

Test Report

No. CANEC1905137007

Date: 08 Apr 2019

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SHENGYI TECHNOLOGY CO., LTD.

5 WESTERN INDUSTRY ROAD, SONGSHAN LAKE, DONGGUAN CITY, GUANGDONG, P.R.
CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : The Halogen Free Copper Clad Laminate

SGS Job No. : CP19-014676 - GZ

Model No. : S7045G

Date of Sample Received : 01 Apr 2019

Testing Period : 01 Apr 2019 - 08 Apr 2019

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

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

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

Conclusion : Based on the performed tests on submitted sample(s), the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP) , Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) , and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Dongyu Xie

Dongyu Xie
Approved Signatory



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Guangzhou Branch Testing Center Chemical Laboratory.

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Test Results :

Test Part Description :

| Specimen No. | SGS Sample ID | Description |
|--------------|------------------|-------------|
| SN1 | CAN19-051370.007 | Beige board |

Remarks :

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

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

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) | Limit | Unit | MDL | 007 |
|----------------------------|-------|-------|-----|-----|
| Cadmium (Cd) | 100 | mg/kg | 2 | ND |
| Lead (Pb) | 1,000 | mg/kg | 2 | 7 |
| Mercury (Hg) | 1,000 | mg/kg | 2 | ND |
| Hexavalent Chromium (CrVI) | 1,000 | mg/kg | 8 | ND |
| Sum of PBBs | 1,000 | mg/kg | - | ND |
| Monobromobiphenyl | - | mg/kg | 5 | ND |
| Dibromobiphenyl | - | mg/kg | 5 | ND |
| Tribromobiphenyl | - | mg/kg | 5 | ND |
| Tetrabromobiphenyl | - | mg/kg | 5 | ND |
| Pentabromobiphenyl | - | mg/kg | 5 | ND |
| Hexabromobiphenyl | - | mg/kg | 5 | ND |
| Heptabromobiphenyl | - | mg/kg | 5 | ND |
| Octabromobiphenyl | - | mg/kg | 5 | ND |
| Nonabromobiphenyl | - | mg/kg | 5 | ND |
| Decabromobiphenyl | - | mg/kg | 5 | ND |
| Sum of PBDEs | 1,000 | mg/kg | - | ND |
| Monobromodiphenyl ether | - | mg/kg | 5 | ND |
| Dibromodiphenyl ether | - | mg/kg | 5 | ND |
| Tribromodiphenyl ether | - | mg/kg | 5 | ND |
| Tetrabromodiphenyl ether | - | mg/kg | 5 | ND |
| Pentabromodiphenyl ether | - | mg/kg | 5 | ND |



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| <u>Test Item(s)</u> | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>007</u> |
|-------------------------------------|--------------|-------------|------------|------------|
| Hexabromodiphenyl ether | - | mg/kg | 5 | ND |
| Heptabromodiphenyl ether | - | mg/kg | 5 | ND |
| Octabromodiphenyl ether | - | mg/kg | 5 | ND |
| Nonabromodiphenyl ether | - | mg/kg | 5 | ND |
| Decabromodiphenyl ether | - | mg/kg | 5 | ND |
| Dibutyl phthalate (DBP) | 1,000 | mg/kg | 50 | ND |
| Butyl benzyl phthalate (BBP) | 1,000 | mg/kg | 50 | ND |
| Bis (2-ethylhexyl) phthalate (DEHP) | 1,000 | mg/kg | 50 | ND |
| Diisobutyl Phthalates (DIBP) | 1,000 | mg/kg | 50 | ND |

Notes :

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.IEC 62321 series is equivalent to EN 62321 series
http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

Halogen

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

| <u>Test Item(s)</u> | <u>Unit</u> | <u>MDL</u> | <u>007</u> |
|---------------------|-------------|------------|------------|
| Fluorine (F) | mg/kg | 50 | 1032 |
| Chlorine (Cl) | mg/kg | 50 | 280 |
| Bromine (Br) | mg/kg | 50 | ND |
| Iodine (I) | mg/kg | 50 | ND |

Element(s)

Test Method : SGS In-house method (GZTC CHEM-TOP-004-01, with reference to US EPA Method 3052:1996), analysis was performed by ICP-OES.

| <u>Test Item(s)</u> | <u>Unit</u> | <u>MDL</u> | <u>007</u> |
|---------------------|-------------|------------|------------|
| Beryllium (Be) | mg/kg | 5 | ND |
| Antimony (Sb) | mg/kg | 10 | ND |

Hexabromocyclododecane (HBCDD)



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Test Method : With reference to IEC 62321:2008, analysis was performed by GC-MS.

| Test Item(s) | Unit | MDL | 007 |
|--------------------------------|-------|-----|-----|
| Hexabromocyclododecane (HBCDD) | mg/kg | 10 | ND |

Phthalate

Test Method : With reference to EN14372: 2004. Analysis was performed by GC-MS.

| Test Item(s) | CAS NO. | Unit | MDL | 007 |
|--|----------------------------|--------|-------|-----|
| Dibutyl Phthalate (DBP) | 84-74-2 | %(w/w) | 0.003 | ND |
| Benzylbutyl Phthalate (BBP) | 85-68-7 | %(w/w) | 0.003 | ND |
| Bis(2-ethylhexyl) Phthalate (DEHP) | 117-81-7 | %(w/w) | 0.003 | ND |
| Diisononyl Phthalate (DINP) | 28553-12-0 / 68515-48-0 | %(w/w) | 0.010 | ND |
| Di-n-octyl Phthalate (DNOP) | 117-84-0 | %(w/w) | 0.003 | ND |
| Diisodecyl Phthalate (DIDP) | 26761-40-0 / 68515-49-1 | %(w/w) | 0.010 | ND |
| Di-n-hexyl Phthalate (DnHP) | 84-75-3 | %(w/w) | 0.003 | ND |
| Diisobutyl Phthalate (DIBP) | 84-69-5 | %(w/w) | 0.003 | ND |
| 1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNP) | 68515-42-4 | %(w/w) | 0.010 | ND |
| Bis(2-methoxyethyl) Phthalate (DMEP) | 117-82-8 | %(w/w) | 0.003 | ND |
| 1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP) | 71888-89-6 | %(w/w) | 0.010 | ND |
| Diisopentyl Phthalate (DIPP) | 605-50-5 | %(w/w) | 0.003 | ND |
| n-pentyl Isopentyl Phthalate (nPIPP) | 776297-69-9 | %(w/w) | 0.003 | ND |
| 1,2-Benzenedicarboxylic acid, dipentyl ester, branched and linear (DPP) | 84777-06-0 | %(w/w) | 0.010 | ND |
| Di-n-pentyl Phthalate (DnPP) | 131-18-0 | %(w/w) | 0.003 | ND |
| 1,2-Benzenedicarboxylic acid, dihexyl ester branched and linear(DHP) | 68515-50-4 | %(w/w) | 0.010 | ND |

Notes :

- (1) DBP,BBP,DEHP, DIBP Reference information: Entry 51 of Regulation (EU) No2018/2005 amending Annex XVII of REACH Regulation (EC) No 1907/2006:
- i) Shall not be used as substances or in mixtures, individually or in any combination of DBP, BBP, DEHP & DIBP, in concentrations equal to or greater than 0.1 % by weight of the plasticised material, in toys and childcare articles.
- ii) Shall not be placed on the market in toys or childcare articles, individually or in any combination of



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DBP, BBP, DEHP, in concentrations equal to or greater than 0.1 % by weight of the plasticised material. In addition, DIBP shall not be placed on the market after 7 July 2020 in toys or childcare articles, individually or in any combination of DBP, BBP, DEHP & DIBP, in concentrations equal to or greater than 0.1 % by weight of the plasticised material.

iii) shall not be placed on the market after 7 July 2020 in articles, individually or in any combination of DBP, BBP, DEHP & DIBP, in concentrations equal to or greater than 0.1 % by weight of the plasticised material in the articles.

Please refer to Regulation (EU) No 2018/2005 to get more detail information.

(2) DINP, DNOP, DIDP Reference information: Entry 52 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC).

i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1 % by weight of the plasticised material, in toys and childcare articles which can be placed in the mouth by children.

ii) Such toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information.

PFOA & PFOS (Perfluorooctanoic acid & Perfluorooctane sulfonates)

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

| <u>Test Item(s)</u> | <u>CAS NO.</u> | <u>Unit</u> | <u>MDL</u> | <u>007</u> |
|------------------------------------|----------------|-------------|------------|------------|
| Perfluorooctanoic acid (PFOA) | 335-67-1 | mg/kg | 0.025 | ND |
| Perfluorooctane Sulfonates (PFOS)^ | | mg/kg | 10 | ND |

Notes :

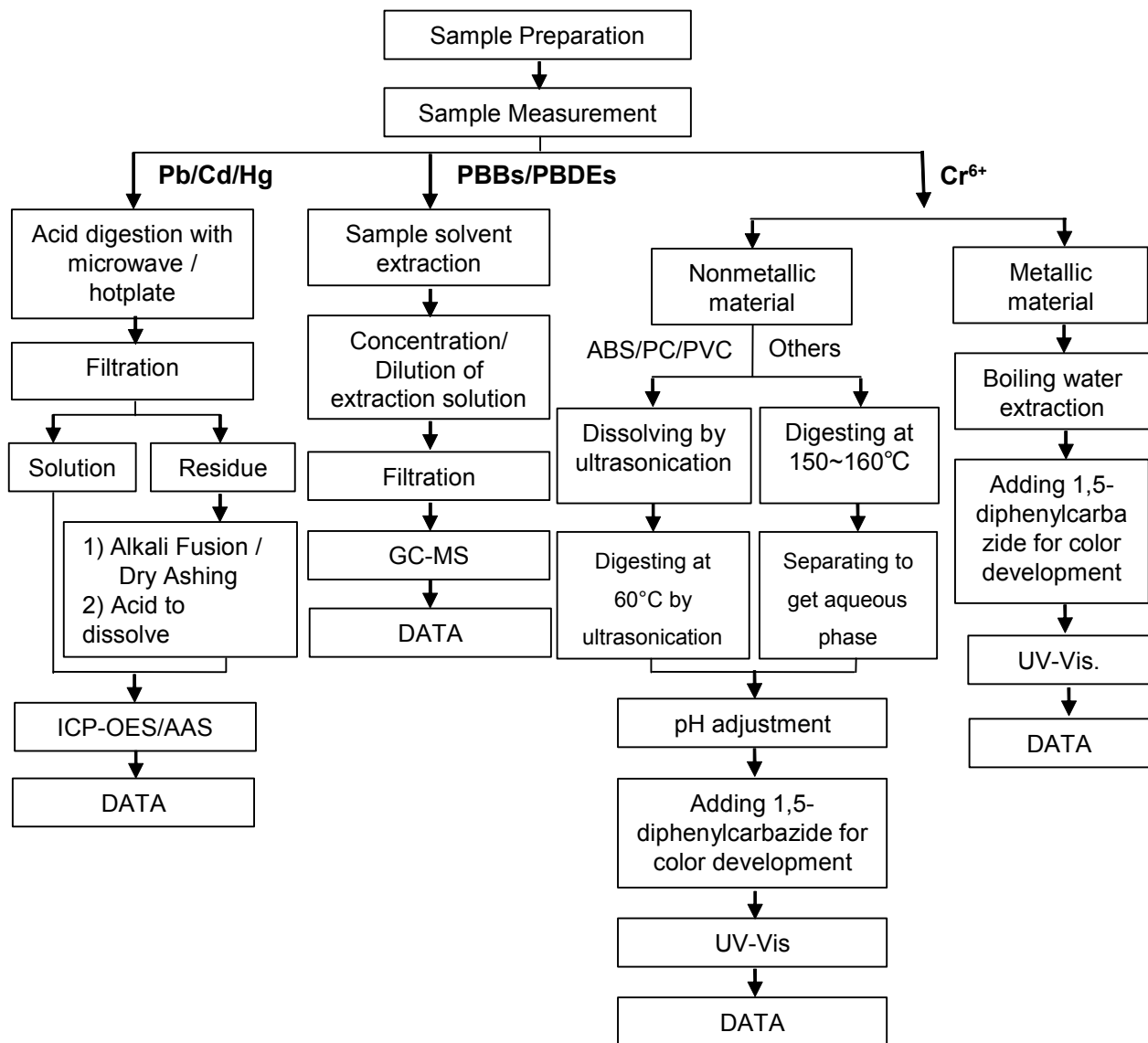
(1) ^ PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.



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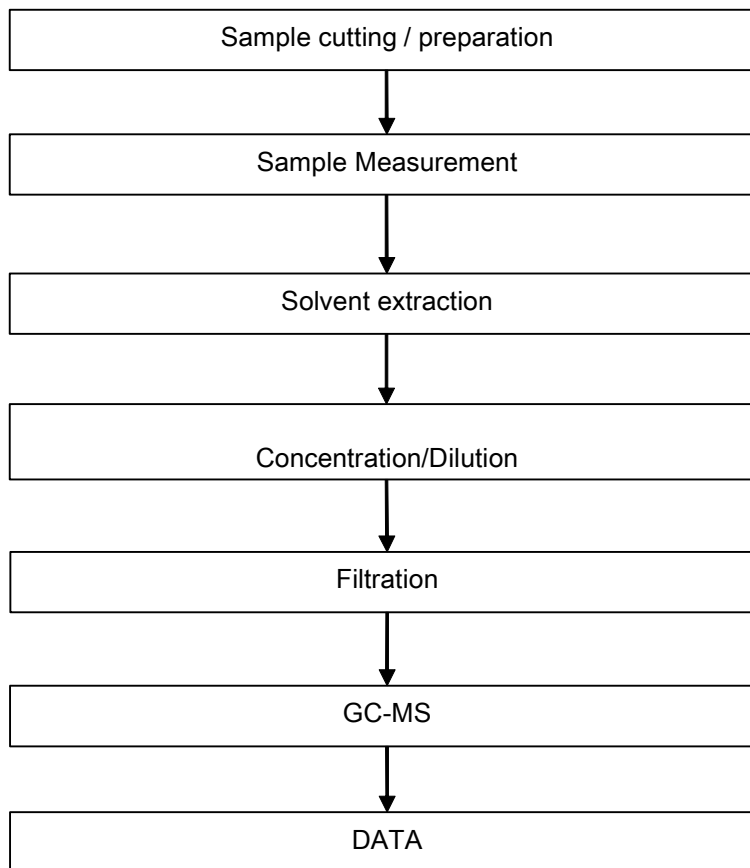
Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs Testing Flow Chart

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



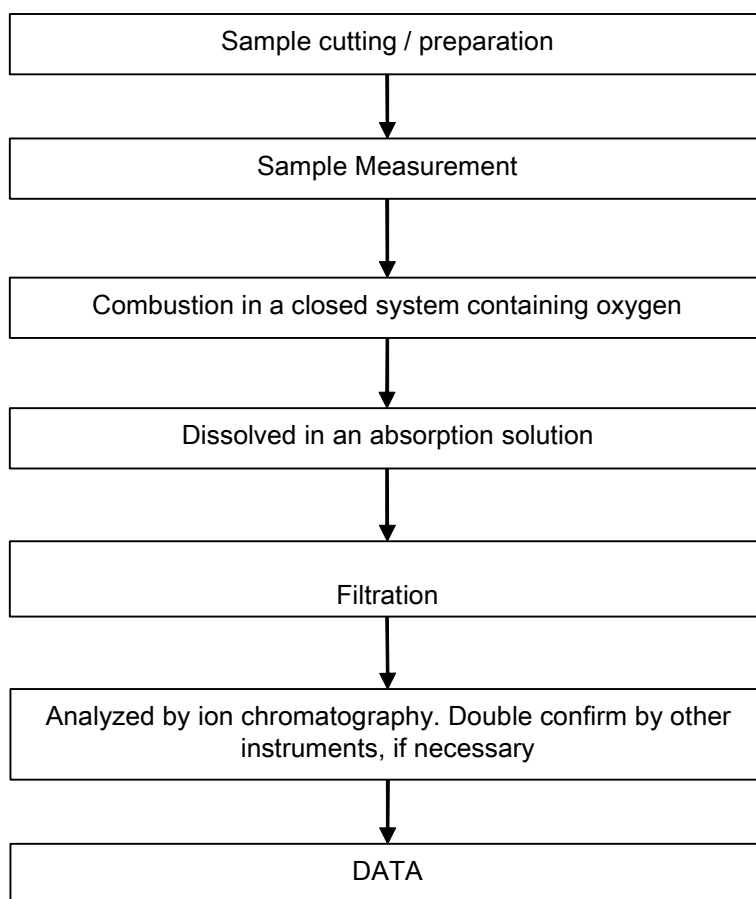
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Phthalates Testing Flow Chart



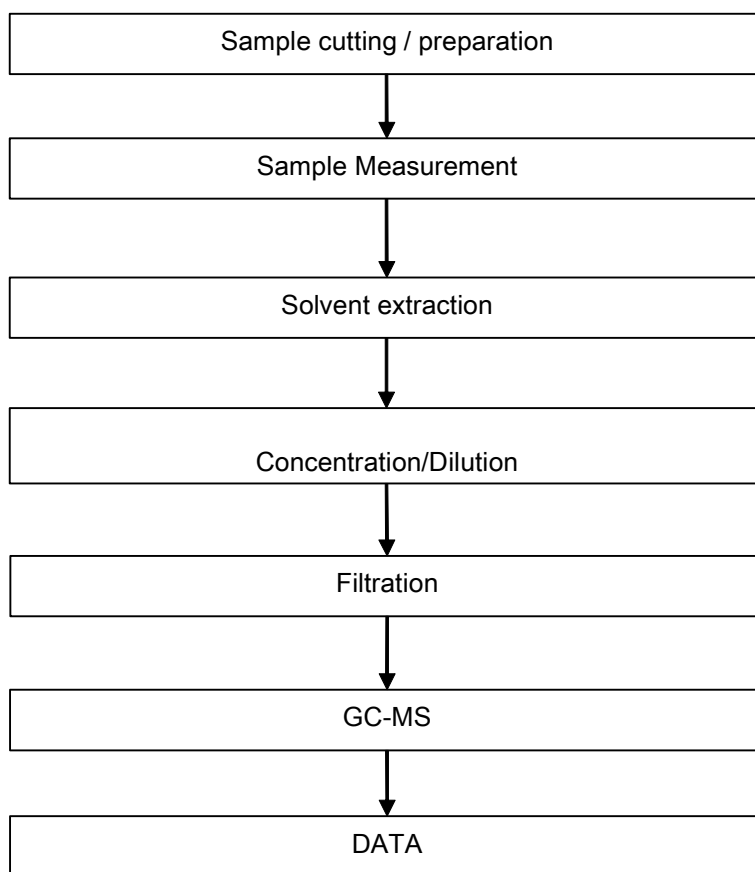
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Halogen Testing Flow Chart



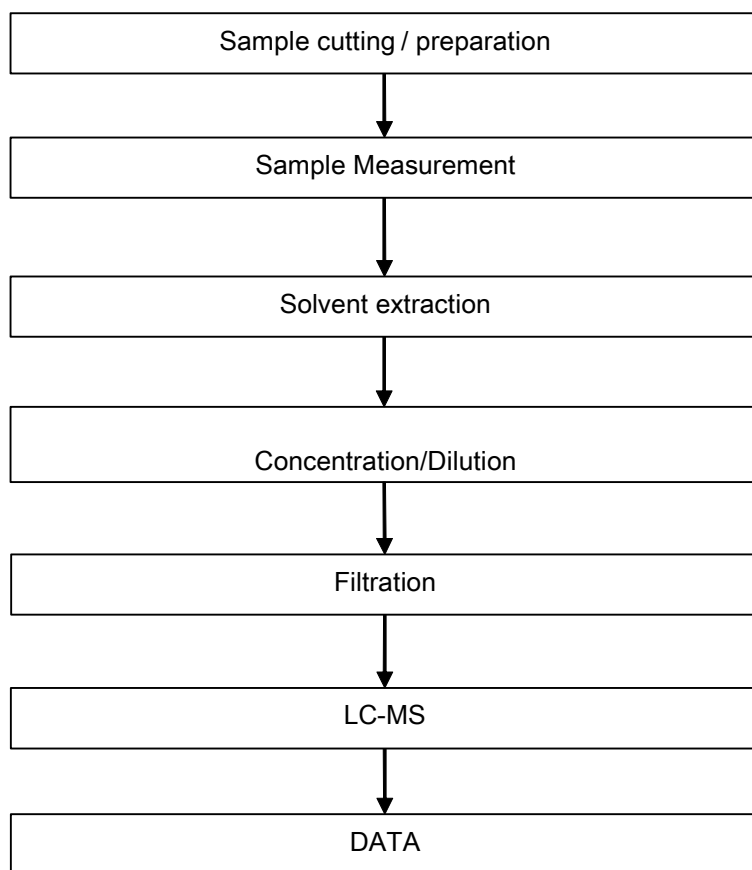
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HBCDD Testing Flow Chart



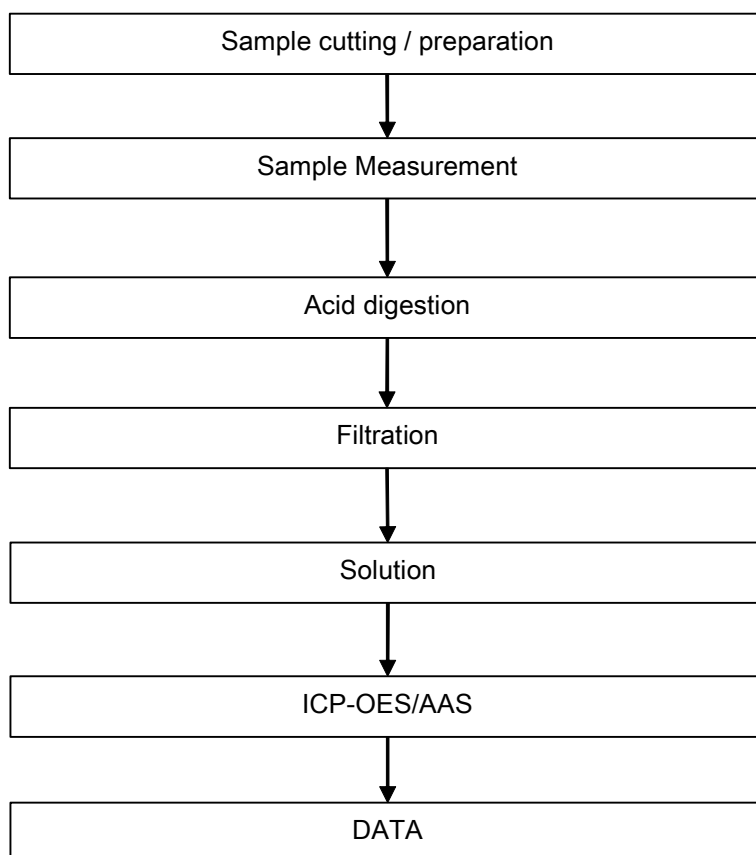
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PFOA / PFOS Testing Flow Chart



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Elementary Testing Flow Chart



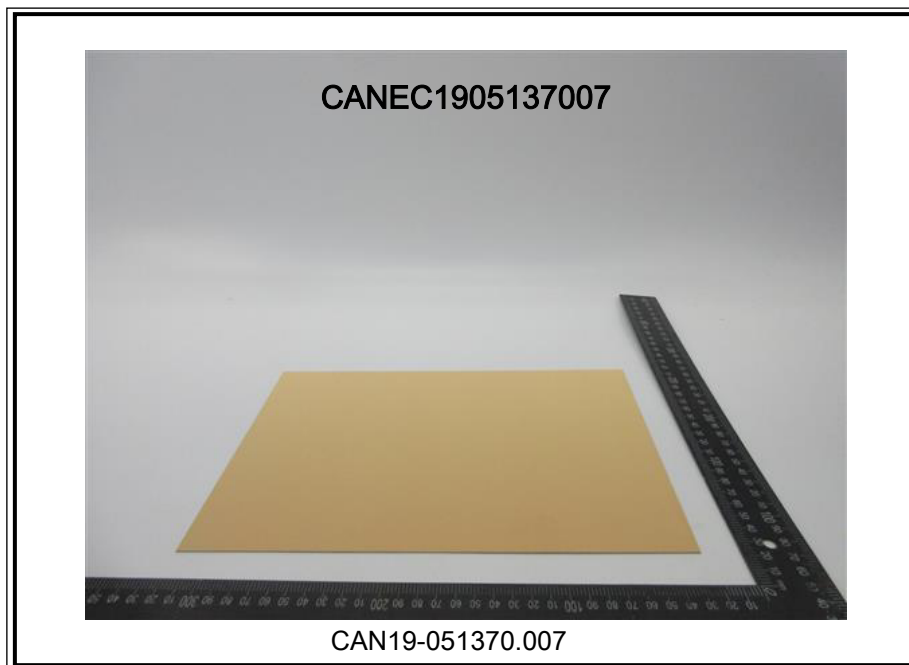
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Sample photo:



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