

Test Report No. CANEC2300109001 Date: 31 Jan 2023 Page 1 of 14

Client Name: YAGEO CORPORATION/BESTBRIGHT ELECTRONICS CO.,LTD

Client Address: 3F.,233-1,BAOQIAO RD.,XINDIAN DIST.,NEW TAIPEI CITY 23145,TAIWAN,CHINA

BUILDING 3.NO.24 EAST INDUSTRIAL ROAD.SONGSHAN LAKE PARK.DONGGUAN

CITY, GUANGDONG PROVINCE, P.R.C

Sample Name: TVS SMD

The above sample(s) and information were provided by the client.

SGS Job No.: CP23-000004 - SZ

Date of Sample Received: 04 Jan 2023

Testing Period: 04 Jan 2023 - 30 Jan 2023

Test Requested: Selected test(s) as requested by the client.

Test Method(s): Please refer to next page(s).

Test Result(s): Please refer to next page(s).

Result Summary:

| Test Requested | Conclusion |
|---|-------------|
| EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU-Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) | PASS |
| EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium and Hexavalent chromium | PASS |
| Halogen | See Results |
| AfPS GS 2019:01 PAK - Polycyclic Aromatic Hydrocarbons (PAHs) | See Results |
| Perfluorooctanoic acid (PFOA) and its salts & Perfluorooctane sulfonates (PFOS) and its derivatives | See Results |





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Signed for and on behalf of SGS-CSTC Standards Technical Services Co., Ltd. Guangzhou Branch

SS SS

Allie Chen

Allie Chen
Approved Signatory





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Test Result(s):

Test Part Description:

| Specimen No. | SGS Sample ID | Description |
|--------------|------------------|--------------------------------|
| SN1 | CAN23-001090.001 | Silvery metal pin |
| SN2 | CAN23-001090.002 | Black plastic |
| SN3 | CAN23-001090.003 | Copper-colored metal with chip |
| SN4 | CAN23-001090.004 | "TVS SMD"(mixed) |

Remarks:

- (1) 1 mg/kg = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

Test Method: With reference to IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015 and IEC 62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

| Test Item(s) | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>002</u> | <u>003</u> |
|----------------------------|--------------|-------------|------------|------------|------------|
| Cadmium (Cd) | 100 | mg/kg | 2 | ND | ND |
| Lead (Pb) | 1000 | mg/kg | 2 | ND | 29301▲ |
| Mercury (Hg) | 1000 | mg/kg | 2 | ND | ND |
| Hexavalent Chromium (CrVI) | 1000 | mg/kg | 8 | ND | ND |
| Sum of PBBs | 1000 | mg/kg | - | ND | ND |
| Monobromobiphenyl | - | mg/kg | 5 | ND | ND |
| Dibromobiphenyl | - | mg/kg | 5 | ND | ND |
| Tribromobiphenyl | - | mg/kg | 5 | ND | ND |
| Tetrabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Pentabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Hexabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Heptabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Octabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Nonabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Decabromobiphenyl | - | mg/kg | 5 | ND | ND |
| Sum of PBDEs | 1000 | mg/kg | - | ND | ND |
| | | | | | |



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|-------------------------------------|---------------------|-------------|------------|------------|--------------|--|
| Test Item(s) | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>002</u> | <u>003</u> | |
| Monobromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Dibromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Tribromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Tetrabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Pentabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Hexabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Heptabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Octabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Nonabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Decabromodiphenyl ether | - | mg/kg | 5 | ND | ND | |
| Dibutyl phthalate (DBP) | 1000 | mg/kg | 50 | ND | ND | |
| Butyl benzyl phthalate (BBP) | 1000 | mg/kg | 50 | ND | ND | |
| Bis (2-ethylhexyl) phthalate (DEHP) | 1000 | mg/kg | 50 | ND | ND | |
| Diisobutyl Phthalates (DIBP) | 1000 | mg/kg | 50 | ND | ND | |

Notes:

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series
- (3) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium and Hexavalent chromium

Test Method: With reference to IEC 62321-4:2013+A1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, analyzed by ICP-OES and UV-Vis.

| Test Item(s) | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>001</u> |
|-------------------------------|--------------|-------------|------------|------------|
| Cadmium (Cd) | 100 | mg/kg | 2 | ND |
| Lead (Pb) | 1000 | mg/kg | 2 | 6 |
| Mercury (Hg) | 1000 | mg/kg | 2 | ND |
| Hexavalent Chromium (Cr(VI))▼ | - | µg/cm² | 0.10 | ND |

Notes:

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series
- (3) ▼= a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm². The sample coating is considered to contain CrVI
 - b. The sample is negative for CrVI if CrVI is ND (concentration less than $0.10 \,\mu g/cm^2$). The coating is considered a non-CrVI based coating



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c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

Halogen

Test Method: With reference to EN 14582:2016, analysis was performed by IC.

| Test Item(s) | <u>Unit</u> | <u>MDL</u> | <u>004</u> |
|---------------|-------------|------------|------------|
| Fluorine (F) | mg/kg | 50 | ND |
| Chlorine (CI) | mg/kg | 50 | 95 |
| Bromine (Br) | mg/kg | 50 | ND |
| lodine (I) | mg/kg | 50 | ND |

AfPS GS 2019:01 PAK - Polycyclic Aromatic Hydrocarbons (PAHs)

Test Method: With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

| Test Item(s) | CAS NO. | <u>Unit</u> | <u>MDL</u> | <u>004</u> |
|--|----------|-------------|------------|------------|
| Naphthalene(NAP) | 91-20-3 | mg/kg | 0.1 | ND |
| Phenanthrene(PHE) | 85-01-8 | mg/kg | 0.1 | ND |
| Anthracene(ANT) | 120-12-7 | mg/kg | 0.1 | ND |
| Fluoranthene(FLT) | 206-44-0 | mg/kg | 0.1 | ND |
| Pyrene(PYR) | 129-00-0 | mg/kg | 0.1 | ND |
| Benzo(a)anthracene(BaA) | 56-55-3 | mg/kg | 0.1 | ND |
| Chrysene(CHR) | 218-01-9 | mg/kg | 0.1 | ND |
| Benzo(b)fluoranthene(BbF) | 205-99-2 | mg/kg | 0.1 | ND |
| Benzo(j)fluoranthene(BjF) | 205-82-3 | mg/kg | 0.1 | ND |
| Benzo(k)fluoranthene(BkF) | 207-08-9 | mg/kg | 0.1 | ND |
| Benzo(a)pyrene(BaP) | 50-32-8 | mg/kg | 0.1 | ND |
| Benzo(e)pyrene(BeP) | 192-97-2 | mg/kg | 0.1 | ND |
| Indeno(1,2,3-c,d)pyrene(IPY) | 193-39-5 | mg/kg | 0.1 | ND |
| Dibenzo(a,h)anthracene(DBA) | 53-70-3 | mg/kg | 0.1 | ND |
| Benzo(g,h,i)perylene(BPE) | 191-24-2 | mg/kg | 0.1 | ND |
| Sum of 4 PAHs (Phenanthrene, Pyrene, Anthracene, | - | mg/kg | - | ND |
| Fluoranthene) | | | | |
| Sum of 15 PAHs | - | mg/kg | - | ND |





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AfPS (German commission for Product Safety): PAHs requirements

| | Category 1 | Cateç | jory 2 | Category 3 | | |
|--|--|--|-------------------------------------|---|-------------------------------------|--|
| Parameter (mg/kg) | Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use | Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact ^c with skin during the intended or foreseeable use ^d . | | Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use. | | |
| | -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age. | a. use by children | b. other consumer products | a. use by children | b. other consumer products | |
| Benzo(a)pyrene (BaP) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(e)pyrene (BeP) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(a)anthracene (BaA) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(b)fluoranthene (BbF) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(j)fluoranthene (BjF) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(k)fluoranthene (BkF) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Chrysene (CHR) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Dibenzo(a,h)anthracene (DBA) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Benzo(g,h,i)perylene (BPE) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Indeno(1,2,3-cd)pyrene (IPY) | < 0.2 | < 0.2 | < 0.5 | < 0.5 | < 1 | |
| Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT) | < 1 Sum | < 5 Sum | < 10 Sum | < 20 Sum | < 50 Sum | |
| Naphthalene (NAP) | < 1 | < | 2 | < 10 | | |
| Sum of 15 PAHs | <1 | < 5 | < 10 | < 20 | < 50 | |

Note:

Remark: The German committee on Product Safety (AfPS) published a new PAHs document (AfPS GS 2019:01 PAK) on April 10, 2020, which will be binding for the issue of GS mark certificate from July 1, 2020.

Perfluorooctanoic acid (PFOA) and its salts & Perfluorooctane sulfonates (PFOS) and its derivatives

Test Method: With reference to CEN/TS15968:2010, analysis was performed by LC-MS or LC-MS/MS.



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^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No. 1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28) "foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.



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|--|----------------|---------------------|----------|-------------------|-------|-------------|-------------|
| Test Item(s) | | CAS NO. | <u> </u> | <u>Unit</u> | MDL | <u>(</u> | <u> 004</u> |
| Perfluorooctanoic acid (PFOA) and | its salts* | - | m | ng/kg | 0.010 | ı | ND |
| Perfluorooctane sulfonates (PFOS) derivatives* | and its salts/ | - | m | ng/kg | 0.010 | ı | ND |
| Perfluorooctane Sulfonamide (PFOS | SA) | 754-91-6 | m | ng/kg | 0.010 | ı | ND |
| N-methylperfluoro-1-octanesulfonar | nide(N-MeFOSA) | 31506-32-8 | m | ng/kg | 0.010 | I | ND |
| N-ethylperfluoro-1-octanesulfonamio | de (N-EtFOSA) | 4151-50-2 | m | ng/kg | 0.010 | ı | ND |
| 2-(N-methylperfluoro-1-octanesulfor-ethanol(N-MeFOSE) | namido) | 24448-09-7 | m | ng/kg | 0.010 | ı | ND |
| 2-(N-ethylperfluoro-1-octanesulfona -ethanol(N-EtFOSE) | mido) | 1691-99-2 | m | ng/kg | 0.010 | I | ND |
| Perfluorooctane sulfonates (PFOS) derivatives | and its | - | m | ng/kg | - | ı | ND |

Notes:

- (1) PFOA and its salts* including PFOA (CAS No. 335-67-1), APFO (CAS No. 3825-26-1), PFOA-Na (CAS No. 335-95-5), PFOA-K (CAS No. 2395-00-8), PFOA-Ag (CAS No. 335-93-3) and PFOA-F (CAS No. 335-66-0). The result of PFOA is used to represent PFOA and its salts.
- (2) PFOS and its salts* including PFOS (CAS No. 1763-23-1), POSF(CAS No. 307-35-7), PFOS-K (CAS No. 2795-39-3), PFOS-NH₄ (CAS No. 29081-56-9), PFOS-N($C_{10}H_{21}$)₂(CH₃)₂ (CAS No. 251099-16-8), PFOS-NH₂($C_{2}H_{4}OH$)₂ (CAS No. 70225-14-8), PFOS-Li (CAS No. 29457-72-5), PFOS-N($C_{2}H_{5}$)₄ (CAS No. 56773-42-3) and PFOS-Na (CAS No. 4021-47-0). The result of PFOS is used to represent PFOS and its salts.

Remark: The sample(s) 004 was/were analyzed on behalf of the applicant as mixing sample in one testing. The above result(s) was/were only given as the informality value and only for reference.

Remark *: According to the declaration from the client, Lead (Pb) in specimen 003 is exempted by EU RoHS directive 2011/65/EU based on |ANNEX III 7(a)|: Lead in high melting temperature type solders (i.e. lead-based alloys containing 85 % by weight or more lead).

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019.





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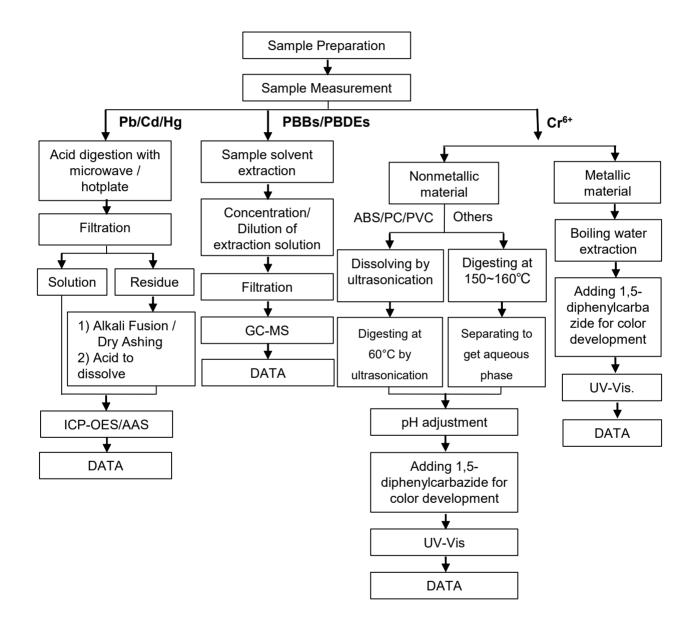
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Pb/Cd/Hg/Cr6+/PBBs/PBDEs Testing Flow Chart

1) These samples were dissolved totally by pre -conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs test method excluded).







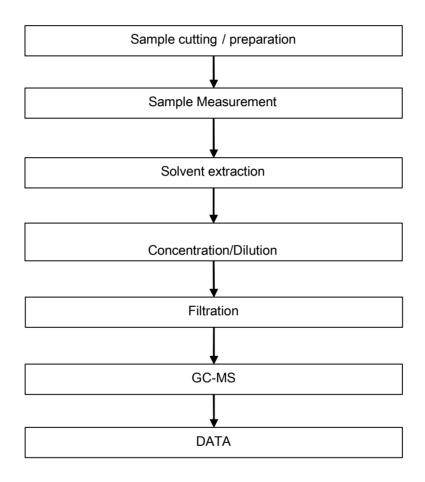
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Phthalates Testing Flow Chart







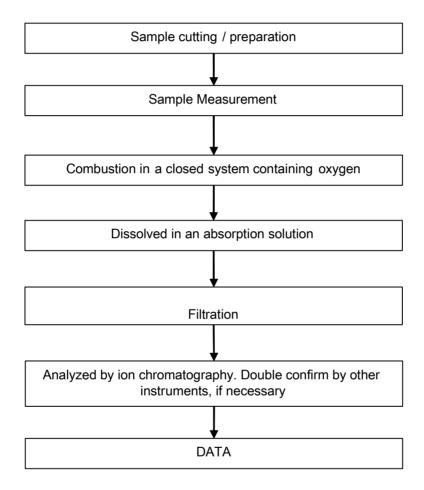
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Halogen Testing Flow Chart







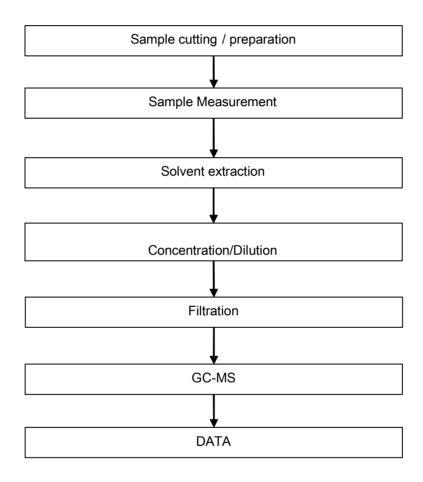
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PAHs Testing Flow Chart







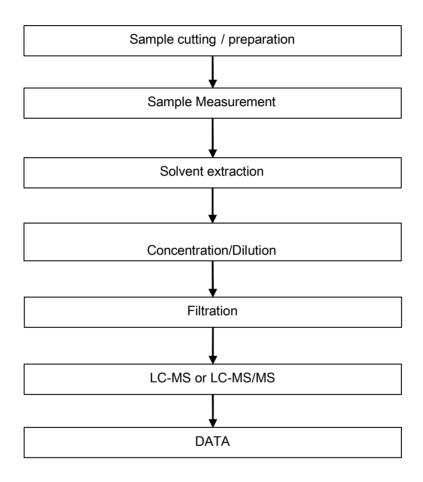
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Testing Flow Chart







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Sample photo:









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