND
多溴联苯之和(PBBs)	1000	mg/kg	-	ND
一溴联苯	-	mg/kg	5	ND
二溴联苯	-	mg/kg	5	ND
三溴联苯	-	mg/kg	5	ND
四溴联苯	-	mg/kg	5	ND
五溴联苯	-	mg/kg	5	ND
六溴联苯	-	mg/kg	5	ND
七溴联苯	-	mg/kg	5	ND
八溴联苯	-	mg/kg	5	ND
九溴联苯	-	mg/kg	5	ND
十溴联苯	-	mg/kg	5	ND
多溴二苯醚之和(PBDEs)	1000	mg/kg	-	ND
一溴二苯醚	-	mg/kg	5	ND
二溴二苯醚	-	mg/kg	5	ND
三溴二苯醚	-	mg/kg	5	ND
四溴二苯醚	-	mg/kg	5	ND
五溴二苯醚	-	mg/kg	5	ND
六溴二苯醚	-	mg/kg	5	ND



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日期: 2021年11月08日 第4页,共23页

测试项目	限值	单位	MDL	001
七溴二苯醚	-	mg/kg	5	ND
八溴二苯醚	-	mg/kg	5	ND
九溴二苯醚	-	mg/kg	5	ND
十溴二苯醚	-	mg/kg	5	ND
邻苯二甲酸二丁酯 (DBP)	1000	mg/kg	50	ND
邻苯二甲酸丁苄酯(BBP)	1000	mg/kg	50	ND
邻苯二甲酸二(2-乙基己基)酯(DEHP)	1000	mg/kg	50	ND
邻苯二甲酸二异丁酯(DIBP)	1000	mg/kg	50	ND

### 备注:

(1)最大允许极限值引用自RoHS指令(EU) 2015/863。

(2) IEC 62321 系列等同于 EN 62321 系列

[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)

(3) 2021年7月22号开始, DEHP, BBP, DBP 和 DIBP的限制适用于医疗器械, 包括体外医疗器械, 监控仪表, 包括工业监测和控制仪器。

### 卤素

测试方法: 参考EN 14582:2016, 用 IC分析。

测试项目	单位	MDL	001
氟 (F)	mg/kg	50	ND
氯 (Cl)	mg/kg	50	62
溴 (Br)	mg/kg	50	ND
碘 (I)	mg/kg	50	ND

### 元素分析

测试方法: SGS内部方法 (GZTC CHEM-TOP-004-01, 参考EPA 3052: 1996), 采用ICP-OES进行分析。

测试项目	单位	MDL	001
砷 (As)	mg/kg	10	ND
锑 (Sb)	mg/kg	10	ND

### 四溴双酚-A



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日期: 2021年11月08日 第5页,共23页

测试方法: SGS内部方法(GZTC CHEM-TOP-065, 参考EPA 3540C:1996 & EPA 8270E:2017), 采用LC-MS/MS进行分析。

测试项目	单位	MDL	001
四溴双酚-A	mg/kg	5	ND

## 红磷

测试方法: SGS内部方法(GZTC CHEM-TOP-215-01), 采用PY-GC/MS / ICP-OES 进行分析。

测试项目	单位	MDL	001
红磷	mg/kg	500	ND

## 邻苯二甲酸盐(或酯)

测试方法: 参考EN 14372: 2004的方法测定, 采用GC-MS进行分析。

测试项目	CAS NO.	单位	MDL	001
邻苯二甲酸二丁酯 (DBP)	84-74-2	%(w/w)	0.003	ND
邻苯二甲酸丁苄酯 (BBP)	85-68-7	%(w/w)	0.003	ND
邻苯二甲酸二(2-乙基己基)酯 (DEHP)	117-81-7	%(w/w)	0.003	ND
邻苯二甲酸二异壬酯 (DINP)	28553-12-0 / 68515-48-0	%(w/w)	0.010	ND
邻苯二甲酸二正辛酯 (DNOP)	117-84-0	%(w/w)	0.003	ND
邻苯二甲酸二异癸酯 (DIDP)	26761-40-0 / 68515-49-1	%(w/w)	0.010	ND
邻苯二甲酸二甲酯 (DMP)	131-11-3	%(w/w)	0.003	ND
邻苯二甲酸二乙酯 (DEP)	84-66-2	%(w/w)	0.003	ND
邻苯二甲酸二丙酯 (DPrP)	131-16-8	%(w/w)	0.003	ND
邻苯二甲酸二异丁酯 (DIBP)	84-69-5	%(w/w)	0.003	ND
邻苯二甲酸二戊酯 (DPENP/ DnPP)	131-18-0	%(w/w)	0.003	ND
邻苯二甲酸二正己酯 (DnHP)	84-75-3	%(w/w)	0.003	ND
邻苯二甲酸二环己酯 (DCHP)	84-61-7	%(w/w)	0.003	ND
邻苯二甲酸二苯酯 (DPhP)	84-62-8	%(w/w)	0.003	ND
邻苯二甲酸二苄酯 (DBzP)	523-31-9	%(w/w)	0.003	ND
邻苯二甲酸二壬酯 (DNP)	84-76-4	%(w/w)	0.003	ND
邻苯二甲酸二异辛酯 (DIOP)	27554-26-3	%(w/w)	0.010	ND
邻苯二甲酸二(2-甲氧基乙基)酯 (DMEP)	117-82-8	%(w/w)	0.003	ND



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日期: 2021年11月08日 第6页,共23页

测试项目	CAS NO.	单位	MDL	001
邻苯二甲酸二(2-甲氧基乙基)酯 (DMEP)	117-82-8	%(w/w)	0.003	ND
邻苯二甲酸二烯丙酯 (DAP)	131-17-9	%(w/w)	0.003	ND
邻苯二甲酸癸基辛基酯 (nDnOP)	119-07-3	%(w/w)	0.003	ND
邻苯二甲酸二癸酯 (DnDP)	84-77-5	%(w/w)	0.003	ND
邻苯二甲酸二异戊酯 (DIPP)	605-50-5	%(w/w)	0.003	ND
邻苯二甲酸正戊基异戊基酯 (nPIPP)	776297-69-9	%(w/w)	0.003	ND
邻苯二甲酸二(C6-8支链)烷基酯(富C7) (DIHP)	71888-89-6	%(w/w)	0.010	ND
邻苯二甲酸二(C7-11支链与直链)烷基(醇)酯 (DHNUP)	68515-42-4	%(w/w)	0.010	ND
己二酸二(2-乙基己基)酯(DEHA)	103-23-1	%(w/w)	0.003	ND
邻苯二甲酸二(4-甲基-2-戊基)酯 (BMPP)	146-50-9	%(w/w)	0.003	ND
邻苯二甲酸二(2-乙氧基)乙酯 (DEEP)	605-54-9	%(w/w)	0.003	ND
邻苯二甲酸二(2-丁氧基)乙酯 (DBEP)	117-83-9	%(w/w)	0.003	ND
邻苯二甲酸双十一烷酯 (DUDP)	3648-20-2	%(w/w)	0.003	ND
己二酸二异壬酯(DINA)	33703-08-1	%(w/w)	0.010	ND
邻苯二甲酸双十三烷基酯 (DTDP)	119-06-2	%(w/w)	0.003	ND
偏苯三酸三(2-乙基己)酯 (TOTM)	3319-31-1	%(w/w)	0.003	ND
对苯二甲酸二(2-乙基己)酯 (DOTP)	6422-86-2	%(w/w)	0.003	ND
邻苯二甲酸二庚酯 (DnHpP)	3648-21-3	%(w/w)	0.003	ND
乙酰柠檬酸三丁酯 (Citroflex, ATBC)	77-90-7	%(w/w)	0.010	ND
邻苯二甲酸二(支链与直链)戊基酯 (DPP)	84777-06-0	%(w/w)	0.010	ND
邻苯二甲酸二(支链与直链)己基酯 (DHP)	68515-50-4	%(w/w)	0.010	ND
邻苯二甲酸二(2-丙基庚)酯(DPHpP)	53306-54-0	%(w/w)	0.010	ND

备注:

(1) DBP、BBP、DEHP、DIBP参考信息: 欧盟决议(EC) No 1907/2006 REACH 附录XVII及其修正法案(EU) 2018/2005 第51条:

i) 不允许DBP、BBP、DEHP、DIBP单一质量浓度或质量浓度总和等于或高于0.1%的可塑性物料用于玩具和儿童护理品。

ii) 当玩具和儿童护理品中的可塑性物料含DBP、BBP、DEHP单一质量浓度或质量浓度总和等于或高于0.1%时, 不得投放市场。另外, 当玩具和儿童护理品中的可塑性物料含DIBP单一质量浓度或DBP、BBP、DEHP、DIBP质量浓度总和等于或高于0.1%时, 2020年7月7日后不得投放市场。

iii) 当成品中的可塑性物料含DBP、BBP、DEHP、DIBP单一质量浓度或质量浓度总和等于或高于0.1%时, 2020年7月7日后不得投放市场。

详细信息请参见Regulation (EU) 2018/2005

(2) DINP、DNOP、DIDP参考信息: 欧盟决议(EC) No 1907/2006 REACH 附录XVII及修正法案(EU) 2015/326 第52条:

i) 不允许DINP、DNOP、DIDP质量浓度高于0.1%的可塑性物料用于可放入儿童口中的玩具和儿童护理品。

ii) 当可放入儿童口中的玩具和儿童护理品中的可塑性物料含DINP, DNOP, DIDP质量浓度高于0.1%时, 不得投放市场。

详细信息请参见Regulation (EU) 2015/326



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日期: 2021年11月08日 第7页,共23页

### 六溴环十二烷(HBCDD)

测试方法: SGS 内部方法(GZTC CHEM-TOP-073, 参考EPA 3550C:2007), 采用GC-MS进行分析。

测试项目	CAS NO.	单位	MDL	001
六溴环十二烷(HBCDD) 及其非对映异构体( $\alpha$ -HBCDD, $\beta$ -HBCDD, $\gamma$ -HBCDD)	25637-99-4 3194-55-6 134237-50-6 134237-51-7 134237-52-8	mg/kg	10	ND

### 全氟辛酸(PFOA)及其盐 & 全氟辛烷磺酸 (PFOS)及其衍生物

测试方法: 参考CEN/TS 15968:2010, 采用LC-MS或LC-MS/MS进行分析。

测试项目	CAS NO.	单位	MDL	001
全氟辛酸 (PFOA) 及其盐+	335-67-1	mg/kg	0.010	ND
全氟辛烷磺酸 (PFOS) <sup>^</sup>	1763-23-1	mg/kg	0.010	ND
全氟辛基磺酰胺(PFOA)	754-91-6	mg/kg	0.010	ND
N-甲基全氟辛烷磺酰胺(MeFOA)	31506-32-8	mg/kg	0.010	ND
N-乙基全氟辛烷磺酰胺(EtFOA)	4151-50-2	mg/kg	0.010	ND
2-(N-甲基全氟辛基磺酰胺)乙醇(MeFOE)	24448-09-7	mg/kg	0.010	ND
2-(N-乙基全氟辛基磺酰胺)乙醇(EtFOE)	1691-99-2	mg/kg	0.010	ND
全氟辛烷磺酸 (PFOS) 及其衍生物	-	mg/kg	-	ND

备注:

(1) + PFOA 及其盐包含PFOA-Na (CAS No.: 335-95-5), PFOA-K (CAS No.: 2395-00-8), PFOA-Ag (CAS No.: 335-93-3), PFOA-F (CAS No.: 335-66-0) 和 APFO (CAS No.: 3825-26-1);

(2) ^ 全氟辛烷磺酸 (PFOS) 包含 PFOS-K (CAS No.: 2795-39-3), PFOS-Li (CAS No.: 29457-72-5), PFOS-NH<sub>4</sub> (CAS No.: 29081-56-9), PFOS-NH(OH)<sub>2</sub> (CAS No.: 70225-14-8), PFOS-N(C<sub>2</sub>H<sub>5</sub>)<sub>4</sub> (CAS No.: 56773-42-3), PFOS-DDA (CAS No.: 251099-16-8) 和 POSF (CAS No.: 307-35-7)

### 有机锡

测试方法: SGS 内部方法 (GZTC CHEM-TOP-031, 参考ISO 17353:2004), 采用GC-MS进行分析。

测试项目	单位	MDL	001
二丁基锡(DBT)	mg/kg	0.02	ND
三丁基锡(TBT)	mg/kg	0.02	ND
二辛基锡(DOT)	mg/kg	0.02	ND
三苯基锡(TPhT)	mg/kg	0.02	ND



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## 测试报告

No. CANEC2119679802

日期: 2021年11月08日 第8页,共23页

测试项目	单位	MDL	001
三苯基锡(TPhT)	mg/kg	0.02	ND

### 欧盟POPs法规(EU) 2019/1021-短链氯化石蜡 (SCCPs)

测试方法: 参考ISO 18219-1:2021, 采用GC-NCI-MS进行分析。

测试项目	限值	单位	MDL	001
短链氯化石蜡(C10-C13) (SCCPs)	1500	mg/kg	50	ND
评论				符合

### AfPS GS 2019:01 PAK-多环芳香烃

测试方法: 参考AfPS GS 2019:01 PAK 测试, 采用 GC-MS进行分析。

测试项目	CAS NO.	单位	MDL	001
萘 (NAP)	91-20-3	mg/kg	0.1	ND
菲 (PHE)	85-01-8	mg/kg	0.1	ND
蒽 (ANT)	120-12-7	mg/kg	0.1	ND
荧蒽 (FLT)	206-44-0	mg/kg	0.1	ND
芘 (PYR)	129-00-0	mg/kg	0.1	ND
苯并(a)蒽 (BaA)	56-55-3	mg/kg	0.1	ND
蒎 (CHR)	218-01-9	mg/kg	0.1	ND
苯并(b)荧蒽 (BbF)	205-99-2	mg/kg	0.1	ND
苯并(j)荧蒽 (BjF)	205-82-3	mg/kg	0.1	ND
苯并(k)荧蒽 (BkF)	207-08-9	mg/kg	0.1	ND
苯并(a)芘 (BaP)	50-32-8	mg/kg	0.1	ND
苯并(e)芘 (BeP)	192-97-2	mg/kg	0.1	ND
茚并(1,2,3-c,d)芘 (IPY)	193-39-5	mg/kg	0.1	ND
二苯并(a,h)蒽 (DBA)	53-70-3	mg/kg	0.1	ND
苯并(g,h,i)芘(二苯并(a,h)蒽) (BPE)	191-24-2	mg/kg	0.1	ND
4项多环芳香烃总和(菲 (PHE), 芘 (PYR), 蒽 (ANT), 荧蒽 (FLT))	-	mg/kg	-	ND
15项多环芳香烃总和	-	mg/kg	-	ND



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**AfPS (德国产品安全委员会):多环芳香烃的要求**

参数 (mg/kg)	1类	2类		3类	
	设计意图为放入口中的材料,或与皮肤长期接触(超过30秒)的材料用于 -2009/48/EC定义的玩具,或 -供3岁以下儿童 <sup>a,b</sup> 使用。	不属于第1类,设计意图或可预见 <sup>d</sup> 与皮肤长期接触(超过30秒)或短期重复接触 <sup>e</sup> 的材料		不属于第1和2类,设计意图或可预见与皮肤短期接触(不超过30秒)材料	
		a.供儿童使用的产品	b.其他产品	a.供儿童使用的产品	b.其他产品
苯并(a)芘 (BaP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(e)芘 (BeP)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(a)蒽 (BaA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(b)荧蒽 (BbF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(j)荧蒽 (BjF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(k)荧蒽 (BkF)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
蒽 (CHR)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
二苯并(a,h)蒽 (DBA)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
苯并(g,h,i)芘(二萘嵌苯) (BPE)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
茚并(1,2,3-c,d)芘 (IPY)	< 0.2	< 0.2	< 0.5	< 0.5	< 1
菲 (PHE), 芘 (PYR), 蒽 (ANT), 荧蒽 (FLT)	< 1 (总和)	< 5 (总和)	< 10 (总和)	< 20 (总和)	< 50 (总和)
萘 (NAP)	< 1	< 2		< 10	
<b>15 PAH之和</b>	<1	< 5	< 10	< 20	< 50

注释:

- <sup>a</sup> 儿童是指法定年龄未满 14 周岁的人。
- <sup>b</sup> 供儿童使用包括儿童的主动接触或被动接触。
- <sup>c</sup> “短期重复接触”的定义摘自 REACH 附录 XVII 第 50 条修正案 (EC) No. 1272/2013)。
- <sup>d</sup> 根据德国产品安全法 (ProdSG) (第一章第 2 条第 28 款) 的定义,“可预见的使用”是指将产品投放市场的人无意但可以合理预见的方式使用产品。

备注:

德国产品安全委员会 (AfPS) 于 2020 年 4 月 10 日发布了关于多环芳香烃 (PAHs) 的新文件 (AfPS GS 2019:01 PAK), 该文件将于 2020 年 7 月 1 日起用于 GS-MARK 认证。

**美国环保署有毒物质控制法 (TSCA) 第 6 (h) 节规定的持久性、生物累积性和毒性 (PBT) 化学物质**

测试方法: SGS内部方法(SGS-CCL-TOP-149-07, 参考US EPA 方法 3550C:2007), 采用GC-MS进行分析。



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## 测试报告

No. CANEC2119679802

日期: 2021年11月08日 第10页,共23页

测试项目	CAS NO.	限值	单位	MDL	001
十溴二苯醚 (Deca-BDE) $\Delta^1$	1163-19-5	★	mg/kg	5	ND
异丙基化磷酸三苯酯 (PIP 3:1) $\Delta^2$	68937-41-7	★	mg/kg	5	ND
2,4,6-三叔丁基苯酚 (2,4,6-TTBP) $\Delta^3$	732-26-3	3000	mg/kg	5	ND
六氯丁二烯 (HCBD)	87-68-3	★	mg/kg	5	ND
五氯苯硫酚 (PCTP)	133-49-3	10000	mg/kg	5	ND
结论					符合

### 备注:

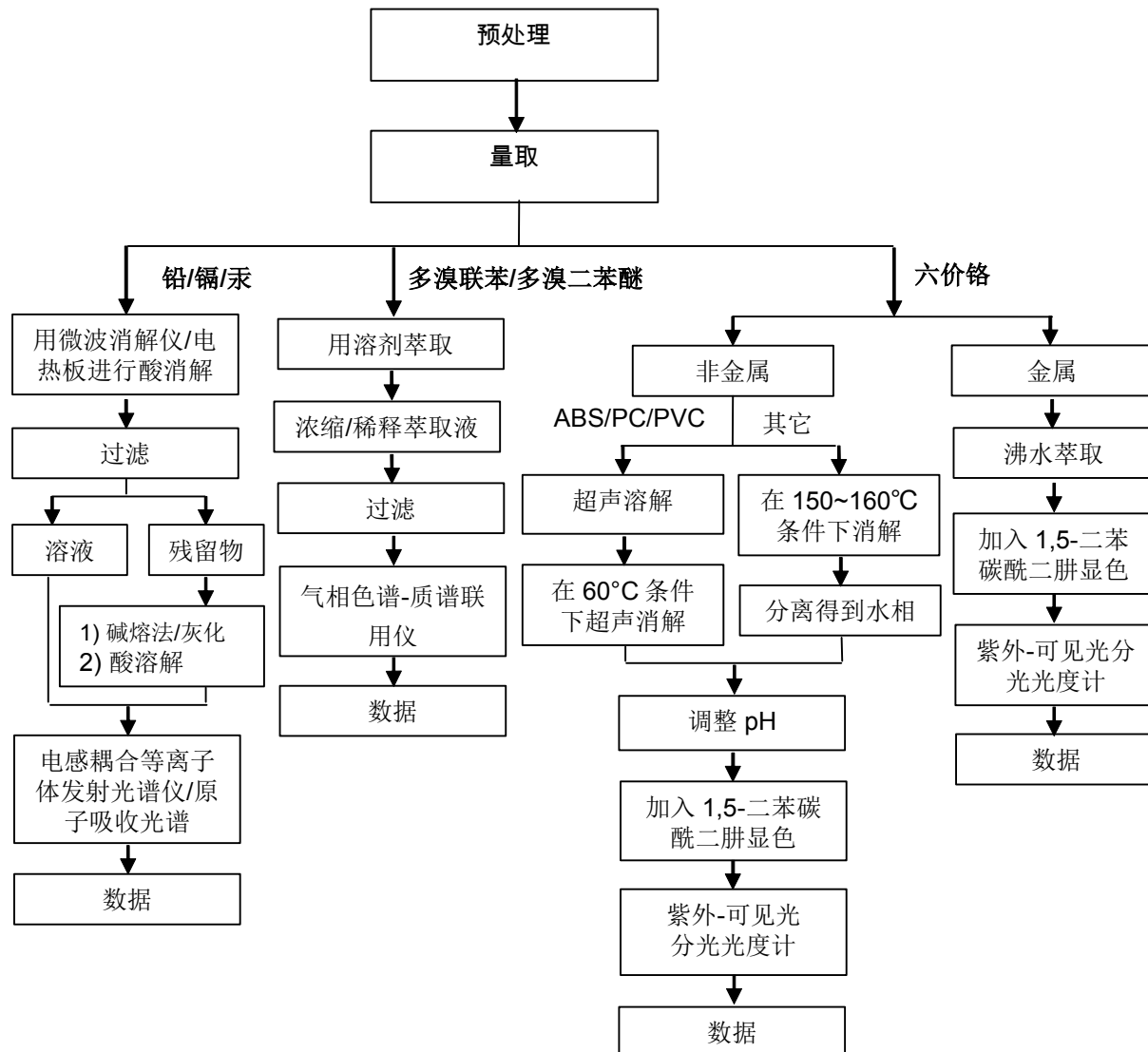
1. “★”= 禁止使用
  2. 法规信息请参见下链接  
<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/persistent-bioaccumulative-and-toxic-pbt-chemicals-under>
  3.  $\Delta^1$ : 若送测样品来自于产品或物品含有十溴二苯醚的产品或物品的回收塑料, 则可豁免;
  4.  $\Delta^2$ : 提交的样品有下列情形之一的, 不在法规的管控范围内:
    - 用于航空或军事用途的液压油;
    - 润滑剂和润滑脂;
    - 汽车和航空航天车辆的新零件和替换零件;
    - 生产氰基丙烯酸酯胶粘剂的中间体;
    - 机车和船用专用发动机空气滤清器;
    - 来自于含有PIP (3:1) 的产品或物品的回收塑料;
    - 用含有PIP (3:1) 回收产品或物品的塑料制成的产品或物品
  5.  $\Delta^3$ : 提交的样品如果不是机油或润滑油, 则不在法规的管控范围内;
- 除非另有说明, 此报告结果仅对测试的样品负责。本报告未经本公司书面许可, 不可部分复制。检测报告仅用于客户科研、教学、内部质量控制、产品研发等目的, 仅供内部参考。



附件

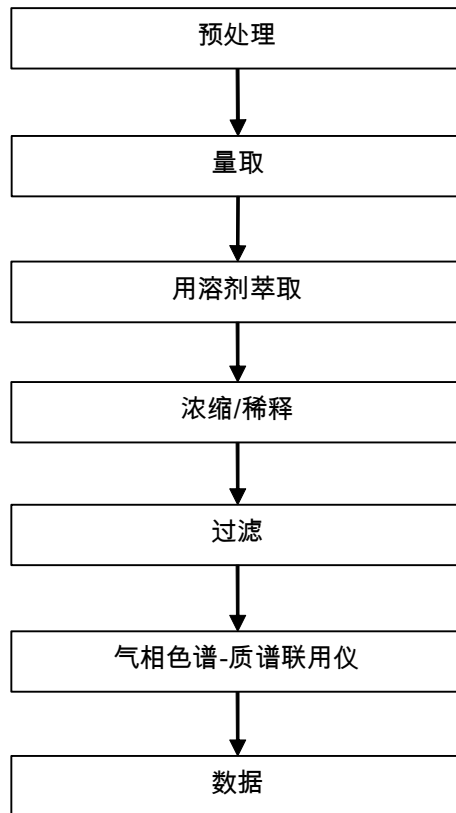
## Pb/Cd/Hg/Cr<sup>6+</sup>/PBBs/PBDEs 测试流程图

1) 样品按照下述流程被完全消解（六价铬和多溴联苯/多溴二苯醚测试除外）。



附件

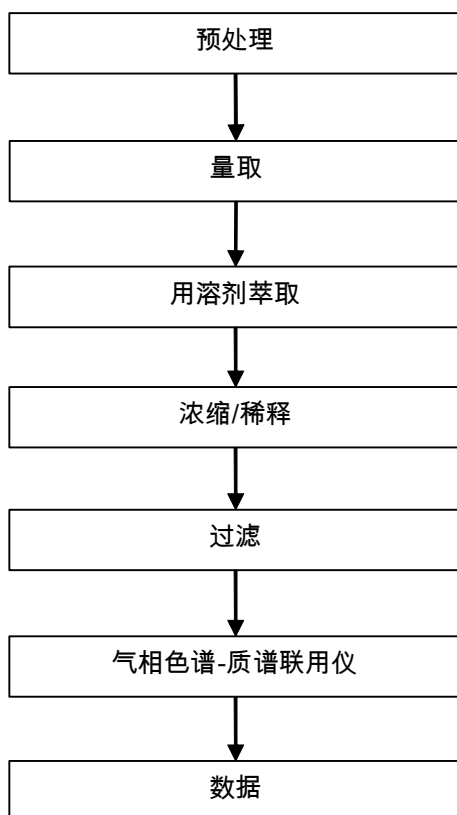
### Phthalates 测试流程图





附件

### Phthalates 测试流程图

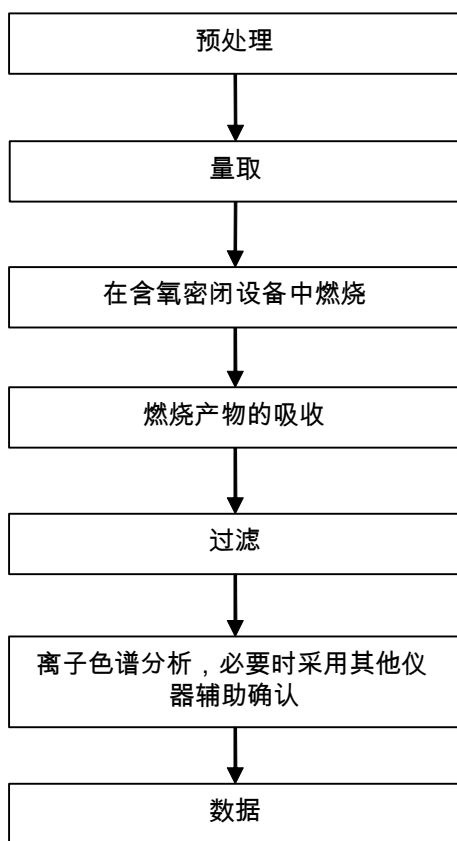


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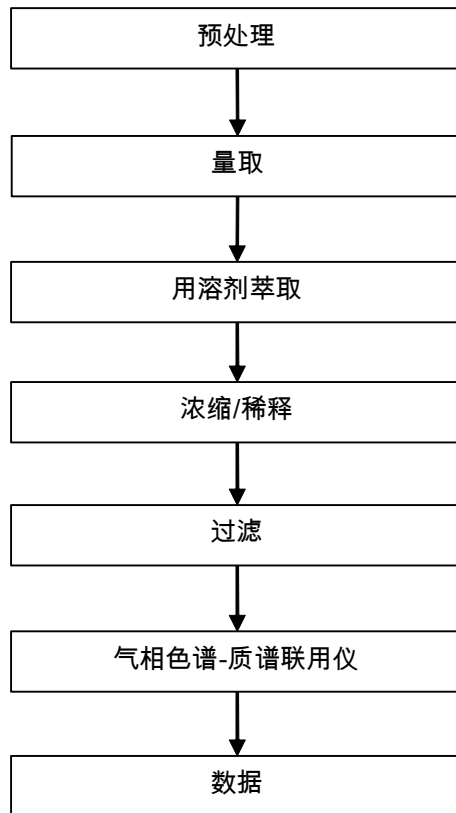
附件

## Halogen 测试流程图



附件

### HBCDD 测试流程图

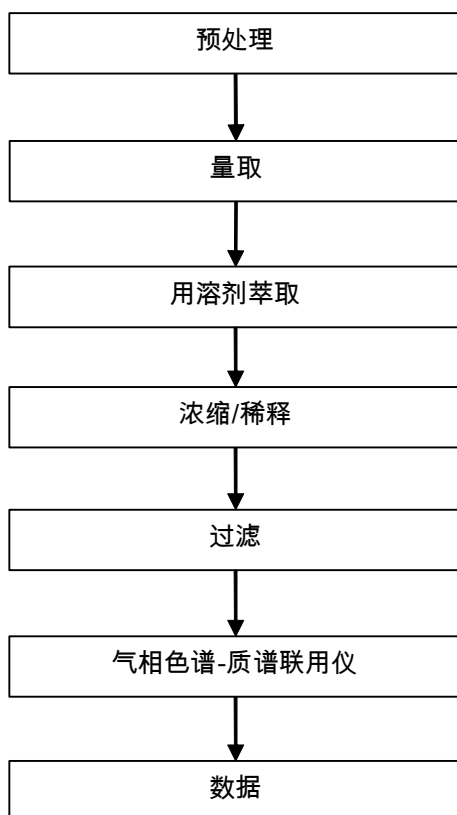


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附件

PAHs 测试流程图



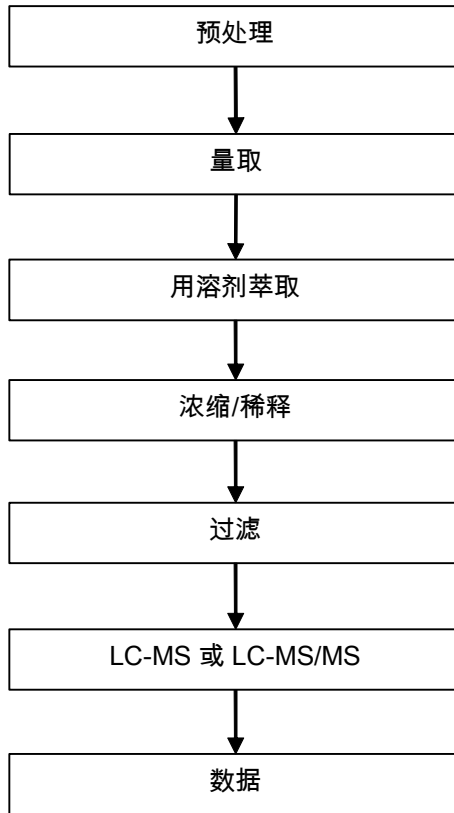
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附件

### PFOA / PFOS 测试流程图

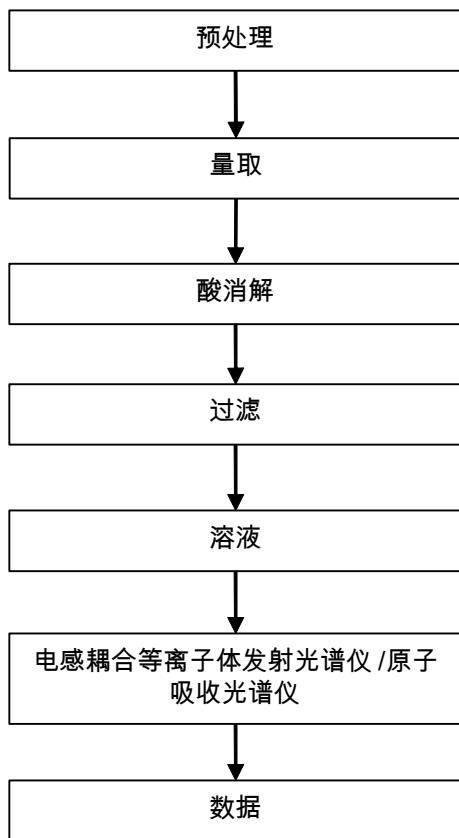


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附件

元素测试流程图

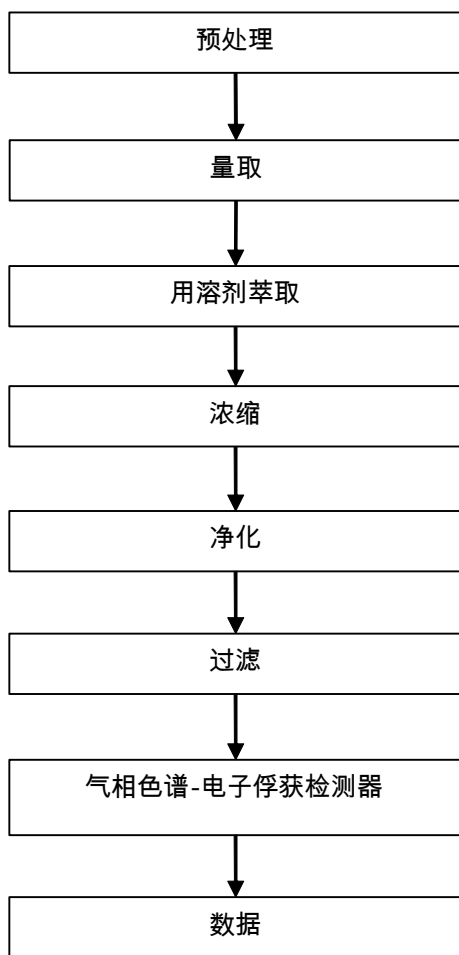


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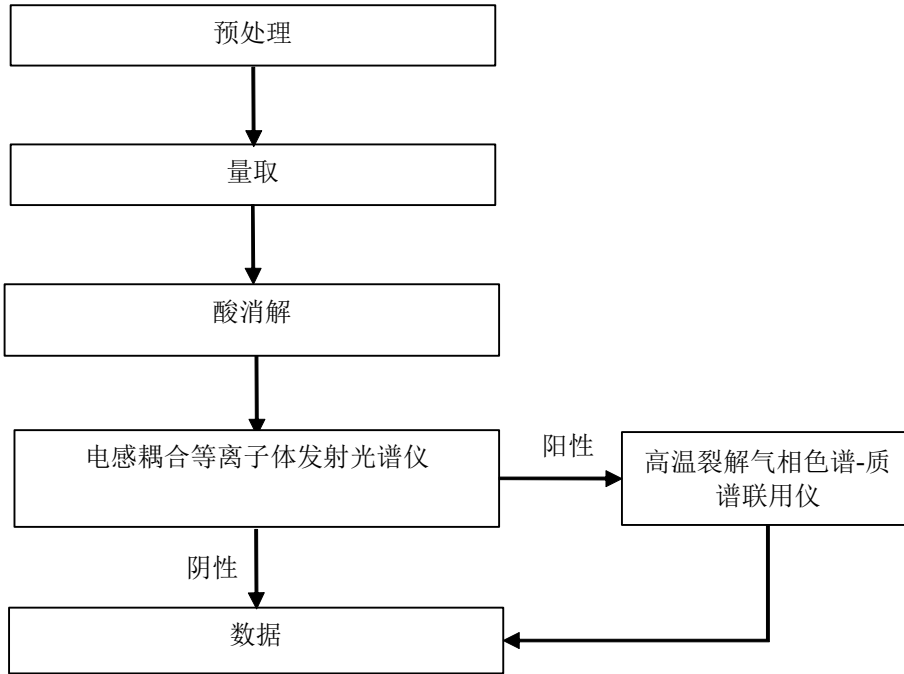
附件

## SCCP/MCCP/LCCP 测试流程图



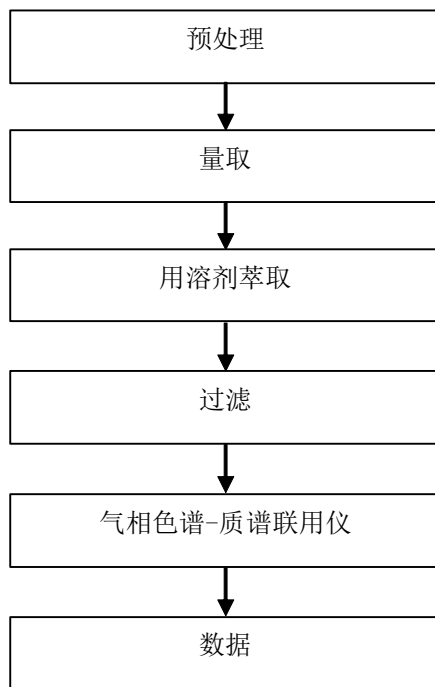
附件

### 红磷测试流程图



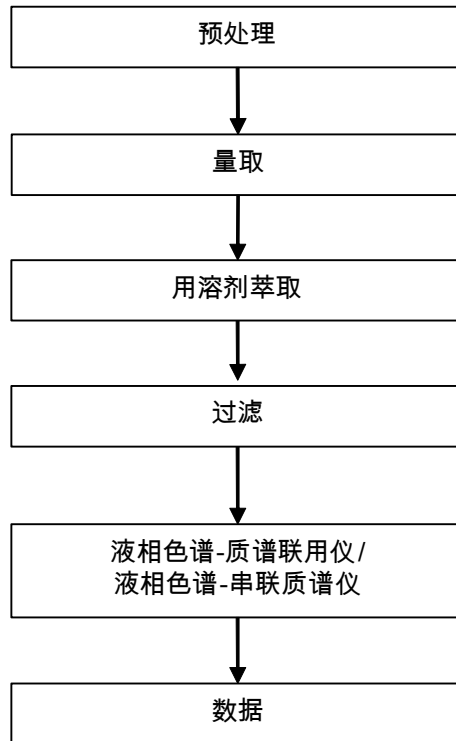


## 持久性、生物累积性和毒性 (PBT) 化学物质测试流程图



附件

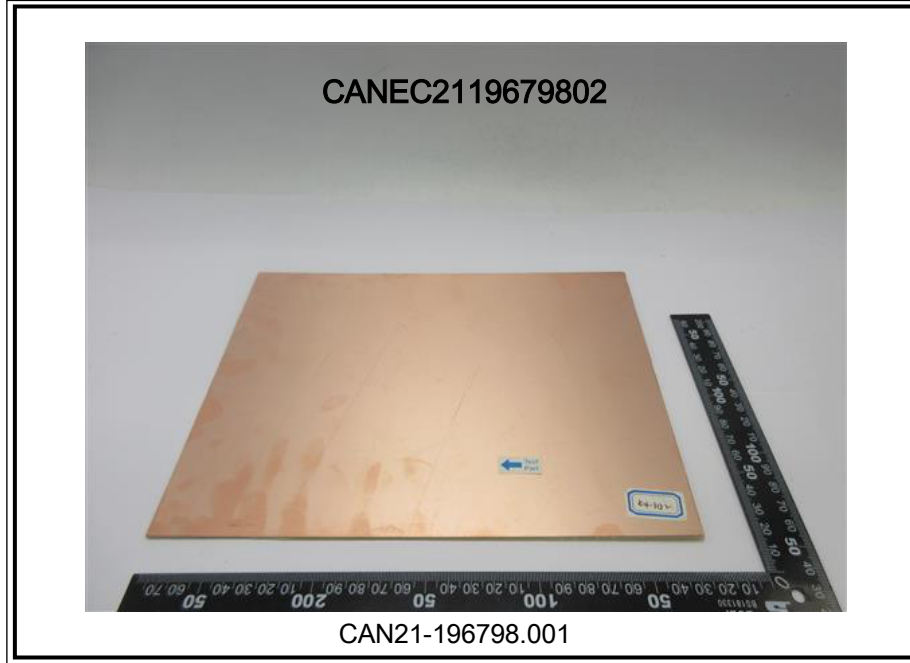
### TBBP-A 测试流程图



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