

**TEST REPORT:** No. CRSSA/190615521-CA13933  
Job Ref. CRS/2019-06-11-013

**REPORTED DATE:** 19/06/2019

**MALAYSIAN SH ELECTRONICS SDN BHD**

LOT 5, 7 & 9, JLN RAGUM 15/17, 40200  
SHAH ALAM

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

**SAMPLE DESCRIPTION :** NiPdAu Finished LeadFrame on A194  
Name of Material List : Metal  
Material Lot Number : 700307081  
Date of Manufactured : 29-09-17  
Country of Origin : Germany

**SAMPLE RECEIVED :** 11/06/2019

**TESTING PERIOD :** 11/06/2019 to 19/06/2019

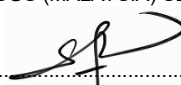
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**TEST REQUESTED :** Selected test(s) as requested by customer

**TEST METHOD :** -PLEASE REFER TO NEXT PAGE(S)-

**TEST RESULTS :** -PLEASE REFER TO NEXT PAGE(S)-

SIGNED FOR AND ON BEHALF OF  
SGS (MALAYSIA) SDN BHD

  
TAY SIAM PINE  
TECHNICAL MANAGER

IKM No. M/3452/6047/11/12



Test Report Form No.: SGS/TR/CRS/013, Ver: 2.0, Effective Date: 10/05/2019

**MSHE** MALAYSIAN SH ELECTRONICS SDN. BHD.  
(180965-A)

(Member of Chang Wah Technology Co., Ltd.)

Lot 5, 7 & 9, Jalan Ragum 15/17,  
40200 Shah Alam, Selangor Darul Ehsan, Malaysia.

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**TEST RESULTS:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Result	MDL	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.	N.D.	2	Max 100
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.	N.D.	2	Max 1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+A1:2017, determination of Mercury by ICP-OES.	N.D.	2	Max 1000
Hexavalent Chromium (CrVI)	µg/cm <sup>2</sup>	With reference to IEC 62321-7-1:2015, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.	N.D.	0.10	-
Sum of PBBs	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	Max 1000
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-

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**TEST RESULTS:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive 2011/65/EU Annex II

Test Item(s):	Unit	Test Method	Result	MDL	Limit
Sum of PBDEs	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	Max 1000
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	N.D.	5	-

Note : (a) mg/kg = ppm ; (0.1wt% = 1000ppm)

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) - = Not regulated

(e) a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 g/cm<sup>2</sup>. The sample coating is considered to contain CrVI.

b. The sample is negative for CrVI if CrVI is N.D. (concentration less than 0.10 g/cm<sup>2</sup>). The coating is considered a non-CrVI based coating.

c. The result between 0.10 g/cm<sup>2</sup> and 0.13 g/cm<sup>2</sup> is considered to be inconclusive - unavoidable coating variations may influence the determination.

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

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**TEST RESULTS:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive 2011/65/EU Annex II (amended by Directive (EU) 2015/863)

Test Item(s):	Unit	Test Method	Result	MDL	Limit
Dibutyl phthalate (DBP) (CAS No. 84-74-2)	mg/kg	With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.	N.D.	50	Max 1000
Benzyl butyl phthalate (BBP) (CAS No. 85-68-7)	mg/kg	With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.	N.D.	50	Max 1000
Di(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)	mg/kg	With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.	N.D.	50	Max 1000
Diisobutyl phthalate (DIBP) (CAS No. 84-69-5)	mg/kg	With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.	N.D.	50	Max 1000
Dibutyl phthalate (DBP) (CAS No. 84-74-2)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30	-
Di(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30	-
Benzyl butyl phthalate (BBP) (CAS No. 85-68-7)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30	-

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- Note :
- (a) mg/kg = ppm ; (0.1wt% = 1000ppm)
  - (b) N.D. = Not Detected
  - (c) MDL = Method Detection Limit
  - (d) - = Not regulated
  - (e) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the RoHS Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.
  - (f) 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.
  - (g) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.
  - (h) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

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**TEST RESULTS BY CHEMICAL METHOD:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

Test Item(s):	Unit	Test Method	Result	MDL
Beryllium (Be)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES.	N.D.	2
Antimony (Sb)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES.	N.D.	2
<b>Halogen</b>	-	-	-	-
Halogen-Fluorine (F)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Fluorine content.	N.D.	50
Halogen-Chlorine (Cl)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Chlorine content.	N.D.	50
Halogen-Bromine (Br)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Bromine content.	N.D.	50
Halogen-Iodine (I)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Iodine content.	N.D.	50

Note : (a) mg/kg = ppm  
(b) N.D. = Not Detected  
(c) MDL = Method Detection Limit  
(d) Negative = Undetectable / Positive = Detectable

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**TEST RESULTS BY CHEMICAL METHOD:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

Test Item(s):	Unit	Test Method	Result	MDL
<b>Phthalates</b>	-	-	-	-
Dibutyl phthalate (DBP) (CAS No. 84-74-2)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30
Di(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30
Di-n-octyl phthalate (DNOP) (CAS No. 117-84-0)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30
Di-isononyl phthalate (DINP) (CAS No. 28553-12-0)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	100
Di-isodecyl phthalate (DIDP) (CAS No. 26761-40-0)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	100
Benzyl butyl phthalate (BBP) (CAS No. 85-68-7)	mg/kg	With reference to EN14372:2004, determination of phthalates by GC-MS.	N.D.	30

- Note :
- (a) mg/kg = ppm ; (0.1wt% = 1000ppm)
  - (b) N.D. = Not Detected
  - (c) MDL = Method Detection Limit
  - (d) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the RoHS Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.
  - (e) 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.
  - (f) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.
  - (g) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

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**TEST RESULTS:**

**Test Part Description**

Sample Description: -PLEASE REFER TO PAGE 1-

Test Method: CEN/TS 15968:2010

Test Item(s):	Result (%)	Max. Limit ( $\mu\text{g}/\text{m}^2$ ) (Textile/Coated material)	Max.Limit(%) (Plastic)	Max. Limit(%) (Substances/ in mixtures)
Perfluorooctanesulfonic acid (PFOS)	N.D.	1	0.1	0.001
Perfluorooctanoic acid (PFOA) (CAS No. 335-67-1)	N.D.	/	/	/
<b>Conclusion</b>	Pass			

Note: (a) N.D. = Not Detected

(b) Detection limit =  $1 \mu\text{g}/\text{m}^2$  for Textile / Coated Material  
= 0.001% for Plastic, substances or mixtures

(c) Max. limit specified by commission regulation (EU) No. 757/2010 amending Regulation (EC) No. 850/2004 (previously restricted under entry 53 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006).

(d) PFOS refers to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

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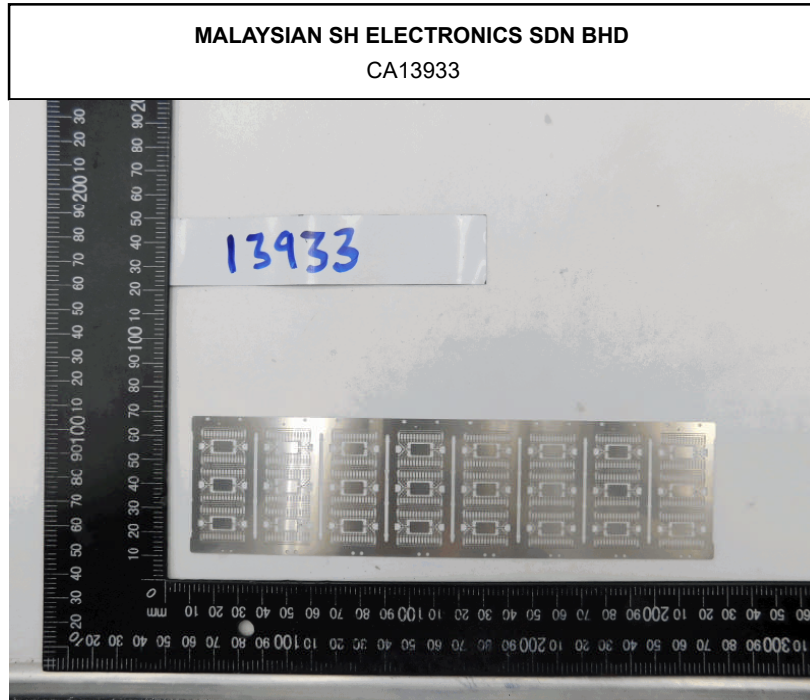


**TEST REPORT:** No. CRSSA/190615521-CA13933  
Job Ref. CRS/2019-06-11-013

**REPORTED DATE:** 19/06/2019

**Test Part Description :**

Sample Description: -PLEASE REFER TO PAGE 1-



SGS authenticate the photo on original report only

SIGNED FOR AND ON BEHALF OF  
SGS (MALAYSIA) SDN BHD

TAY SIAM PINE  
TECHNICAL MANAGER

IKM No. M/3452/6047/11/12



Test Report Form No.: SGS/TR/CRS/013, Ver: 2.0, Effective Date: 10/05/2019

**MSHE** MALAYSIAN SH ELECTRONICS SDN. BHD.  
(180965-A)

(Member of Chang Wah Technology Co., Ltd.)

Lot 5, 7 & 9, Jalan Ragum 15/17,  
40200 Shah Alam, Selangor Darul Ehsan, Malaysia.

Tel : 03-55198140 Fax : 03-55198110

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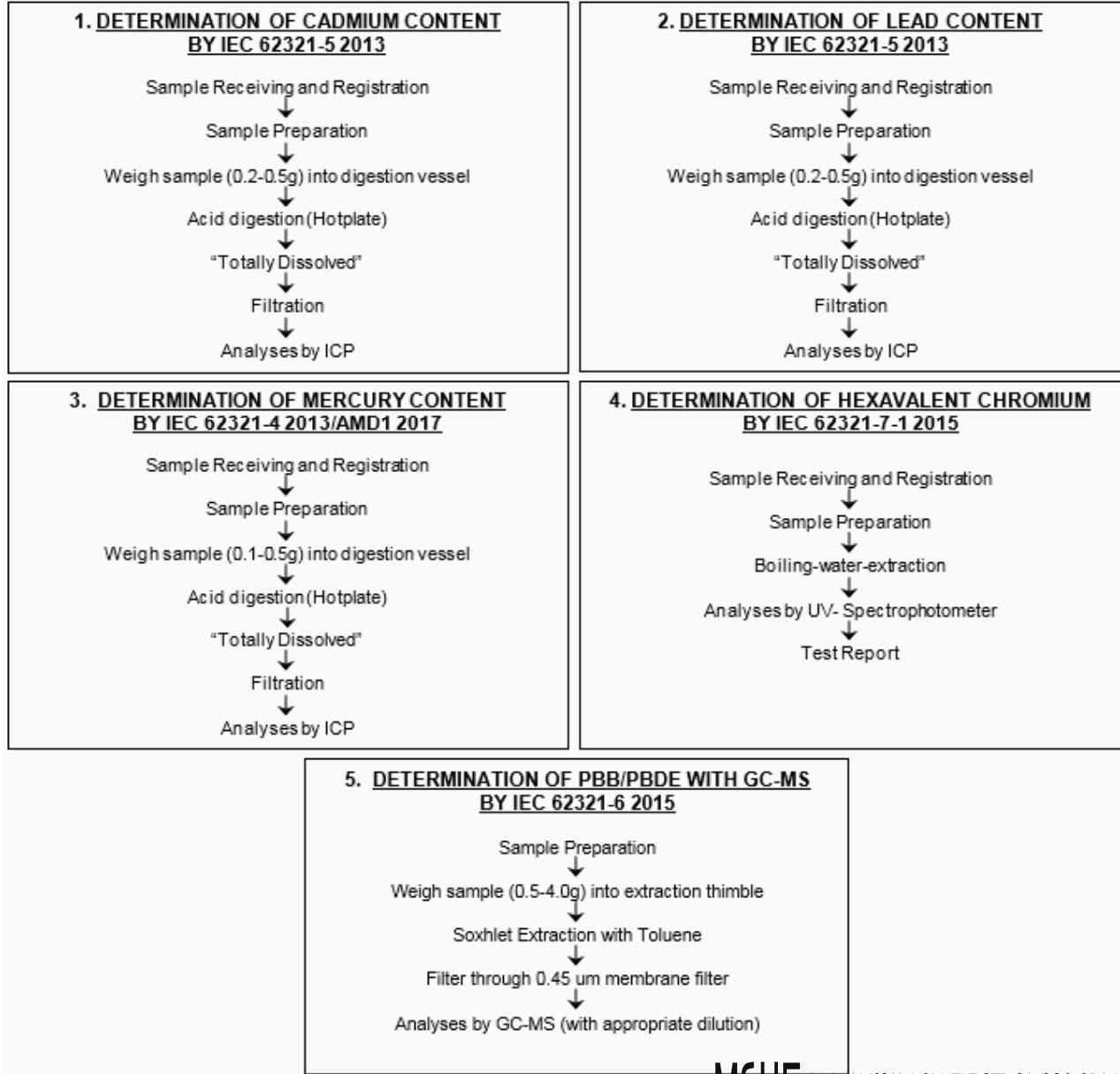
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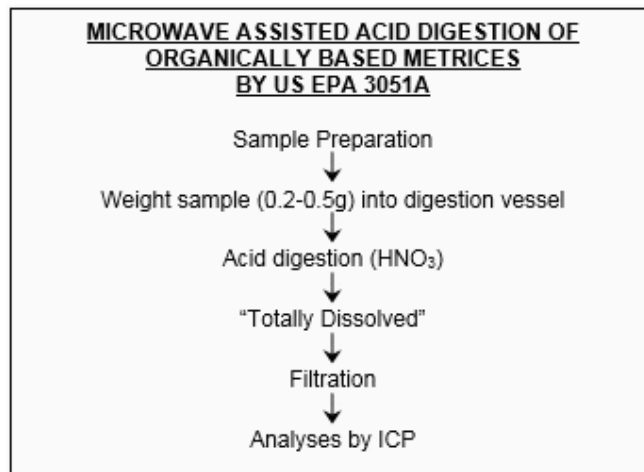
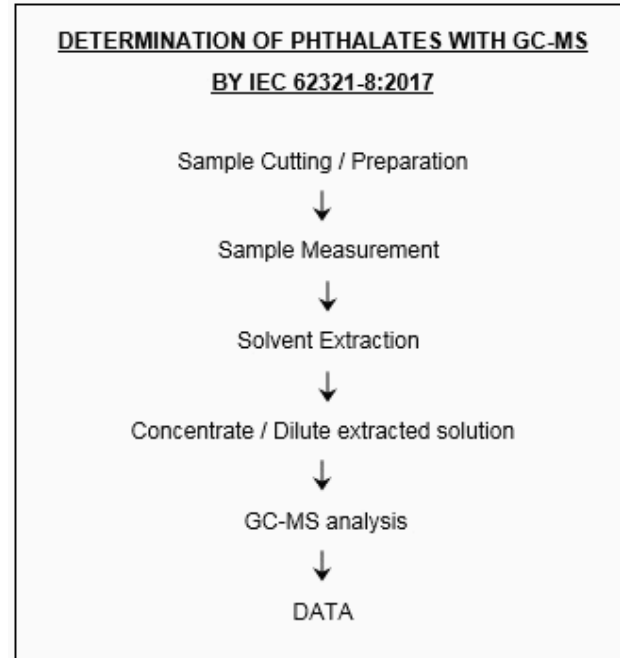
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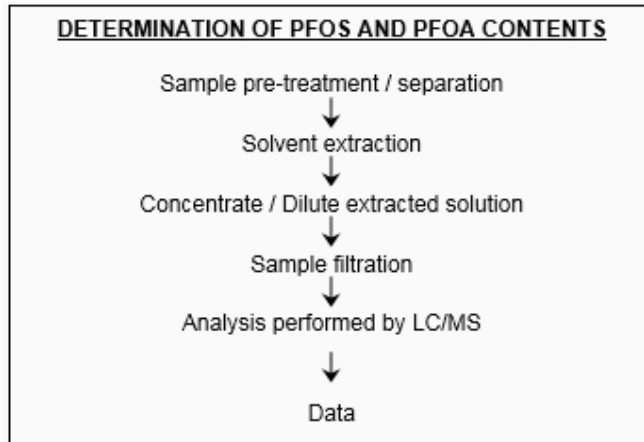
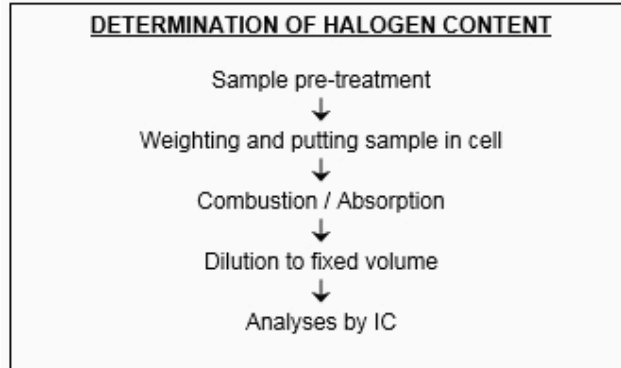
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\*\*\* End of test report \*\*\*

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