

## Test Report

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

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

Sample Submitted By : TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.  
Sample Name : TSMC FAB 14A FINISHED WAFER

Sample Receiving Date : 02-Dec-2021  
Testing Period : 02-Dec-2021 to 21-Dec-2021

**Test Requested** : (1) 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).  
(2) As specified by client, the sample(s) was/were tested for 5 PBTs with reference to Regulation of Persistent, Bioaccumulative, Toxic (PBT) Chemicals under Toxic Substances Control Act (TSCA) Section 6(h). Please refer to result table for testing item(s).  
(3) Please refer to next pages for the other item(s).

**Test Results** : Please refer to following pages.

**Conclusion** : (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.  
(2) Based on the performed tests on submitted sample(s), the test result(s) comply with the limits as set by Persistent, Bioaccumulative, Toxic (PBT) Chemicals under Toxic Substances Control Act (TSCA) Section 6(h).

*Troy Chang*  
Troy Chang, Manager, Technical  
Signed for and on behalf of  
SGS TAIWAN LTD.  
Chemical Laboratory - Taipei



PIN CODE: D4517BAE

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## Test Part Description

No.1 : WAFER

## Test Result(s)

| Test Item(s)                                     | Method   | Unit  | MDL  | Result | Limit |
|--|--|-------|------|--------|-------|
|  |  |       |      | No.1   |       |
| Cadmium (Cd) (CAS No.: 7440-43-9)                | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.            | mg/kg | 2    | n.d.   | 100   |
| Lead (Pb) (CAS No.: 7439-92-1)                   |  | mg/kg | 2    | n.d.   | 1000  |
| Mercury (Hg) (CAS No.: 7439-97-6)                | With reference to IEC 62321-4: 2013+AMD1: 2017, analysis was performed by ICP-OES. | mg/kg | 2    | n.d.   | 1000  |
| Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9) | With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.           | mg/kg | 8    | n.d.   | 1000  |
| Monobromobiphenyl                                | With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.              | 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.   | -     |
| <b>Sum of PBBs</b>                               |  | mg/kg | -    | n.d.   | 1000  |
| 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. | -      |       |
| <b>Sum of PBDEs</b>                              | mg/kg  | -     | n.d. | 1000   |       |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)   | Method  | Unit  | MDL  | Result | Limit |
|--|---|-------|------|--------|-------|
|  |   |       |      | No.1   |       |
| Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)  | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | 1000  |
| Dibutyl phthalate (DBP) (CAS No.: 84-74-2)   | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | 1000  |
| Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)   | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | 1000  |
| Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)   | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | 1000  |
| Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)  | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | -     |
| Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0)  | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | -     |
| Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)  | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.     | mg/kg | 50   | n.d.   | -     |
| Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified ( $\alpha$ - HBCDD, $\beta$ - HBCDD, $\gamma$ - HBCDD) (CAS No.: 25637-99-4, 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8)) | With reference to IEC 62321-9: 2021, analysis was performed by GC/MS.     | mg/kg | 20   | n.d.   | -     |
| Fluorine (F) (CAS No.: 14762-94-8)   | With reference to BS EN 14582: 2016, analysis was performed by IC.        | mg/kg | 50   | n.d.   | -     |
| Chlorine (Cl) (CAS No.: 22537-15-1)  | With reference to BS EN 14582: 2016, analysis was performed by IC.        | mg/kg | 50   | n.d.   | -     |
| Bromine (Br) (CAS No.: 10097-32-2)   | With reference to BS EN 14582: 2016, analysis was performed by IC.        | mg/kg | 50   | n.d.   | -     |
| Iodine (I) (CAS No.: 14362-44-8)   | With reference to BS EN 14582: 2016, analysis was performed by IC.        | mg/kg | 50   | n.d.   | -     |
| PFOS and its salts (CAS No.: 1763-23-1 and its salts)  | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| N-ethylperfluoro-1-octanesulfonamide (EtFOA) (CAS No.: 4151-50-2)  | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |

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| Test Item(s)   | Method  | Unit  | MDL  | Result | Limit |
|--|---|-------|------|--------|-------|
|  |   |       |      | No.1   |       |
| N-Methyl-Perfluorooctanesulfonamide (N-Me-FOSA) (CAS No.: 31506-32-8)                | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| N-Ethyl-Perfluorooctanesulfonamidoethanol (N-Et-FOSE alcohol) (CAS No.: 1691-99-2)   | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| N-Methyl-Perfluorooctanesulfonamidoethanol (N-Me-FOSE alcohol) (CAS No.: 24448-09-7) | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| Perfluorooctanesulfonamide (PFOSA) (CAS No.: 754-91-6)                               | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| PFOA and its salts (CAS No.: 335-67-1 and its salts)                                 | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| 1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS) (CAS No.: 39108-34-4)             | With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS. | mg/kg | 0.01 | n.d.   | -     |
| Methyl perfluorooctanoate (Me-PFOA) (CAS No.: 376-27-2)                              | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.    | mg/kg | 0.1  | n.d.   | -     |
| Ethyl perfluorooctanoate (Et-PFOA) (CAS No.: 3108-24-5)                              | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.    | mg/kg | 0.1  | n.d.   | -     |
| 1H,1H,2H,2H-Perfluoro-1-decanol (8:2 FTOH) (CAS No.: 678-39-7)                       | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.    | mg/kg | 0.1  | n.d.   | -     |
| 1H,1H,2H,2H-Perfluorodecyl acrylate (8:2 FTA) (CAS No.: 27905-45-9)                  | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.    | mg/kg | 0.1  | n.d.   | -     |
| 1H,1H,2H,2H-Perfluorodecyl methacrylate (8:2 FTMA) (CAS No.: 1996-88-9)              | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.    | mg/kg | 0.1  | n.d.   | -     |

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| Test Item(s)  | Method  | Unit  | MDL   | Result   | Limit |
|---|---|-------|-------|----------|-------|
|   |   |       |       | No.1     |       |
| Perfluoro-1-iodooctane (PFOI) (CAS No.: 507-63-1)                       | With reference to CEN/TS 15968: 2010, analysis was performed by GC/MS.  | mg/kg | 0.1   | n.d.     | -     |
| Polychlorinated biphenyls (PCBs)  | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.  | mg/kg | 0.5   | n.d.     | -     |
| Polychlorinated terphenyls (PCTs)                                       | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.  | mg/kg | 0.5   | n.d.     | -     |
| Polychlorinated naphthalene (PCNs)                                      | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.  | mg/kg | 5     | n.d.     | -     |
| Short Chain Chlorinated Paraffins(C10-C13) (SCCP) (CAS No.: 85535-84-8) | With reference to ISO 18219: 2015, analysis was performed by GC/MS.   | mg/kg | 50    | n.d.     | -     |
| Triphenyl tin (TPT)   | With reference to ISO 17353: 2004, analysis was performed by GC/FPD.  | mg/kg | 0.03  | n.d.     | -     |
| Tributyl tin (TBT)  | With reference to ISO 17353: 2004, analysis was performed by GC/FPD.  | mg/kg | 0.03  | n.d.     | -     |
| Dioctyl tin (DOT)   | With reference to ISO 17353: 2004, analysis was performed by GC/FPD.  | mg/kg | 0.03  | n.d.     | -     |
| Dibutyl tin (DBT)   | With reference to ISO 17353: 2004, analysis was performed by GC/FPD.  | mg/kg | 0.03  | n.d.     | -     |
| Bis(tributyltin) oxide (TBTO) (CAS No.: 56-35-9)                        | Calculated from the result of Tributyl Tin (TBT).   | mg/kg | 0.03▲ | n.d.     | -     |
| <b>Asbestos</b>   |   |       |       |          |       |
| Actinolite (CAS No.: 77536-66-4)  | With reference to EPA 600/R-93/116: 1993, analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD). | %     | -     | Negative | -     |
| Amosite (CAS No.: 12172-73-5)   |   | %     | -     | Negative | -     |
| Anthophyllite (CAS No.: 77536-67-5)                                     |   | %     | -     | Negative | -     |
| Chrysotile (CAS No.: 12001-29-5)  |   | %     | -     | Negative | -     |
| Crocidolite (CAS No.: 12001-28-4)                                       |   | %     | -     | Negative | -     |
| Tremolite (CAS No.: 77536-68-6)   |   | %     | -     | Negative | -     |
| <b>AZO Dyes</b>   |   |       |       |          |       |
| 4-aminodiphenyl (CAS No.: 92-67-1)                                      | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.   | mg/kg | 3     | n.d.     | -     |

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| Test Item(s)  | Method  | Unit  | MDL | Result | Limit |
|---|---|-------|-----|--------|-------|
|   |   |       |     | No.1   |       |
| Benzidine (CAS No.: 92-87-5)                                  | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 4-chloro-o-toluidine (CAS No.: 95-69-2)                       | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 2-naphthylamine (CAS No.: 91-59-8)                            | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| o-aminoazotoluene (CAS No.: 97-56-3)                          | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 5-nitro-o-toluidine (CAS No.: 99-55-8)                        | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 4-chloroaniline (CAS No.: 106-47-8)                           | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 2,4-diaminoanisoole (CAS No.: 615-05-4)                       | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 4,4'-diaminodiphenylmethane (MDA) (CAS No.: 101-77-9)         | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 3,3'-dichlorobenzidine (CAS No.: 91-94-1)                     | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 3,3'-dimethoxybenzidine (CAS No.: 119-90-4)                   | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 3,3'-dimethylbenzidine (CAS No.: 119-93-7)                    | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 3,3'-dimethyl-4,4'-diaminodiphenylmethane (CAS No.: 838-88-0) | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD. | mg/kg | 3   | n.d.   | -     |

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| Test Item(s)   | Method  | Unit  | MDL | Result | Limit |
|--|---|-------|-----|--------|-------|
|  |   |       |     | No.1   |       |
| 2-methoxy-5-methylaniline (CAS No.: 120-71-8)            | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 4,4'-methylene-bis-(2-chloroaniline) (CAS No.: 101-14-4) | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 4,4'-oxydianiline (CAS No.: 101-80-4)                    | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 4,4'-thiodianiline (CAS No.: 139-65-1)                   | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| o-toluidine (CAS No.: 95-53-4)                           | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 2,4-diaminotoluene (CAS No.: 95-80-7)                    | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 2,4,5-trimethylaniline (CAS No.: 137-17-7)               | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| o-anisidine (CAS No.: 90-04-0)                           | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 4-aminoazobenzene (CAS No.: 60-09-3)                     | With reference to EN ISO 14362-1: 2017 or/and EN ISO 14362-3: 2017, analysis was performed by GC/MS & HPLC/DAD. | mg/kg | 3   | n.d.   | -     |
| 2,4-xylidine (CAS No.: 95-68-1)                          | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |
| 2,6-xylidine (CAS No.: 87-62-7)                          | With reference to EN ISO 14362-1: 2017, analysis was performed by GC/MS and HPLC/DAD.                           | mg/kg | 3   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                      | Method   | Unit  | MDL | Result | Limit |
|-----------------------------------|--|-------|-----|--------|-------|
|                                   |  |       |     | No.1   |       |
| <b>Chlorofluorocarbons (CFCs)</b> |  |       |     |        |       |
| CFC-13 (CAS No.: 75-72-9)         | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-111 (CAS No.: 354-56-3)       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-112 (CAS No.: 76-12-0)        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-211 (CAS No.: 422-78-6)       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-212 (CAS No.: 3182-26-1)      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-213 (CAS No.: 2354-06-5)      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-214 (CAS No.: 29255-31-0)     | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-215 (CAS No.: 4259-43-2)      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-216 (CAS No.: 661-97-2)       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-217 (CAS No.: 422-86-6)       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-12 (CAS No.: 75-71-8)         | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                            | Method   | Unit  | MDL | Result | Limit |
|---|--|-------|-----|--------|-------|
|   |  |       |     | No.1   |       |
| CFC-11 (CAS No.: 75-69-4)               | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-115 (CAS No.: 76-15-3)              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-114 (CAS No.: 76-14-2)              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| CFC-113 (CAS No.: 76-13-1)              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| <b>Hydrochlorofluorocarbons (HCFCs)</b> |  |       |     |        |       |
| HCFC-21 (CAS No.: 75-43-4)              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-22 (CAS No.: 75-45-6)              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-31 (CAS No.: 593-70-4)             | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-121 (CAS No.: 354-14-3)            | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-122 (CAS No.: 354-21-2)            | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-123 (CAS No.: 306-83-2)            | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-124 (CAS No.: 2837-89-0)           | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                   | Method   | Unit  | MDL | Result | Limit |
|--------------------------------|--|-------|-----|--------|-------|
|                                |  |       |     | No.1   |       |
| HCFC-131 (CAS No.: 359-28-4)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-132b (CAS No.: 1649-08-7) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-133a (CAS No.: 75-88-7)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-142b (CAS No.: 75-68-3)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-221 (CAS No.: 422-26-4)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-222 (CAS No.: 422-49-1)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-223 (CAS No.: 422-52-6)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-224 (CAS No.: 422-54-8)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-225ca (CAS No.: 422-56-0) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-225cb (CAS No.: 507-55-1) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-226 (CAS No.: 431-87-8)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-231 (CAS No.: 421-94-3)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                  | Method   | Unit  | MDL | Result | Limit |
|-------------------------------|--|-------|-----|--------|-------|
|                               |  |       |     | No.1   |       |
| HCFC-232 (CAS No.: 460-89-9)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-233 (CAS No.: 7125-84-0) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-234 (CAS No.: 425-94-5)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-235 (CAS No.: 460-92-4)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-241 (CAS No.: 666-27-3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-242 (CAS No.: 460-63-9)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-244                      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-251 (CAS No.: 421-41-0)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-252 (CAS No.: 819-00-1)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-261 (CAS No.: 420-97-3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-262 (CAS No.: 421-02-03) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-271 (CAS No.: 430-55-7)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                    | Method   | Unit  | MDL | Result | Limit |
|---------------------------------|--|-------|-----|--------|-------|
|                                 |  |       |     | No.1   |       |
| HCFC-141b (CAS No.: 1717-00-6)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-243 (CAS No.: 460-69-5)    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-253 (CAS No.: 460-35-5)    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-141                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-142                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-151                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HCFC-225                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| <b>Halons</b>                   |  |       |     |        |       |
| Halon-1211 (CAS No.: 353-59-3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Halon-1301 (CAS No.: 75-63-8)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Halon-2402 (CAS No.: 124-73-2)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Bromomethane (CAS No.: 74-83-9) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                           | Method   | Unit  | MDL | Result | Limit |
|--|--|-------|-----|--------|-------|
|  |  |       |     | No.1   |       |
| <b>Hydrobromofluorocarbons (HBFCs)</b> |  |       |     |        |       |
| HBFC-271B1 (C3H6FBr)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-262B1 (C3H5F2Br)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-261B2 (C3H5FBr2)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-253B1 (C3H4F3Br)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-252B2 (C3H4F2Br2)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-251B3 (C3H4FBr3)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-244B1 (C3H3F4Br)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-243B2 (C3H3F3Br2)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-242B3 (C3H3F2Br3)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-241B4 (C3H3FBr4)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-235B1 (C3H2F5Br)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)           | Method   | Unit  | MDL | Result | Limit |
|------------------------|--|-------|-----|--------|-------|
|                        |  |       |     | No.1   |       |
| HBFC-234B2 (C3H2F4Br2) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-233B3 (C3H2F3Br3) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-232B4 (C3H2F2Br4) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-231B5 (C3H2FBr5)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-226B1 (C3HF6Br)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-225B2 (C3HF5Br2)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-224B3 (C3HF4Br3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-223B4 (C3HF3Br4)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-222B5 (C3HF2Br5)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-221B6 (C3HFBr6)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-151B1 (C2H4FBr)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-142B1 (C2H3F2Br)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                            | Method   | Unit  | MDL | Result | Limit |
|---|--|-------|-----|--------|-------|
|   |  |       |     | No.1   |       |
| HBFC-141B2 (C2H3FBr2)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-133B1 (C2H2F3Br)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-132B2 (C2H2F2Br2)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-131B3 (C2H2FBr3)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-124B1 (C2HF4Br)                    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-123B2 (C2HF3Br2)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-122B3 (C2HF2Br3)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-121B4 (C2HFBr4)                    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-31B1 (CH2FBr) (CAS No.: 373-52-4)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-22B1 (CHF2Br) (CAS No.: 1511-62-2) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HBFC-21B2 (CHFBr2) (CAS No.: 1868-53-7) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                           | Method   | Unit  | MDL | Result | Limit |
|--|--|-------|-----|--------|-------|
|  |  |       |     | No.1   |       |
| <b>Hydrofluorocarbon (HFCs)</b>        |  |       |     |        |       |
| HFC-23 (CHF3) (CAS No.: 75-46-7)       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-32 (CH2F2) (CAS No.: 75-10-5)      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-41 (CH3F) (CAS No.: 593-53-3)      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-43-10mee (C5H2F10)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-125 (C2HF5)                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-134 (C2H2F4)                       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-134a (CH2FCF3) (CAS No.: 811-97-2) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-143 (CH3F3)                        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-143a (CH3F3)                       | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-152a (C2H4F2) (CAS No.: 75-37-6)   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-227ea (C3HF7) (CAS No.: 431-89-0)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                                    | Method   | Unit  | MDL | Result | Limit |
|---|--|-------|-----|--------|-------|
|   |  |       |     | No.1   |       |
| HFC-236fa (CAS No.: 431-63-0)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-245ca (C3H3F5)                              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-245fa (C3H3F5)                              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-365mfc (C4H5F5)                             | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| HFC-236ea (C3H2F6) (CAS No.: 431-63-0)          | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| <b>Perfluorocarbon (PFCs)</b>                   |  |       |     |        |       |
| 1,4-dihydrooctafluorobutane (CAS No.: 377-36-6) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 2-Perfluoromethylpentane (CAS No.: 355-04-4)    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Decafluorobutane (CAS No.: 355-25-9)            | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| F14 (CAS No.: 75-73-0)                          | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Fluorocarbon 116 (CAS No.: 76-16-4)             | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Freon 218 (CAS No.: 76-19-7)                    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)   | Method   | Unit  | MDL | Result | Limit |
|--|--|-------|-----|--------|-------|
|  |  |       |     | No.1   |       |
| Freon C318 (CAS No.: 115-25-3)                           | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Nonafluor-2- (trifluoromethyl)butane (CAS No.: 594-91-2) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Perfluorisobutene (CAS No.: 382-21-8)                    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Perfluorohexane (CAS No.: 355-42-0)                      | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Perfluoro-n-pentane (CAS No.: 678-26-2)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Perfluor-1-butene (CAS No.: 357-26-6)                    | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| <b>Chlorinate hydrocarbon (CHCs)</b>                     |  |       |     |        |       |
| 1,1-Dichloropropene (CAS No.: 563-58-6)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,2-Dichloroethane (CAS No.: 107-06-2)                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 2,2-Dichloropropane (CAS No.: 594-20-7)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Carbon tetrachloride (CAS No.: 56-23-5)                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Chloromethane (CAS No.: 74-87-3)                         | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)   | Method   | Unit  | MDL | Result | Limit |
|--|--|-------|-----|--------|-------|
|  |  |       |     | No.1   |       |
| cis-1,2-Dichloroethene (CAS No.: 156-59-2)             | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| cis-1,3-Dichloropropene (CAS No.: 10061-01-5)          | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Hexachlorobutadiene (CAS No.: 87-68-3)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| trans-1,2-Dichloroethene (CAS No.: 156-60-5)           | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| trans-1,3-Dichloropropene (CAS No.: 10061-02-6)        | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| Dichloromethane, Methylene chloride (CAS No.: 75-09-2) | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,2-Dichloropropane (CAS No.: 78-87-5)                 | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,1,1,2-Tetrachloroethane (CAS No.: 630-20-6)          | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,1,1-Trichloroethane (CAS No.: 71-55-6)               | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,1,2-Trichloroethane (CAS No.: 79-00-5)               | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,1,2,2-Tetrachloroethane (CAS No.: 79-34-5)           | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |
| 1,1-Dichloroethylene (CAS No.: 75-35-4)                | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -     |

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NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)   | Method   | Unit  | MDL | Result | Limit                |
|--|--|-------|-----|--------|----------------------|
|  |  |       |     | No.1   |                      |
| 1,1-Dichloroethane (CAS No.: 75-34-3)                                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Chloroethane (CAS No.: 75-00-3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Tetrachloroethene (CAS No.: 127-18-4)                                  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Trichloroethylene (CAS No.: 79-01-6)                                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| 1,3-Dichloropropane (CAS No.: 142-28-9)                                | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Chloroform (CAS No.: 67-66-3)  | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| 1,2,3-Trichloropropane (CAS No.: 96-18-4)                              | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Bromochloromethan (CAS No.: 74-97-5)                                   | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Sulfur hexafluoride (CAS No.: 2551-62-4)                               | With reference to US EPA 5021A: 2014, analysis was performed by GC/MS. | mg/kg | 1   | n.d.   | -                    |
| Decabromodiphenyl ether (DecaBDE) (CAS No.: 1163-19-5)                 | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 5   | n.d.   | Prohibited / N/A(*3) |
| Phenol, isopropylated, phosphate (3:1) (PIP 3:1) (CAS No.: 68937-41-7) | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 5   | n.d.   | Prohibited / N/A(*1) |
| 2,4,6-Tris(tert-butyl)phenol (2,4,6-TTBP) (CAS No.: 732-26-3)          | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS. | mg/kg | 5   | n.d.   | 3000 / N/A(*2)       |

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TAIWAN SEMICONDUCTOR MANUFACTURING COMPANY, LTD.

NO. 9, CREATION RD. I, HSINCHU SCIENCE PARK, HSINCHU, TAIWAN 300-77, R.O.C.

| Test Item(s)                                     | Method  | Unit  | MDL | Result | Limit      |
|--|---|-------|-----|--------|------------|
|  |   |       |     | No.1   |            |
| Pentachlorothiophenol (PCTP) (CAS No.: 133-49-3) | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.  | mg/kg | 5   | n.d.   | 10000      |
| Hexachlorobutadiene (HCBd) (CAS No.: 87-68-3)    | With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.  | mg/kg | 5   | n.d.   | Prohibited |
| Arsenic (As) (CAS No.: 7440-38-2)                | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2   | n.d.   | -          |
| Beryllium (Be) (CAS No.: 7440-41-7)              | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2   | n.d.   | -          |
| Antimony (Sb) (CAS No.: 7440-36-0)               | With reference to US EPA 3052: 1996, analysis was performed by ICP-OES. | mg/kg | 2   | n.d.   | -          |

**Note :**

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected ( Less than MDL)
4. "-" = Not Regulated
5. Testing range of asbestos qualitative analysis is from less than 0.1% to 100%. The judgment criterion: asbestos fibers being found is shown as "Positive"; asbestos fibers not being found is shown as "Negative".
6. PFOS and its salts including :  
CAS No.: 29081-56-9, 2795-39-3, 29457-72-5, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7.
7. PFOA and its salts including :  
CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.
8. ▲ : The MDL was evaluated for element / tested substance.

Conversion Formula :  $AX = A \times F$

| AX                           | A                  | F     |
|------------------------------|--------------------|-------|
| Bis(tributyltin)oxide (TBTO) | Tributyl Tin (TBT) | 1.024 |

Parameter Conversion Table : [https://eecloud.sgs.com/Region\\_TW/DocDownload.aspx#otherDoc](https://eecloud.sgs.com/Region_TW/DocDownload.aspx#otherDoc)

9. The statement of compliance conformity is based on comparison of testing results and limits.
10. Detail explanation of the regulation is available at the following link.  
<https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/persistent-bioaccumulative-and-toxic-pbt-chemicals-under>

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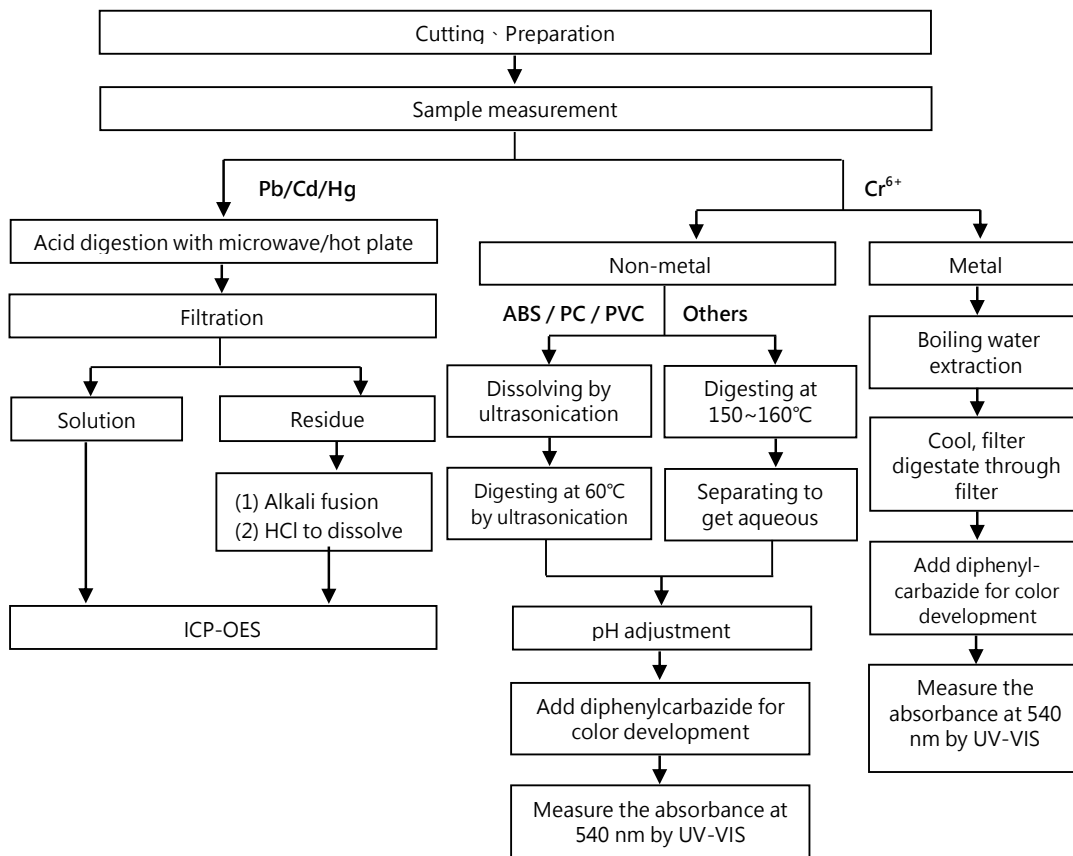
11. N/A(\*1) : The submitted sample is exempted from the regulated scope if it is anyone of the following :
  - Hydraulic fluids for aviation or military
  - Lubricants and grease
  - New and replacement parts for motor and aerospace vehicles
  - Manufacture of cyanoacrylate adhesives in closed systems
  - Specialized engine air filters for locomotive and marine applications
  - Plastic for recycling from PIP (3:1)-containing products or articles
  - Finished products or articles made of plastic recycled from PIP (3:1)-containing products or articles
12. N/A(\*2) : The submitted sample is exempted from the regulated scope if it is not oil and lubricant additives.
13. N/A(\*3) : The submitted sample is exempted from the regulated scope if it is anyone of the following :  
Exempts processing and distribution for recycling of DecaBDE-containing plastic from products or articles and DecaBDE-containing products or articles made from such recycled plastic.

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## Analytical flow chart of Heavy Metal

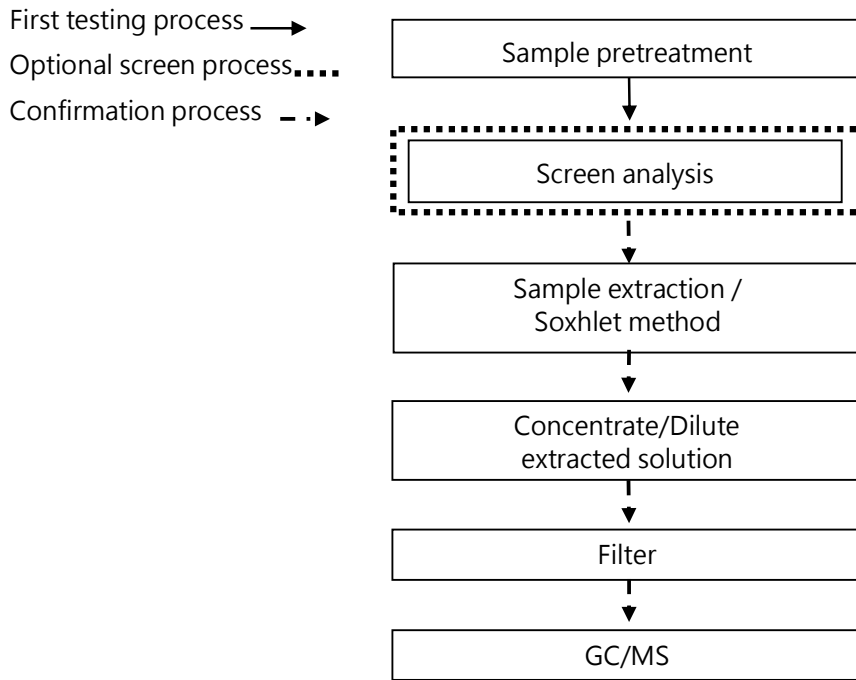
These samples were dissolved totally by pre-conditioning method according to below flow chart.

( Cr<sup>6+</sup> test method excluded )



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### Analytical flow chart – PBBs / PBDEs



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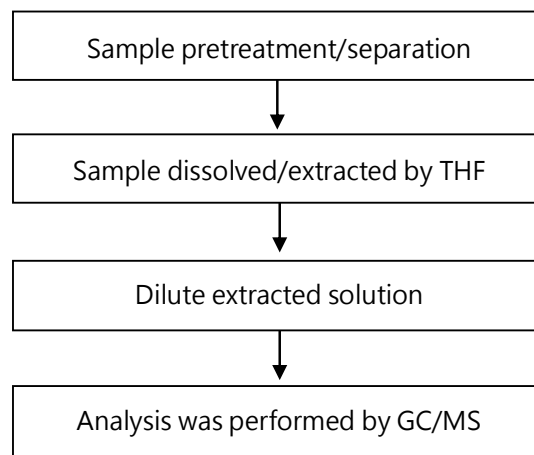


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## Analytical flow chart - Phthalate

【Test method: IEC 62321-8】

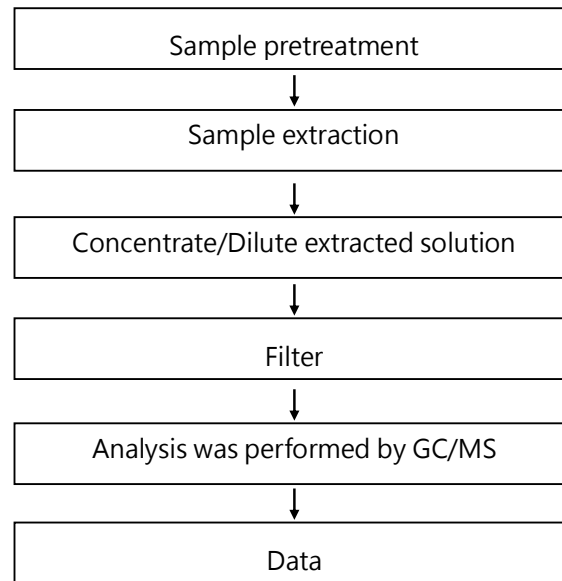


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### Analytical flow chart - HBCDD

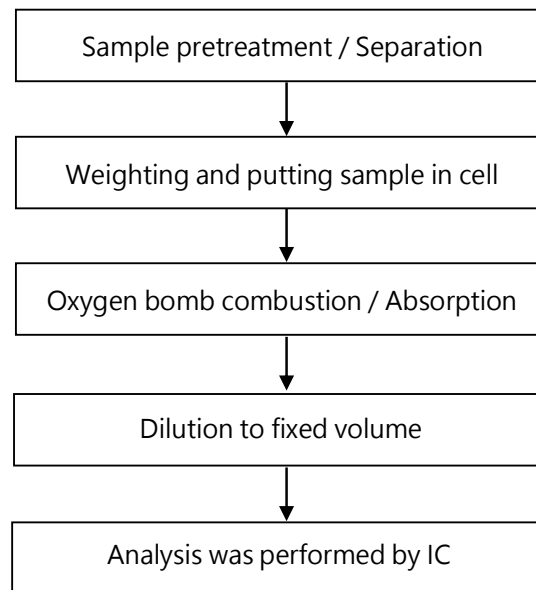


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### Analytical flow chart - Halogen

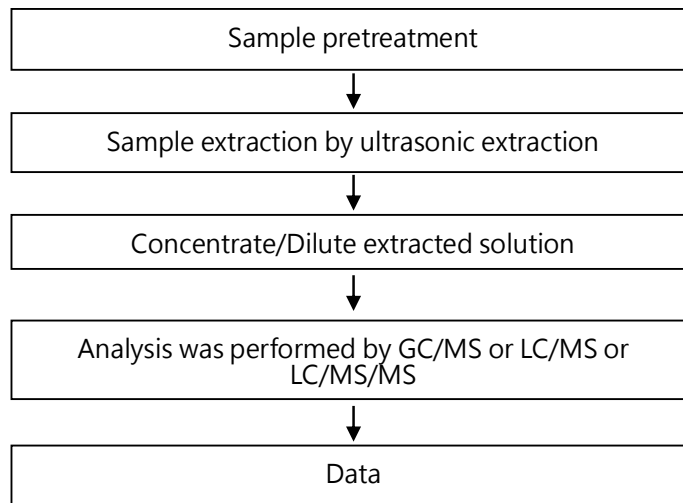


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### Analytical flow chart – PFAS (including PFOA/PFOS/its related compound, etc.)

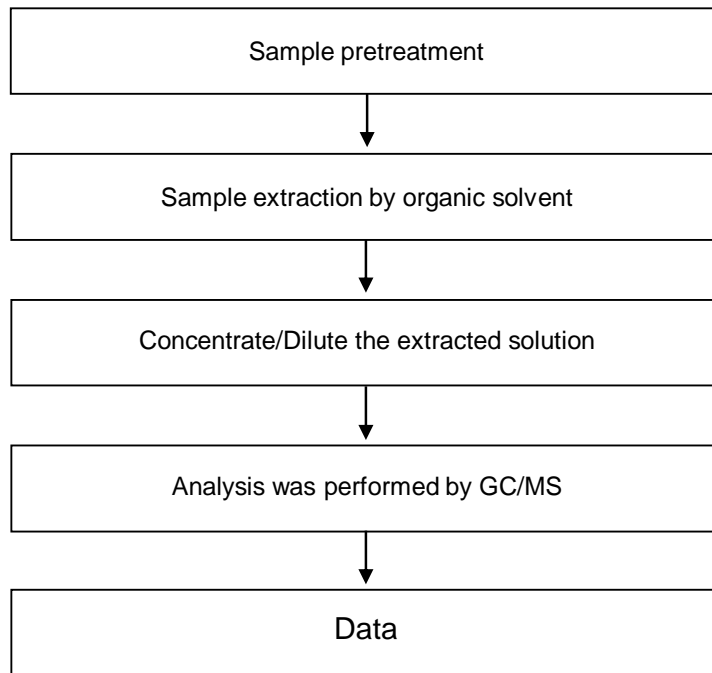


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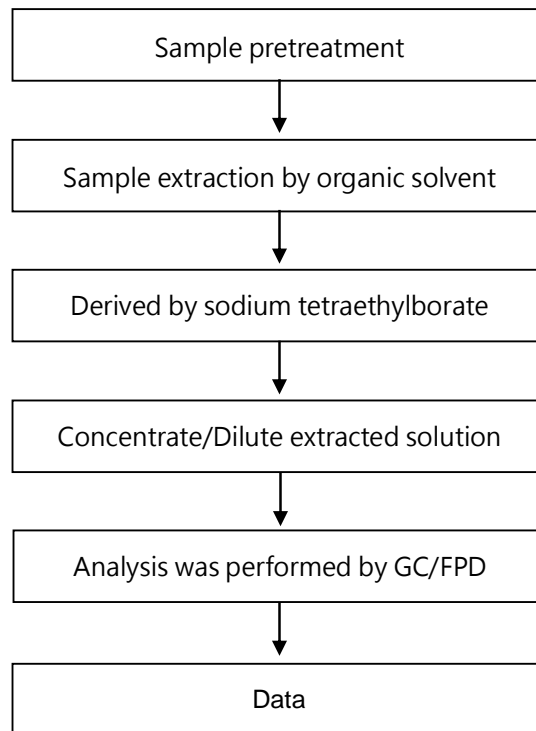
### Analytical flow chart

\* Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT



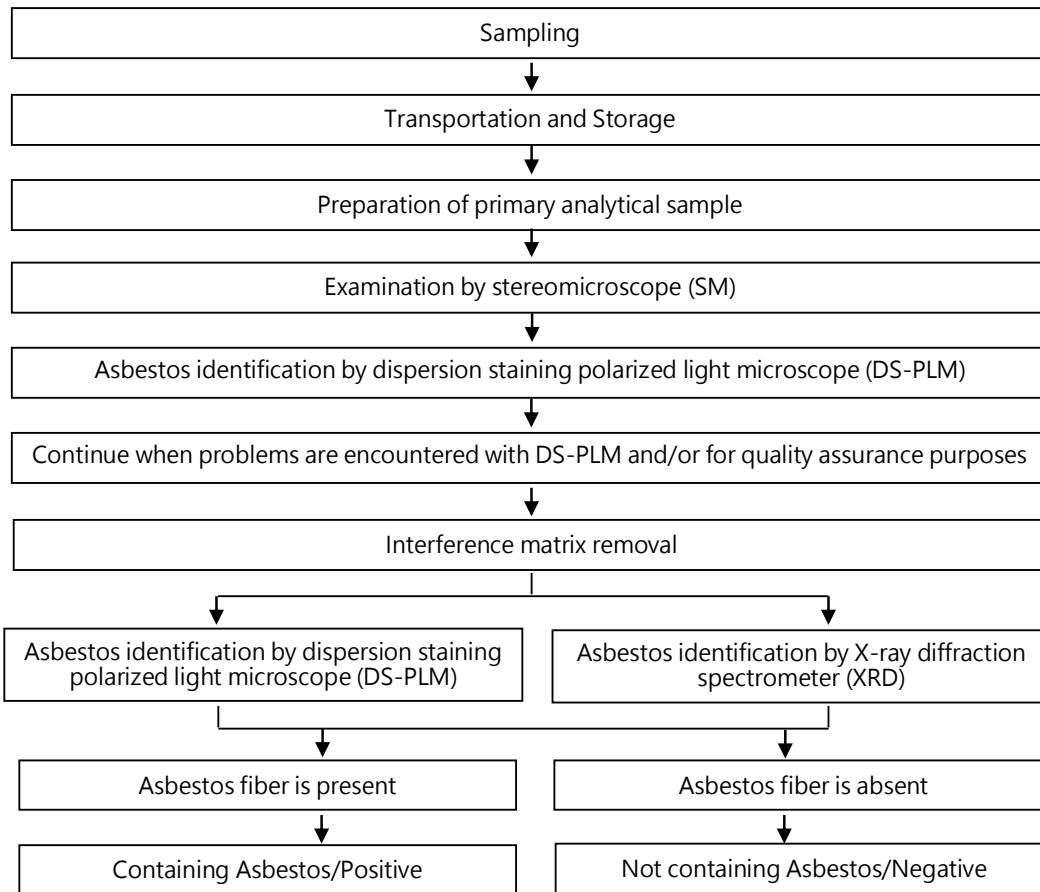
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### Analytical flow chart - Organic-Tin



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**Analysis flow chart for determination of Asbestos**  
**【 Reference method: EPA 600/R-93/116 】**



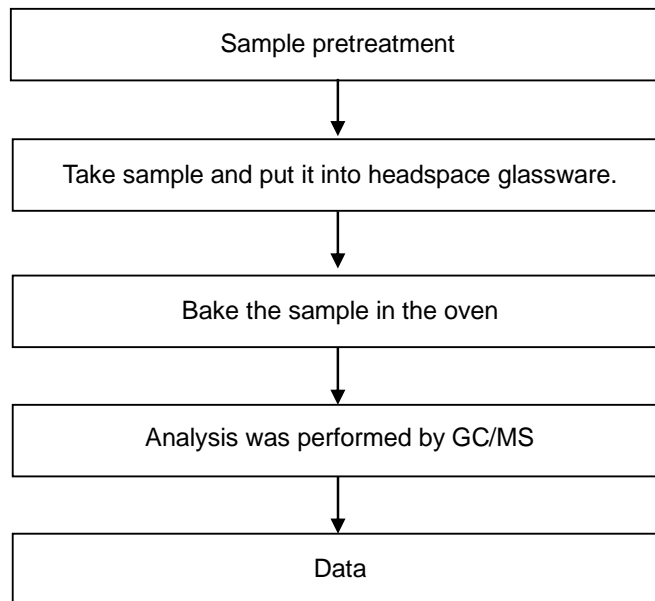
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### Analytical flow chart of volatile organic compounds (VOCs)

【Reference method : US EPA 5021A】



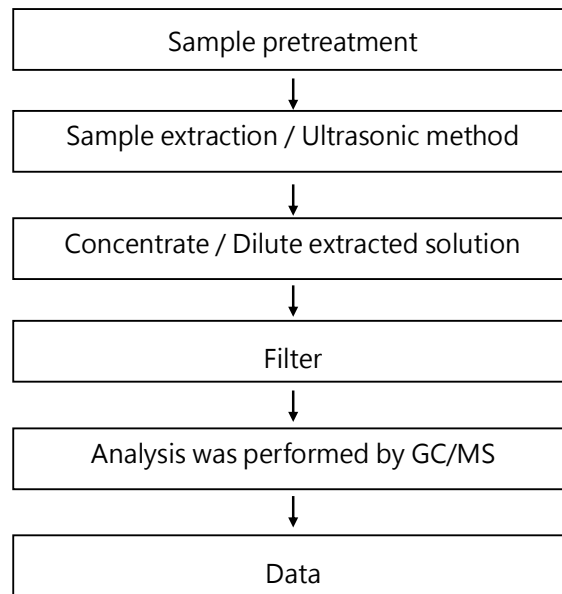
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### Analytical flow chart - Persistent, Bioaccumulative, Toxic (PBTs)

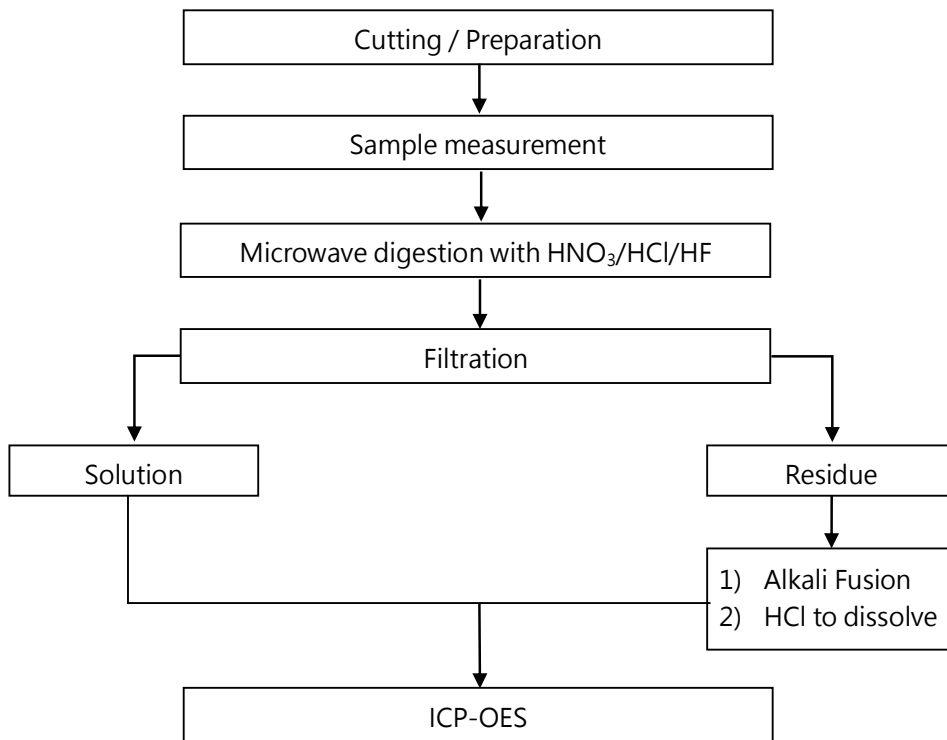


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### Analytical flow chart of Elements (Heavy Metal included)

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

【Reference method : US EPA 3051A 、 US EPA 3052】



\* US EPA 3051A method does not add HF.

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## Test Report

No.: ETR21C00294

Date: 21-Dec-2021

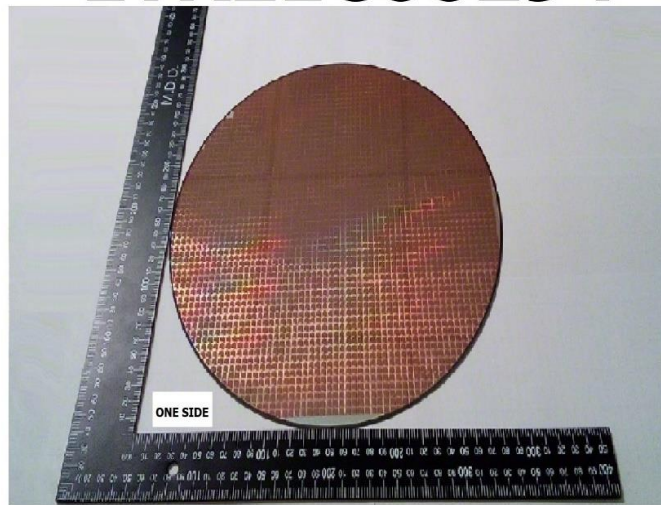
Page: 35 of 35

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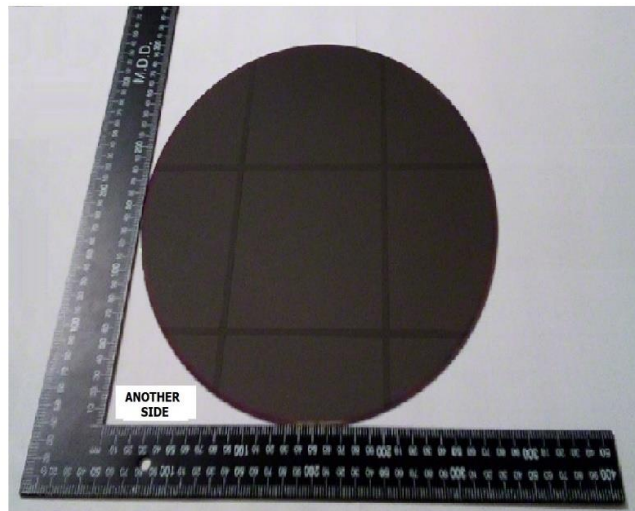
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\* The tested sample / part is marked by an arrow if it's shown on the photo. \*

### ETR21C00294



### ETR21C00294



\*\* End of Report \*\*

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