

# Test Report

No. SHAHG1928634601

Date: 08 Jan 2020

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CHANGZHOU HUAWEI ELECTRONIC CO., LTD  
 ZOUQU TOWN, CHANGZHOU CITY, JIANGSU PROVINCE, CHINA

The following sample(s) was/were submitted and identified on behalf of the clients as : ALUMINIUM ELECTROLYTIC CAPACITOR ( CONDUCTIVE POLYMER )

SGS Job No. : CZHL1912005409OT - SH  
 Date of Sample Received : 24 Dec 2019  
 Testing Period : 24 Dec 2019 - 06 Jan 2020  
 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).

Result Summary :

| Test Requested   | Conclusion  |
|--|-------------|
| RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU | PASS        |
| RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU | PASS        |
| Halogen  | See Results |
| Antimony (Sb)  | See Results |
| Antimony (Sb)  | See Results |
| Phthalates Content   | See Results |

Signed for and on behalf of  
 SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

*Halery Han*

Halery Han  
 Approved Signatory



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Test Results :

Test Part Description :

| Specimen No. | SGS Sample ID    | Description             |
|--------------|------------------|-------------------------|
| SN1          | SHA19-286346.001 | Silvery metal sheet     |
| SN2          | SHA19-286346.002 | Silvery metal sheet     |
| SN3          | SHA19-286346.003 | Black liquid            |
| SN4          | SHA19-286346.004 | Silvery metal lead wire |
| SN5          | SHA19-286346.005 | Black soft plastic part |
| SN6          | SHA19-286346.006 | Red paint               |
| SN7          | SHA19-286346.007 | Silvery metal shell     |

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+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

| <u>Test Item(s)</u>          | <u>Limit</u> | <u>Unit</u> | <u>MDL</u> | <u>003</u> | <u>005</u> | <u>006</u> |
|------------------------------|--------------|-------------|------------|------------|------------|------------|
| Cadmium (Cd)                 | 100          | mg/kg       | 2          | ND         | ND         | ND         |
| Lead (Pb)                    | 1000         | mg/kg       | 2          | ND         | 8          | ND         |
| Mercury (Hg)                 | 1000         | mg/kg       | 2          | ND         | ND         | ND         |
| Hexavalent Chromium (Cr(VI)) | 1000         | mg/kg       | 8          | ND         | ND         | ND         |
| Sum of PBBs                  | 1000         | mg/kg       | -          | ND         | ND         | ND         |
| Monobromobiphenyl            | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Dibromobiphenyl              | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Tribromobiphenyl             | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Tetrabromobiphenyl           | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Pentabromobiphenyl           | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Hexabromobiphenyl            | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Heptabromobiphenyl           | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Octabromobiphenyl            | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Nonabromobiphenyl            | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Decabromobiphenyl            | -            | mg/kg       | 5          | ND         | ND         | ND         |
| Sum of PBDEs                 | 1000         | mg/kg       | -          | ND         | ND         | ND         |



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| Test Item(s)                      | Limit | Unit  | MDL | 003 | 005 | 006 |
|-----------------------------------|-------|-------|-----|-----|-----|-----|
| Monobromodiphenyl ether           | -     | mg/kg | 5   | ND  | ND  | ND  |
| Dibromodiphenyl ether             | -     | mg/kg | 5   | ND  | ND  | ND  |
| Tribromodiphenyl ether            | -     | mg/kg | 5   | ND  | ND  | ND  |
| Tetrabromodiphenyl ether          | -     | mg/kg | 5   | ND  | ND  | ND  |
| Pentabromodiphenyl ether          | -     | mg/kg | 5   | ND  | ND  | ND  |
| Hexabromodiphenyl ether           | -     | mg/kg | 5   | ND  | ND  | ND  |
| Heptabromodiphenyl ether          | -     | mg/kg | 5   | ND  | ND  | ND  |
| Octabromodiphenyl ether           | -     | mg/kg | 5   | ND  | ND  | ND  |
| Nonabromodiphenyl ether           | -     | mg/kg | 5   | ND  | ND  | ND  |
| Decabromodiphenyl ether           | -     | mg/kg | 5   | ND  | ND  | ND  |
| Di-butyl Phthalate (DBP)          | 1000  | mg/kg | 50  | ND  | ND  | ND  |
| Benzyl Butyl Phthalate (BBP)      | 1000  | mg/kg | 50  | ND  | ND  | ND  |
| Di-2-Ethyl Hexyl Phthalate (DEHP) | 1000  | mg/kg | 50  | ND  | ND  | ND  |
| Diisobutyl Phthalates (DIBP)      | 1000  | mg/kg | 50  | ND  | ND  | ND  |

Notes :

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2) 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.
- (3) The restriction of DEHP, BBP, DBP and DIBP shall not apply to toys which are already subject to the restriction of DEHP, BBP, DBP and DIBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

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

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013 and IEC62321-7-1:2015, analyzed by ICP-OES, AAS and UV-Vis .

| Test Item(s)                  | Limit | Unit               | MDL  | 001 | 002 | 004 |
|-------------------------------|-------|--------------------|------|-----|-----|-----|
| Cadmium (Cd)                  | 100   | mg/kg              | 2    | ND  | ND  | ND  |
| Lead (Pb)                     | 1000  | mg/kg              | 2    | ND  | 7   | ND  |
| Mercury (Hg)                  | 1000  | mg/kg              | 2    | ND  | ND  | ND  |
| Hexavalent Chromium (Cr(VI))▼ | -     | µg/cm <sup>2</sup> | 0.10 | ND  | ND  | ND  |



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| <u>Test Item(s)</u>           | <u>Limit</u> | <u>Unit</u>        | <u>MDL</u> | <u>007</u> |
|-------------------------------|--------------|--------------------|------------|------------|
| Cadmium (Cd)                  | 100          | mg/kg              | 2          | ND         |
| Lead (Pb)                     | 1000         | mg/kg              | 2          | ND         |
| Mercury (Hg)                  | 1000         | mg/kg              | 2          | ND         |
| Hexavalent Chromium (Cr(VI))▼ | -            | µg/cm <sup>2</sup> | 0.10       | ND         |

**Notes :**

- (1)The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863. IEC 62321 series is equivalent to EN 62321 series  
[https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP\\_ORG\\_ID,FSP\\_LANG\\_ID:1258637,25](https://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25)
- (2)▼ = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain CrVI  
 b. The sample is negative for CrVI if CrVI is ND (concentration less than 0.10 µg/cm<sup>2</sup>). The coating is considered a non-CrVI based coating  
 c. The result between 0.10 µg/cm<sup>2</sup> and 0.13 µg/cm<sup>2</sup> 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: 2007, analysis was performed by Ion Chromatograph (IC).

| <u>Test Item(s)</u> | <u>Unit</u> | <u>MDL</u> | <u>003</u> | <u>005</u> | <u>006</u> |
|---------------------|-------------|------------|------------|------------|------------|
| Fluorine (F)        | mg/kg       | 50         | ND         | 173        | ND         |
| Chlorine (Cl)       | mg/kg       | 50         | ND         | 85         | 82         |
| Bromine (Br)        | mg/kg       | 50         | ND         | ND         | ND         |
| Iodine (I)          | mg/kg       | 50         | ND         | ND         | ND         |

**Antimony (Sb)**

Test Method : With reference to US EPA 3052:1996, analysis was performed by ICP-OES.

| <u>Test Item(s)</u> | <u>Unit</u> | <u>MDL</u> | <u>003</u> | <u>005</u> | <u>006</u> |
|---------------------|-------------|------------|------------|------------|------------|
| Antimony (Sb)       | mg/kg       | 10         | ND         | ND         | ND         |



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**Antimony (Sb)**

Test Method : With reference to US EPA Method 3050B:1996, analysis was performed by ICP-OES.

| Test Item(s)  | Unit  | MDL | 001 | 002 | 004 |
|---------------|-------|-----|-----|-----|-----|
| Antimony (Sb) | mg/kg | 10  | ND  | ND  | ND  |

| Test Item(s)  | Unit  | MDL | 007 |
|---------------|-------|-----|-----|
| Antimony (Sb) | mg/kg | 10  | ND  |

**Phthalates Content**

Test Method : With reference to EN 14372:2004, analysis was performed by GC-MS.

| Test Item(s)  | CAS NO.                   | Unit | MDL   | 003 |
|---|---------------------------|------|-------|-----|
| Dibutyl Phthalate (DBP)   | 84-74-2                   | %    | 0.003 | ND  |
| Benzylbutyl Phthalate (BBP)   | 85-68-7                   | %    | 0.003 | ND  |
| Bis-(2-ethylhexyl) Phthalate (DEHP)   | 117-81-7                  | %    | 0.003 | ND  |
| Diisononyl Phthalate (DINP)   | 28553-12-0<br>/68515-48-0 | %    | 0.01  | ND  |
| Di-n-octyl Phthalate (DNOP)   | 117-84-0                  | %    | 0.003 | ND  |
| Diisodecyl Phthalate (DIDP)   | 26761-40-0<br>/68515-49-1 | %    | 0.01  | ND  |
| 1,2-Benzenedicarboxylic, dihexylester, branched and linear (DHP)                | 68515-50-4                | %    | 0.01  | ND  |
| Di-n-hexyl Phthalate (DnHP)   | 84-75-3                   | %    | 0.003 | ND  |
| Diisobutyl Phthalate (DIBP)   | 84-69-5                   | %    | 0.003 | ND  |
| Bis(2-methoxyethyl) Phthalate (DMEP)  | 117-82-8                  | %    | 0.003 | ND  |
| Diisopentylphthalate (DIPP)   | 605-50-5                  | %    | 0.003 | ND  |
| Di-n-pentyl Phthalates (DnPP)   | 131-18-0                  | %    | 0.003 | ND  |
| N-Pentyl-isopentylphthalate (nPiPP)   | 776297-69-9               | %    | 0.003 | ND  |
| 1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP) | 68515-42-4                | %    | 0.01  | ND  |
| Diisoheptyl phthalate (DIHP)  | 71888-89-6                | %    | 0.01  | ND  |
| 1,2-Benzenedicarboxylic acid, dipentyl ester, branched and linear               | 84777-06-0                | %    | 0.01  | ND  |



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| Test Item(s)  | CAS NO.                   | Unit | MDL   | 005 |
|---|---------------------------|------|-------|-----|
| Dibutyl Phthalate (DBP)   | 84-74-2                   | %    | 0.003 | ND  |
| Benzylbutyl Phthalate (BBP)   | 85-68-7                   | %    | 0.003 | ND  |
| Bis-(2-ethylhexyl) Phthalate (DEHP)   | 117-81-7                  | %    | 0.003 | ND  |
| Diisononyl Phthalate (DINP)   | 28553-12-0<br>/68515-48-0 | %    | 0.01  | ND  |
| Di-n-octyl Phthalate (DNOP)   | 117-84-0                  | %    | 0.003 | ND  |
| Diisodecyl Phthalate (DIDP)   | 26761-40-0<br>/68515-49-1 | %    | 0.01  | ND  |
| 1,2-Benzenedicarboxylic, dihexylester, branched and linear (DHP)                | 68515-50-4                | %    | 0.01  | ND  |
| Di-n-hexyl Phthalate (DnHP)   | 84-75-3                   | %    | 0.003 | ND  |
| Diisobutyl Phthalate (DIBP)   | 84-69-5                   | %    | 0.003 | ND  |
| Bis(2-methoxyethyl) Phthalate (DMEP)  | 117-82-8                  | %    | 0.003 | ND  |
| Diisopentylphthalate (DIPP)   | 605-50-5                  | %    | 0.003 | ND  |
| Di-n-pentyl Phthalates (DnPP)   | 131-18-0                  | %    | 0.003 | ND  |
| N-Pentyl-isopentylphthalate (nPiPP)   | 776297-69-9               | %    | 0.003 | ND  |
| 1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP) | 68515-42-4                | %    | 0.01  | ND  |
| Diisoheptyl phthalate (DIHP)  | 71888-89-6                | %    | 0.01  | ND  |
| 1,2-Benzenedicarboxylic acid, dipentyl ester, branched and linear               | 84777-06-0                | %    | 0.01  | ND  |

| Test Item(s)  | CAS NO.                   | Unit | MDL   | 006 |
|---|---------------------------|------|-------|-----|
| Dibutyl Phthalate (DBP)   | 84-74-2                   | %    | 0.003 | ND  |
| Benzylbutyl Phthalate (BBP)   | 85-68-7                   | %    | 0.003 | ND  |
| Bis-(2-ethylhexyl) Phthalate (DEHP)   | 117-81-7                  | %    | 0.003 | ND  |
| Diisononyl Phthalate (DINP)   | 28553-12-0<br>/68515-48-0 | %    | 0.01  | ND  |
| Di-n-octyl Phthalate (DNOP)   | 117-84-0                  | %    | 0.003 | ND  |
| Diisodecyl Phthalate (DIDP)   | 26761-40-0<br>/68515-49-1 | %    | 0.01  | ND  |
| 1,2-Benzenedicarboxylic, dihexylester, branched and linear (DHP)                | 68515-50-4                | %    | 0.01  | ND  |
| Di-n-hexyl Phthalate (DnHP)   | 84-75-3                   | %    | 0.003 | ND  |
| Diisobutyl Phthalate (DIBP)   | 84-69-5                   | %    | 0.003 | ND  |
| Bis(2-methoxyethyl) Phthalate (DMEP)  | 117-82-8                  | %    | 0.003 | ND  |
| Diisopentylphthalate (DIPP)   | 605-50-5                  | %    | 0.003 | ND  |
| Di-n-pentyl Phthalates (DnPP)   | 131-18-0                  | %    | 0.003 | ND  |
| N-Pentyl-isopentylphthalate (nPiPP)   | 776297-69-9               | %    | 0.003 | ND  |
| 1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP) | 68515-42-4                | %    | 0.01  | ND  |



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| <u>Test Item(s)</u>   | <u>CAS NO.</u> | <u>Unit</u> | <u>MDL</u> | <u>006</u> |
|---|----------------|-------------|------------|------------|
| Diisoheptyl phthalate (DIHP)                                      | 71888-89-6     | %           | 0.01       | ND         |
| 1,2-Benzenedicarboxylic acid, dipentyl ester, branched and linear | 84777-06-0     | %           | 0.01       | ND         |



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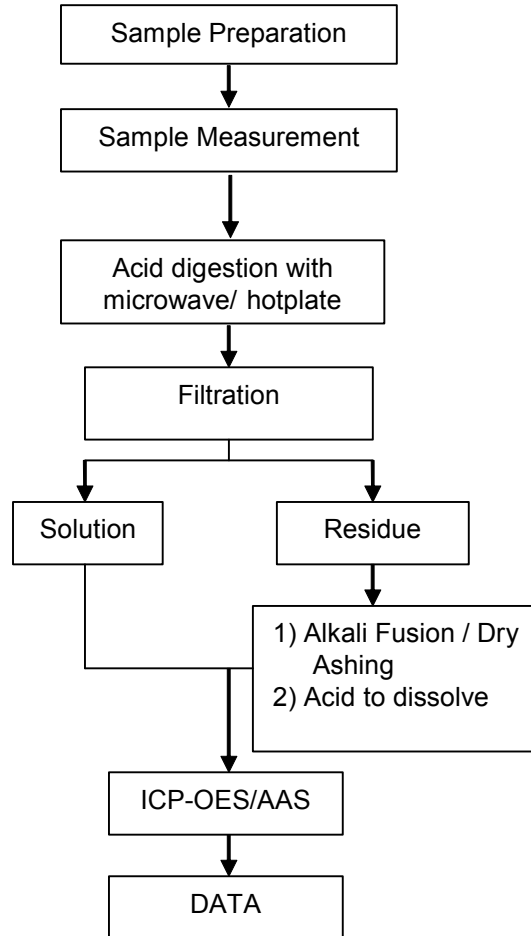
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Elements (IEC62321) Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart.



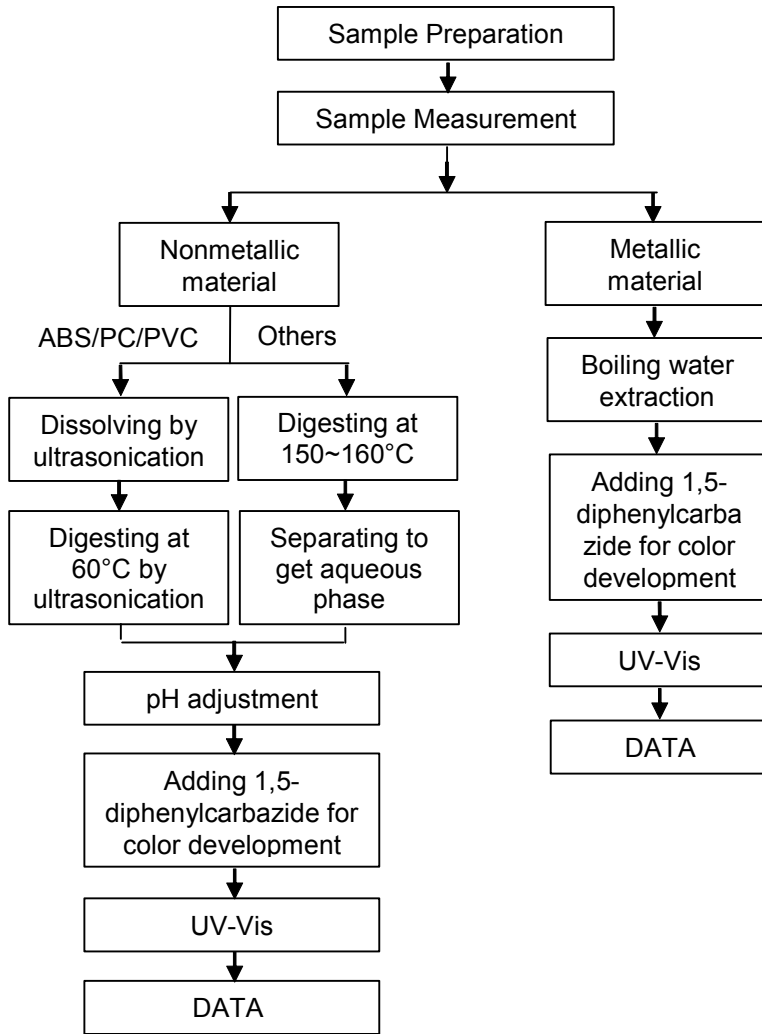
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Hexavalent Chromium (Cr(VI)) Testing Flow Chart

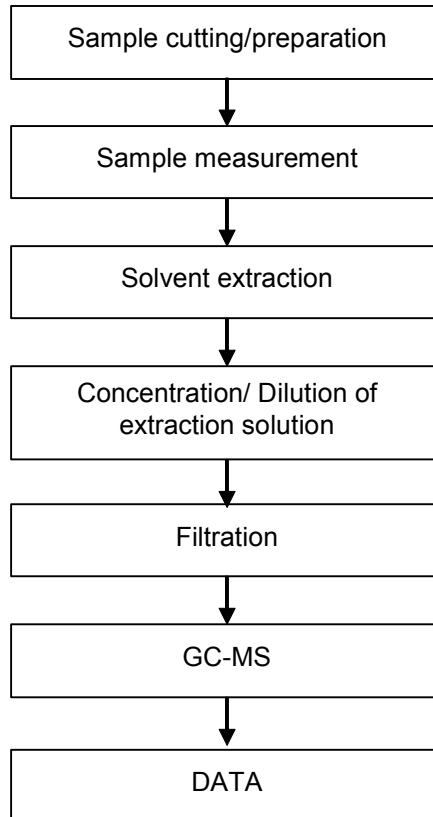


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PBBs/PBDEs Testing Flow Chart

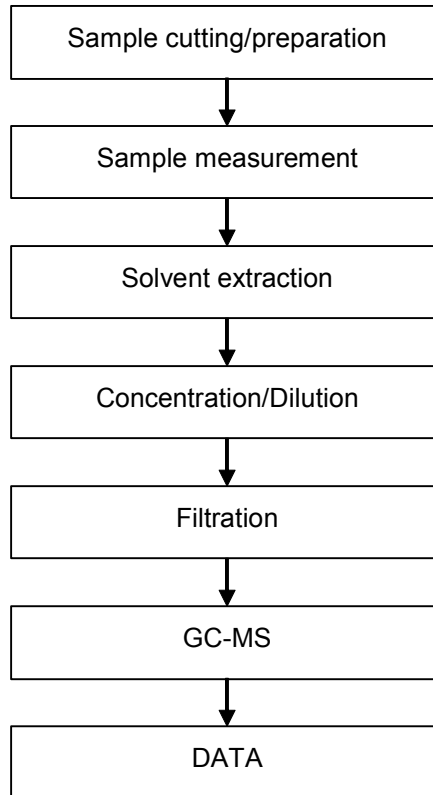


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Phthalates Testing Flow Chart

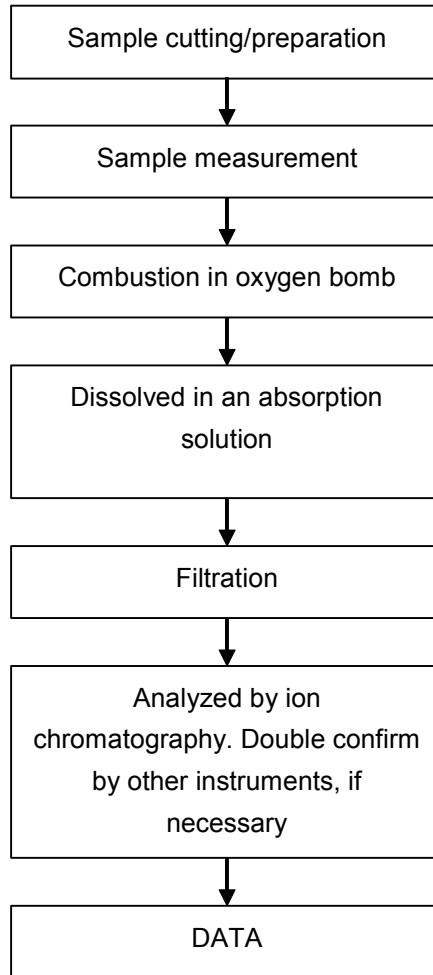


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Halogen Testing (oxygen bomb) Flow Chart

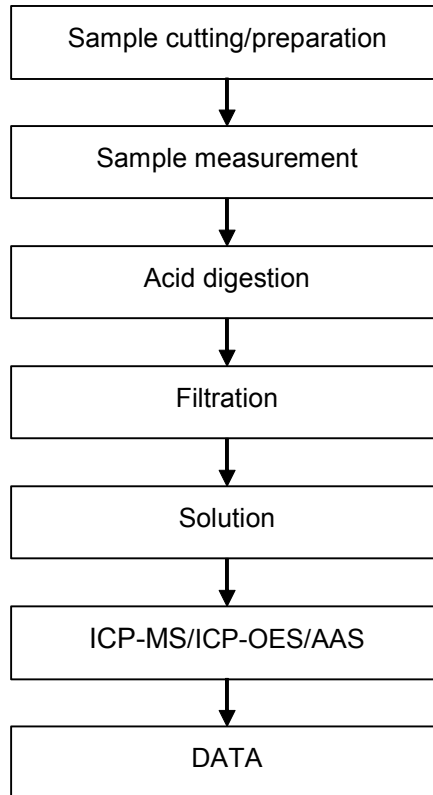


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Elements Testing Flow Chart



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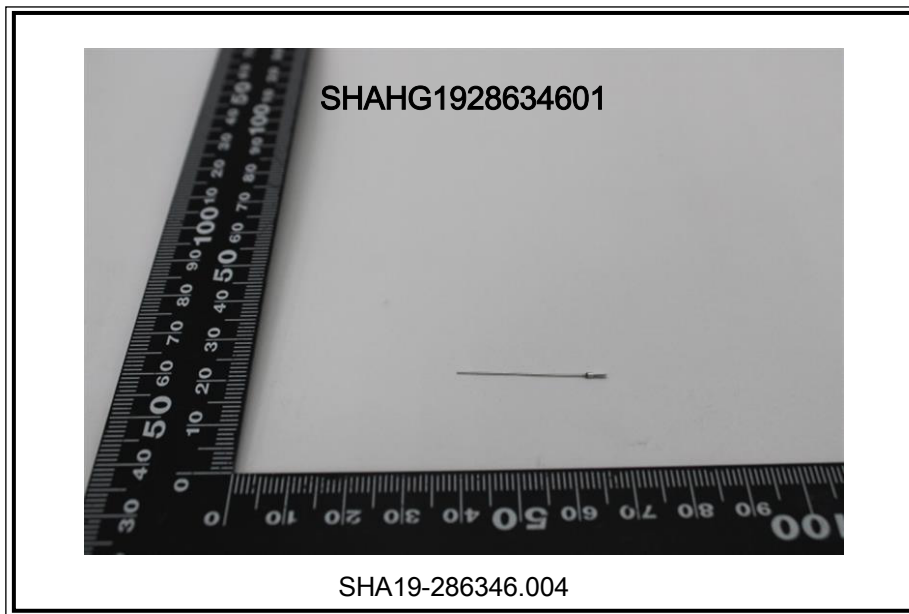
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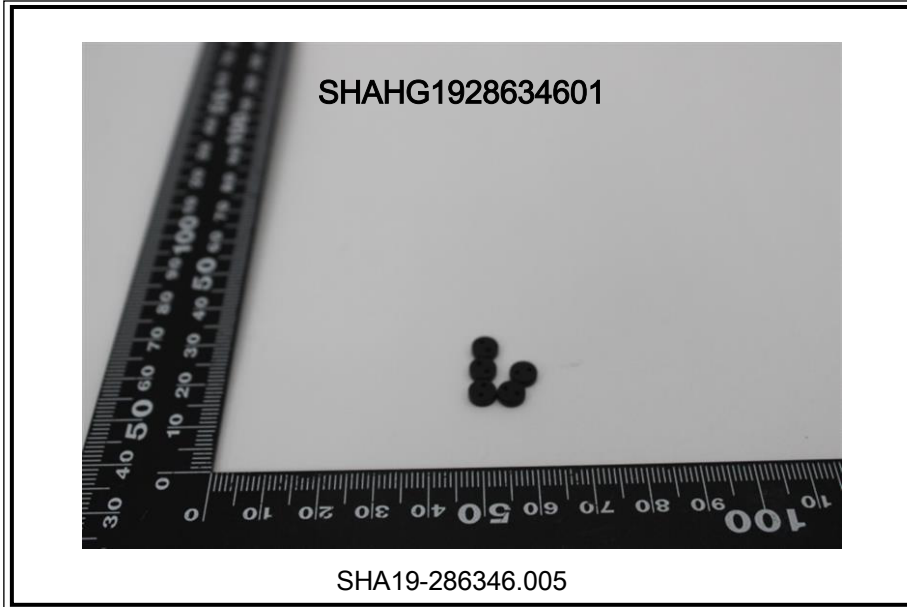


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