

Test Report

No. : CE/2019/42981

Date : 2019/04/19

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AVX HONG KONG LTD. (TAIWAN BRANCH)

7F, NO. 56, LANE 258, RUIGUANG ROAD, NEIHU DISTRICT, TAIPEI CITY 11491, TAIWAN (R.O.C.)

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

Sample Submitted By : AVX HONG KONG LTD. (TAIWAN BRANCH)
 Sample Description : LF Cu-Sn I.a
 Style/Item No : TANTALUM DIVISION
 Sample Receiving Date : 2019/04/12
 Testing Period : 2019/04/12 to 2019/04/19

Test Requested : As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

Test Method : Please refer to following pages.

Test Result(s) : Please refer to following pages.

Troy Chang
 Troy Chang / Manager - Tech
 Signed for and behalf of
 SGS TAIWAN LTD.
 Chemical Laboratory - Taipei



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Test Result(s)

PART NAME No.1 : PLATING LAYER OF SILVER COLORED METAL
PART NAME No.2 : BASE MATERIAL OF SILVER COLORED METAL
PART NAME No.3 : SILVER COLORED METAL (INCLUDING THE PLATING LAYER)

Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
Cadmium (Cd)	mg/kg	IEC 62321-5 (2013) application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---	---
Lead (Pb)	mg/kg		2	87.6	---	---
Mercury (Hg)	mg/kg	IEC 62321-4:2013+AMD1:2017 application of modified digestion by surface etching and performed by ICP-AES.	2	n.d.	---	---
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2	---	n.d.	---
Lead (Pb)	mg/kg		2	---	16.2	---
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+AMD1:2017 and performed by ICP-AES.	2	---	n.d.	---
Hexavalent Chromium Cr(VI)(#2)	µg/cm ²	With reference to IEC 62321-7-1 (2015) and performed by UV-VIS.	0.10	n.d.	n.d.	---
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	---	---	n.d.
Monobromobiphenyl	mg/kg		5	---	---	n.d.
Dibromobiphenyl	mg/kg		5	---	---	n.d.
Tribromobiphenyl	mg/kg		5	---	---	n.d.
Tetrabromobiphenyl	mg/kg		5	---	---	n.d.
Pentabromobiphenyl	mg/kg		5	---	---	n.d.
Hexabromobiphenyl	mg/kg		5	---	---	n.d.
Heptabromobiphenyl	mg/kg		5	---	---	n.d.
Octabromobiphenyl	mg/kg		5	---	---	n.d.
Nonabromobiphenyl	mg/kg		5	---	---	n.d.
Decabromobiphenyl	mg/kg		5	---	---	n.d.

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Test Item(s)	Unit	Method	MDL	Result		
				No.1	No.2	No.3
Sum of PBDEs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	---	---	n.d.
Monobromodiphenyl ether	mg/kg		5	---	---	n.d.
Dibromodiphenyl ether	mg/kg		5	---	---	n.d.
Tribromodiphenyl ether	mg/kg		5	---	---	n.d.
Tetrabromodiphenyl ether	mg/kg		5	---	---	n.d.
Pentabromodiphenyl ether	mg/kg		5	---	---	n.d.
Hexabromodiphenyl ether	mg/kg		5	---	---	n.d.
Heptabromodiphenyl ether	mg/kg		5	---	---	n.d.
Octabromodiphenyl ether	mg/kg		5	---	---	n.d.
Nonabromodiphenyl ether	mg/kg		5	---	---	n.d.
Decabromodiphenyl ether	mg/kg		5	---	---	n.d.
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	---	---	n.d.
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		50	---	---	n.d.
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	---	---	n.d.
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	---	---	n.d.

Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected = below MDL
4. " - " = Not Regulated
5. "---" = Not Conducted
6. (#2) =
 - 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)
 - b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 $\mu\text{g}/\text{cm}^2$).
The coating is considered a non-Cr(VI) based coating
 - 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.

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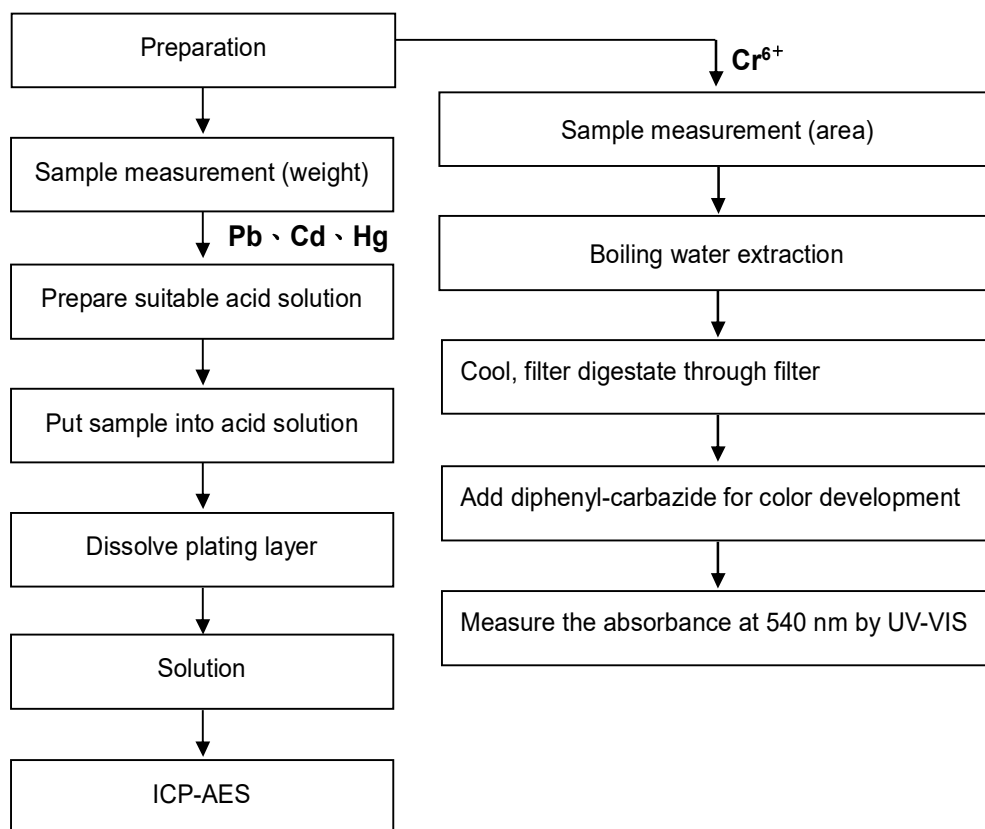
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No.1

The plating layer of samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician: Rita Chen
- Supervisor: Troy Chang

Flow Chart of Stripping method for metal analysis



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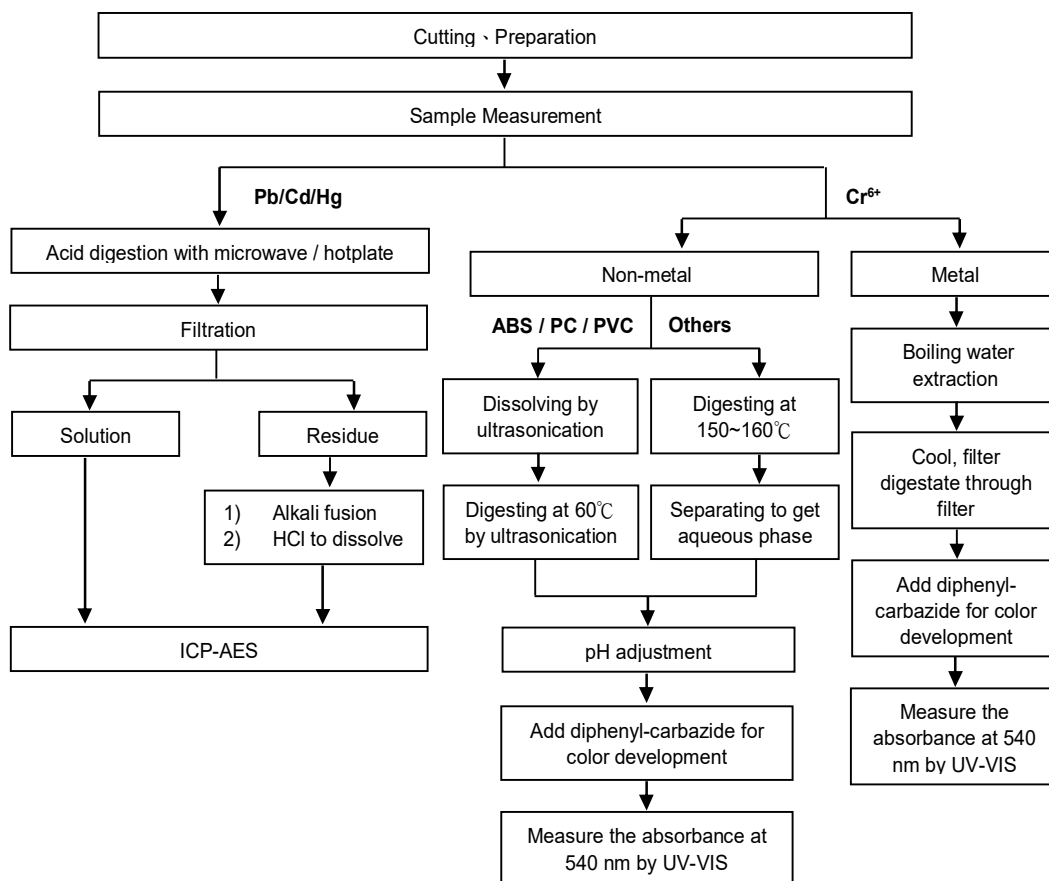
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No.2

Analytical flow chart of Heavy Metal

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

- Technician : Rita Chen
- Supervisor: Troy Chang



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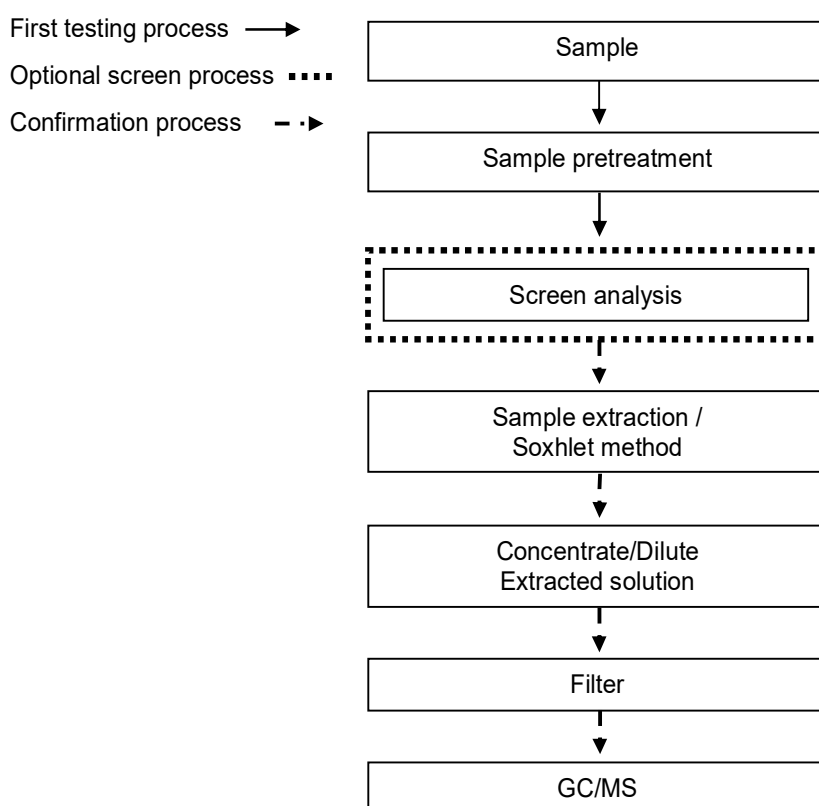
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Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang



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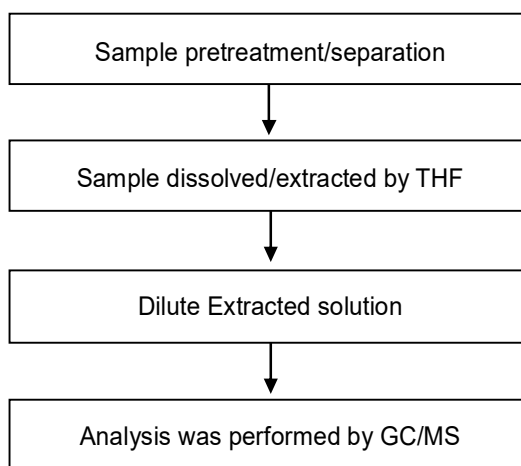
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Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



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* The tested sample / part is marked by an arrow if it's shown on the photo. *



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**** End of Report ****

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