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Test Report

No.: EGZ2303160195C00202R

Date: Apr. 11, 2023

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Applicant : SHENZHEN TUOZHU TECHNOLOGY CO., LTD.

委托单位 : 深圳拓竹科技有限公司

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地址 : 深圳市前海深港合作区前湾一路1号A栋201室

Sample Name : Bambu PLA Matte

样品名称 : 3D 打印线材

Model : A01-xx (xx stands for any suffix)

型 号 : A01-xx(xx 代表任意后缀)

Element
成 分 : PLA

Received Date : Apr. 03, 2023

接收日期 : 2023年04月03日

Test Period : Apr. 03, 2023~ Apr. 11, 2023

检测日期 : 2023年04月03日~2023年04月11日

Test Requested : As requested by client, to evaluate the compliance of the submitted sample with EU RoHS Directive 2011/65/EU Annex II and its amendment (EU) 2015/863 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

根据客户要求, 对送测样品进行欧洲议会及理事会于 2011 年 6 月 8 日决定的关于在电子电器产品中限制使用某些有害物质的指令 2011/65/EU 中附件 II 的修订指令(EU) 2015/863 要求的符合性评估。

Test Method : 1. Review was performed for the sample and the related Bill of Materials submitted by the Applicant.

对客户所提交的样品及其相关材料清单进行检查、评估。

2. a) To refer to the standard IEC 62321-2:2021 ed. 2.0, review was performed for the samples disjointed from the submitted articles.

参照标准 IEC 62321-2:2021 ed. 2.0, 对客户所提交的样品进行拆分。

b) To refer to the standard IEC 62321-1:2013, tests were performed for the samples indicated by the photos in this report.

参照标准 IEC 62321-1:2013, 对客户所提交的指定图片样品进行测试。

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- c) To refer to the standard IEC 62321-3-1:2013: Screening by XRF Spectroscopy.
参照标准 IEC 62321-3-1:2013: X 射线荧光扫描筛选测试。
- d) Wet chemical test
湿化学测试
 - 1) to refer to IEC 62321-5:2013, determine the Cadmium, Lead content by ICP-OES.
参照 IEC 62321-5:2013, 用 ICP-OES 测定铅(Pb)、镉(Cd)的含量。
 - 2) to refer to IEC 62321-4:2013+A1:2017, determine the Mercury content by ICP-OES.
参照 IEC 62321-4:2013+AMD1:2017, 用 ICP-OES 测定汞(Hg)的含量。
 - 3) to refer to IEC 62321-7-1:2015 & IEC 62321-7-2:2017, determine the Hexavalent Chromium(Cr(VI)) content by UV-Vis.
参照 IEC 62321-7-1:2015 & IEC 62321-7-2:2017, 用 UV-Vis 测定六价铬(Cr(VI))的含量。
 - 4) to refer to IEC 62321-6:2015, determine the Polybrominated Biphenyls(PBBs) and Polybrominated Diphenyl Ethers(PBDEs) by GC-MS.
参照 IEC 62321-6:2015, 用 GC-MS 测定多溴联苯(PBBs)和多溴二苯醚(PBDEs)的含量。
 - 5) to refer to IEC 62321-8:2017, determine the Bis(2-ethylhexyl) phthalate(DEHP), Dibutyl phthalate(DBP), Benzylbutyl phthalate(BBP) and Diisobutyl phthalate (DIBP) by GC-MS.
参照 IEC 62321-8:2017, 用 GC-MS 测定邻苯二甲酸二(2-乙基己)酯(DEHP)、邻苯二甲酸二丁酯(DBP)、邻苯二甲酸丁苄酯(BBP)和邻苯二甲酸二异丁酯(DIBP)含量。

Test Results

测试结果

: Please refer to next page (s).

请参见下一页

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Conclusion:**执行测试总结:**

Basing on the test results obtained from the homogeneous materials, the submitted sample **COMPLIES** with EU RoHS Directive 2011/65/EU Annex II and its amendment (EU) 2015/863.

所提交样品中均质材料的测试结果符合 RoHS 指令 2011/65/EU 中附件 II 的修订指令(EU) 2015/863 的要求。



Prepared by:

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Assistant engineer

Reviewed by:

Sun Wei, Ethan
Technical supervisor

Signed for and on behalf of
EMTEK(Guangzhou) Co., Ltd.

Approved by:

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1.1 Sample List/样品清单

| No. 序号 | Sample Number 样品编号 | Sample Name 样品名称 |
|-----------|-----------------------|----------------------------|
| 2 | E2303160195-02.02 | Bambu PLA Matte 3D 打印线材 |

1.2 Test Sample List/检测样品清单

| No. 序号 | Sample Description 样品描述 |
|-----------|---------------------------------|
| 2.2 | Feed line-blue solid 料线-蓝色固体 |

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2. Pb,Cd,Hg,Cr(VI),PBBs,PBDEs Test Results/测试结果

| No. 序号 | Restricted substances 受限物质 | Results of EDXRF ⁽¹⁾ EDXRF 结果 ⁽¹⁾ | Results of Chemical Testing ⁽²⁾ (mg/kg) 湿化学测试结果 ⁽²⁾ (毫克/千克) | Remark ⁽²⁾ 备注 ⁽²⁾ |
|-----------|-------------------------------|---|--|--|
| 2.2 | Cd | BL | --- | No comment 无 |
| | Pb | BL | | |
| | Hg | BL | | |
| | Cr | BL | | |
| | Br | BL | | |

3. Phthalates (DBP, BBP, DEHP, DIBP) Test Results/邻苯二甲酸酯(DBP, BBP, DEHP, DIBP)测试结果

| No. 序号 | Restricted substances 受限物质 | CAS No. CAS 号 | Results of Wet chem. Test (%) 湿化学测试结果 (%) | MDL 方法检测限 (%) | Limit 限值 (%) |
|-----------|----------------------------------|------------------|--|---------------------|--------------------|
| 2.2 | DBP | 84-74-2 | ND | 0.003 | 0.1 |
| | BBP | 85-68-7 | ND | 0.003 | 0.1 |
| | DEHP | 117-81-7 | ND | 0.003 | 0.1 |
| | DIBP | 84-69-5 | ND | 0.003 | 0.1 |

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Note 备注:

- (1) ① Results are obtained by XRF for primary screening, and further wet chemical testing by ICP-OES / AAS (for Cd, Pb, Hg), UV-Vis (for Cr(VI)) and GC/MS (for PBBs, PBDEs) is recommended to be performed, if an inconclusive result was found (as "X" in below table)(unit: mg/kg).
 XRF 结果是初步筛选,如果有不确定结果(如下表中“X”)需要进一步通过 ICP-OES/AAS(针对镉,铅,汞), UV-Vis (针对六价铬)以及 GC/MS(针对多溴联苯, 多溴二苯醚)做湿化学分析 (单位: 毫克/千克)。
- ② OL = Over Limit, BL = Below Limit, X = Inconclusive, NA= Not Applicable.
 OL = 超出限值, BL = 低于限值, X = 不确定, NA= 不适用。
- ③ The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.
 针对元素的扫描结果-不均一材料的测试值与真实值可能存在差异。

| Element 分析元素 | Polymer 聚合物材料 | Metal 金属材料 | Composite Materials 电子元件 |
|-----------------|--------------------------------|--------------------------------|--------------------------------|
| 镉 Cd | BL ≤(70-3σ)< X <(130+3σ)≤ OL | BL ≤(70-3σ)< X <(130+3σ)≤ OL | LOD < X <(150+3σ)≤ OL |
| 铅 Pb | BL ≤(700-3σ)< X <(1300+3σ)≤ OL | BL ≤(700-3σ)< X <(1300+3σ)≤ OL | BL ≤(500-3σ)< X <(1500+3σ)≤ OL |
| 汞 Hg | BL ≤(700-3σ)< X <(1300+3σ)≤ OL | BL ≤(700-3σ)< X <(1300+3σ)≤ OL | BL ≤(500-3σ)< X <(1500+3σ)≤ OL |
| 溴 Br | BL ≤ (300-3σ)< X | NA | BL ≤ (250-3σ)< X |
| 铬 Cr | BL ≤ (700-3σ)< X | BL ≤ (700-3σ)< X | BL ≤ (500-3σ)< X |

- (2) ① mg/kg = ppm = 0.0001%, ND = Not Detected (Less than method detection limit.).
 毫克/千克 = 0.0001%, ND = 未检测到 (小于方法检测限)。

- ② Unit and Method Detection Limit (MDL) in wet chemical test.
 湿化学测试中的单位和方法检测限。

| Test items 测试项目 | 铅 Pb | 镉 Cd | 汞 Hg | Cr(VI)(Non-metal) Cr(VI)(非金属) | PBBs(single) 多溴联苯 (单个) | PBDEs(single) 多溴二苯醚 (单个) |
|--------------------|----------------|----------------|----------------|----------------------------------|---------------------------|--------------------------------|
| Unit 单位 | mg/kg 毫克/千克 | mg/kg 毫克/千克 | mg/kg 毫克/千克 | mg/kg 毫克/千克 | mg/kg 毫克/千克 | mg/kg 毫克/千克 |
| MDL 方法检测限 | 2 | 2 | 2 | 8 | 5 | 5 |

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- ③ According to IEC 62321-7-1:2015, result on Cr(VI) for metal sample is shown as Positive/Negative.

依据 IEC 62321-7-1:2015, 金属样品中 Cr(VI)的结果用阳性/阴性来表示。

a. The sample is positive for Cr(VI) if the Cr(VI)concentration is greater than 0.13 $\mu\text{g}/\text{cm}^2$.

The sample coating is considered to contain Cr(VI).

a. 当六价铬(Cr(VI))结果为阳性(浓度大于 0.13 $\mu\text{g}/\text{cm}^2$)，表示样品镀层含有六价铬(Cr(VI))。

b. The sample is negative for Cr(VI) if the Cr(VI) concentration is less than 0.10 $\mu\text{g}/\text{cm}^2$.

The sample is considered a non-Cr(VI) based coating.

b. 当六价铬(Cr(VI))结果为阴性(浓度小于 0.10 $\mu\text{g}/\text{cm}^2$)，表示样品镀层不含有六价铬(Cr(VI))。

c. The result between 0.10 $\mu\text{g}/\text{cm}^2$ and 0.13 $\mu\text{g}/\text{cm}^2$ is considered to be inconclusive-

unavoidable coating variations may influence the determination.

c. 当六价铬(Cr(VI))结果介于 0.10 及 0.13 $\mu\text{g}/\text{cm}^2$ 时，无法确定镀层是否含有六价铬(Cr(VI))。

Storage condition and production date of the tested sample are unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.

由于未知测试样品的储存条件及生产日期，测试结果仅代表样品在测试期间的状态。

- ④ According to IEC 62321-3-1:2013, this column represents the results of wet chemical test. And “---” means no need to perform wet chemical test, when the XRF screening results are qualified.

根据 IEC 62321-3-1:2013 的标准要求，这列内容代表化学测试结果，而“---”代表前面 XRF 扫描测试合格后不需要再做化学测试。

- (3) This column represents the exempted decoration of material or other related testing sample's information. And “No comment” means no note.

这列内容代表有关材料的豁免声明或者其它必要的批注，而“无”代表没有批注。

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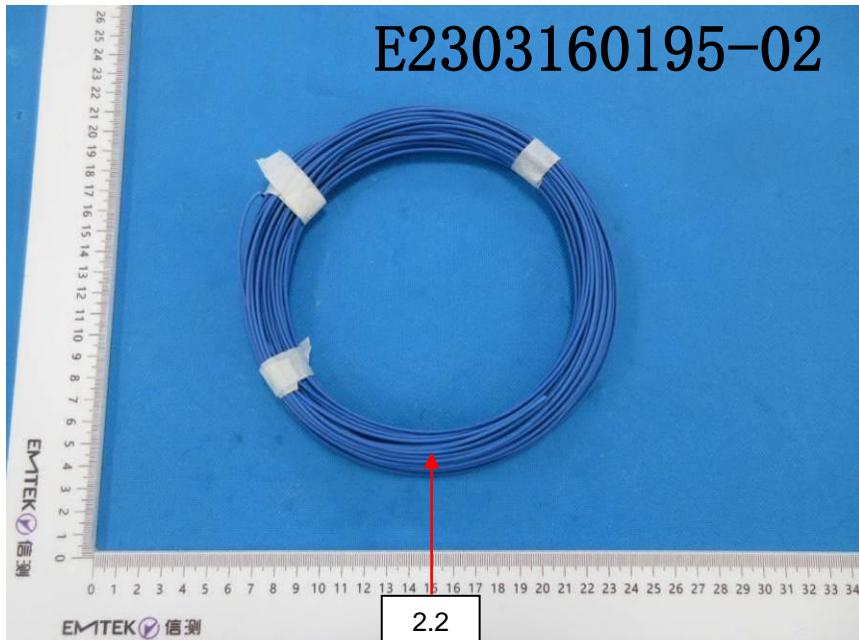
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4. Sample Photo

样品照片



*** End of Report ***
报告结束

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ANNEX

RESTRICTED SUBSTANCES LIST

Restricted substances and maximum concentration values tolerated by weight in homogeneous materials

| | |
|---|--|
| Lead (0.1%) | Mercury (0.1%) |
| Cadmium (0.01%) | Hexavalent chromium (0.1%) |
| Polybrominated biphenyls (PBB) (0.1%) | Polybrominated diphenyl ethers (PBDE) (0.1%) |
| Bis(2-ethylhexyl) phthalate (DEHP) (0.1%) | Butyl benzyl phthalate (BBP) (0.1%) |
| Dibutyl phthalate (DBP) (0.1%) | Diisobutyl phthalate (DIBP) (0.1%) |

EXEMPTION LIST

- 1 Mercury in single capped (compact) fluorescent lamps not exceeding (per burner):
- 1(a) For general lighting purposes < 30W: 5mg (expires on 31 December 2011; 3.5mg may be used per burner after 31 December 2011 until 31 December 2012; 2.5mg shall be used per burner after 31 December 2012)
- 1(b) For general lighting purposes ≥ 30W and <50W: 5mg (expires on 31 December 2011; 3.5mg may be used per burner after 31 December 2011)
- 1(c) For general lighting purposes ≥ 50W and <150W: 5mg
- 1(d) For general lighting purposes ≥ 150W: 15mg
- 1(e) For general lighting purposes with circular or square structural shape and tube diameter ≤17mm (no limitation of use until 31 December 2011; 7mg may be used per burner after 31 December 2011)
- 1(f) For special purposes: 5mg
- 1(g) For general lighting purposes < 30 W with a lifetime equal or above 20 000 h: 3,5 mg (Expires on 31 December 2017)
- 2(a) Mercury in double-capped linear fluorescent lamps for general lighting purposes not exceeding (per lamp):
- 2(a)(1) Tri-band phosphor with normal lifetime and a tube diameter < 9mm (e.g. T2): 5mg (expires on 31 December 2011; 4mg may be used per lamp after 31 December 2011)
- 2(a)(2) Tri-band phosphor with normal lifetime and a tube diameter ≥ 9mm and ≤ 17mm (e.g. T5): 5mg (expires on 31 December 2011; 3mg may be used per lamp after 31 December 2011)
- 2(a)(3) Tri-band phosphor with normal lifetime and a tube diameter > 17mm and ≤ 28mm (e.g. T8): 5mg (expires on 31 December 2011; 3.5mg may be used per lamp after 31 December 2011)
- 2(a)(4) Tri-band phosphor with normal lifetime and a tube diameter > 28mm (e.g. T12): 5mg (expires on 31 December 2012; 3.5mg may be used per lamp after 31 December 2012)
- 2(a)(5) Tri-band phosphor with long lifetime (≥ 25000h): 8mg (expires on 31 December 2011; 5mg may be used per lamp after 31 December 2011)
- 2(b) Mercury in other fluorescent lamps not exceeding (per lamp):
- 2(b)(2) Non-linear halophosphate lamps (all diameters): 15mg (expires on 13 April 2016)
- 2(b)(3) Non-linear tri-band phosphor lamps with tube diameter > 17mm (e.g. T9) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
- 2(b)(4) Lamps for other general lighting and special purposes (e.g. induction lamps) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
- 3 Mercury in cold cathode fluorescent lamps and external electrode fluorescent lamps (CCFL and EEFL) for special purposes not exceeding (per lamp):
- 3(a) Short length (≤ 500mm) (No limitation of use until 31 December 2011; 3.5mg may be used per lamp after 31 December 2011)
- 3(b) Medium length (> 500m and ≤ 1500mm) (No limitation of use until 31 December 2011; 5mg may be used per lamp after 31 December 2011)
- 3(c) Long length (> 1500mm) (No limitation of use until 31 December 2011; 13mg may be used per lamp after 31 December 2011)
- 4(a) Mercury in other low pressure discharge lamps (per lamp) (no limitation of use until 31 December 2011; 15mg may be used per lamp after 31 December 2011)
- 4(b) Mercury in High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner) in lamps with improved colour rendering index Ra > 60:
- 4(b)-I P ≤ 155W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
- 4(b)-II 155W < P ≤ 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
- 4(b)-III P > 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)
- 4(c) Mercury in other High Pressure Sodium (vapour) lamps for general lighting purposes not exceeding (per burner):
- 4(c)-I P ≤ 155W (no limitation of use until 31 December 2011; 25mg may be used per burner after 31 December 2011)
- 4(c)-II 155W < P ≤ 405W (no limitation of use until 31 December 2011; 30mg may be used per burner after 31 December 2011)
- 4(c)-III P > 405W (no limitation of use until 31 December 2011; 40mg may be used per burner after 31 December 2011)

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- 4(d) Mercury in High Pressure Mercury (vapour) lamps (HPMV) (expires on 13 April 2015)
- 4(e) Mercury in metal halide lamps (MH)
- 4(f) Mercury in other discharge lamps for special purposes not specifically mentioned in this Annex
- 4(g) Mercury in hand crafted luminous discharge tubes used for signs, decorative or architectural and specialist lighting and lightartwork, where the mercury content shall be limited as follows: (Expires on 31 December 2018)
- (a) 20 mg per electrode pair + 0,3 mg per tube length in cm, but not more than 80 mg, for outdoor applications and indoor applications exposed to temperatures below 20 °C;
 - (b) 15 mg per electrode pair + 0,24 mg per tube length in cm, but not more than 80 mg, for all other indoor applications.
- 5(a) Lead in glass of cathode ray tubes
- 5(b) Lead in glass of fluorescent tubes not exceeding 0.2% by weight
- 6(a) Lead as an alloying element in steel for machining purposes and in galvanized steel containing up to 0.35% lead by weight
- 6(b) Lead as an alloying element in aluminium containing up to 0.4% lead by weight
- 6(c) Copper alloy containing up to 4% lead by weight.
- 7(a) Lead in high melting temperature type solders (i.e. lead based alloys containing 85% by weight or more lead)
- 7(b) Lead in solders for servers, storage and storage array systems, network infrastructure equipment for switching, signalling, transmission, and network management for telecommunications
- 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g. piezoelectric devices, or in a glass or ceramic matrix compound
- 7(c)-II Lead in dielectric ceramic in capacitors for a rated voltage of 125V AC or 250V DC or higher
- 7(c)-III Lead in dielectric ceramic in capacitors for a rated voltage of less than 125V AC or 250V DC (expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013).
- 7(c)-IV Lead in PZT based dielectric ceramic materials for capacitors being part of integrated circuits or discrete semiconductors
- 8(a) Cadmium and its compounds in one shot pellet type thermal cut-offs (expires on 1 January 2012 and after that date may be used in spare parts for EEE placed on the market before 1 January 2012)
- 8(b) Cadmium and its compounds in electrical contacts
- 9 Hexavalent chromium as an anti-corrosion agent of the carbon steel cooling system in absorption refrigerators up to 0.75% by weight in the cooling solution
- 9(b) Lead in bearing shells and bushes for refrigerant-containing compressors for heating, ventilation, air conditioning and refrigeration (HVACR) applications
- 11(b) Lead used in other than C-press compliant pin connector systems (expires on 1 January 2013 and after that date may be used in spare parts for EEE placed on the market before 1 January 2013)
- 13(a) Lead in white glasses used for optical applications
- 13(b) Cadmium and lead in filter glasses and glasses used for reflectance standards
- 14 Lead in solders consisting of more than two elements for the connection between the pins and the package of microprocessors with a lead content of more than 80% and less than 85% by weight (expires on 1 January 2011 and after that date may be used in spare parts for EEE placed on the market before 1 January 2011)
- 15 Lead in solders to complete a viable electrical connection between semiconductor die and carrier within integrated circuit Flip Chip packages
- 17 Lead halide as radiant agent in High Intensity Discharge (HID) lamps used for professional reprography applications
- 18(b) Lead as activator in the fluorescent powder (1% lead by weight or less) of discharge lamps when used as sun tanning lamps containing phosphors such as BSP (BaSi₂O₅:Pb)
- 21 Lead and cadmium in printing inks for the application of enamels on glasses, such as borosilicate and soda lime glass
- 24 Lead in solders for the soldering to machined through hole discoidal and planar array ceramic multilayer capacitors
- 25 Lead oxide in surface conduction electron emitter displays (SED) used in structural elements, notably in the seal frit and frit ring
- 29 Lead bound in crystal glass as defined in Annex 1 (Categories 1, 2, 3 and 4) of Council Directive 69/493/EEC
- 30 Cadmium alloys as electrical/mechanical solder joints to electrical conductors located directly on the voice coil in transducers used in high-powered loudspeakers with sound pressure levels of 100 dB (A) and more
- 31 Lead in soldering materials in mercury free flat fluorescent lamps (which e.g. are used for liquid crystal displays, design or industrial lighting)
- 32 Lead oxide in seal frit used for making window assemblies for Argon and Krypton laser tubes
- 33 Lead in solders for the soldering of thin copper wires of 100 µm diameter and less in power transformers
- 34 Lead in cermet-based trimmer potentiometer elements
- 37 Lead in the coating layer of high voltage diodes on the basis of a zinc borate glass body

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- 38 Cadmium and cadmium oxide in thick film pastes used on aluminium bonded beryllium oxide
39 Cadmium in colour converting II-VI LEDs (< 10 µg Cd per mm² of light-emitting area) for use in solid state illumination or display systems (expires on 1 July 2014)
- 41 Lead in solders and termination finishes of electrical and electronic components and finishes of printed circuit boards used in ignition modules and other electrical and electronic engine control systems, which for technical reasons must be mounted directly on or in the crankcase or cylinder of hand-held combustion engines (classes SH:1, SH:2, SH:3 of Directive 97/68/EC of the European Parliament and of the Council (2)) (Expires on 31 December 2018)

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Test Report

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The test items are marked with special symbols in the report is out of the scope of CMA accreditation. The test result only used for client's requirement, scientific researching ,teaching or internal quality control.

6. 其它声明请查阅报告页脚及书面报告背页。

For other statements, please refer to the footer of the report.

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