

Test Report

No.: EKR22700735

Date: 19-Jul-2022

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NXP SEMICONDUCTORS
HIGH TECH CAMPUS 60, 5656AG EINDHOVEN, THE NETHERLANDS

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

Sample Submitted By : NXP SEMICONDUCTORS
Sample Name : ATMC WAFER

=====
Sample Receiving Date : 13-Jul-2022
Testing Period : 13-Jul-2022 to 19-Jul-2022

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) 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.


Ray Chang, Ph.D./Department Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory-Kaohsiung



PIN CODE: C6306144

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Test Part Description

No.1 : MULTICOLORED 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) | With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES. | 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. | - |
| Sum of PBBs | | 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. | - | |
| Sum of PBDEs | mg/kg | - | n.d. | 1000 | |

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| 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 |
| 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 |
| 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 |
| 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. | - |
| 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. | - |
| 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. | - |
| Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0) | With reference to IEC 62321-8: 2017, analysis was performed by GC/MS. | mg/kg | 50 | 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. | - |
| 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. | - |
| 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. | - |
| 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. | - |

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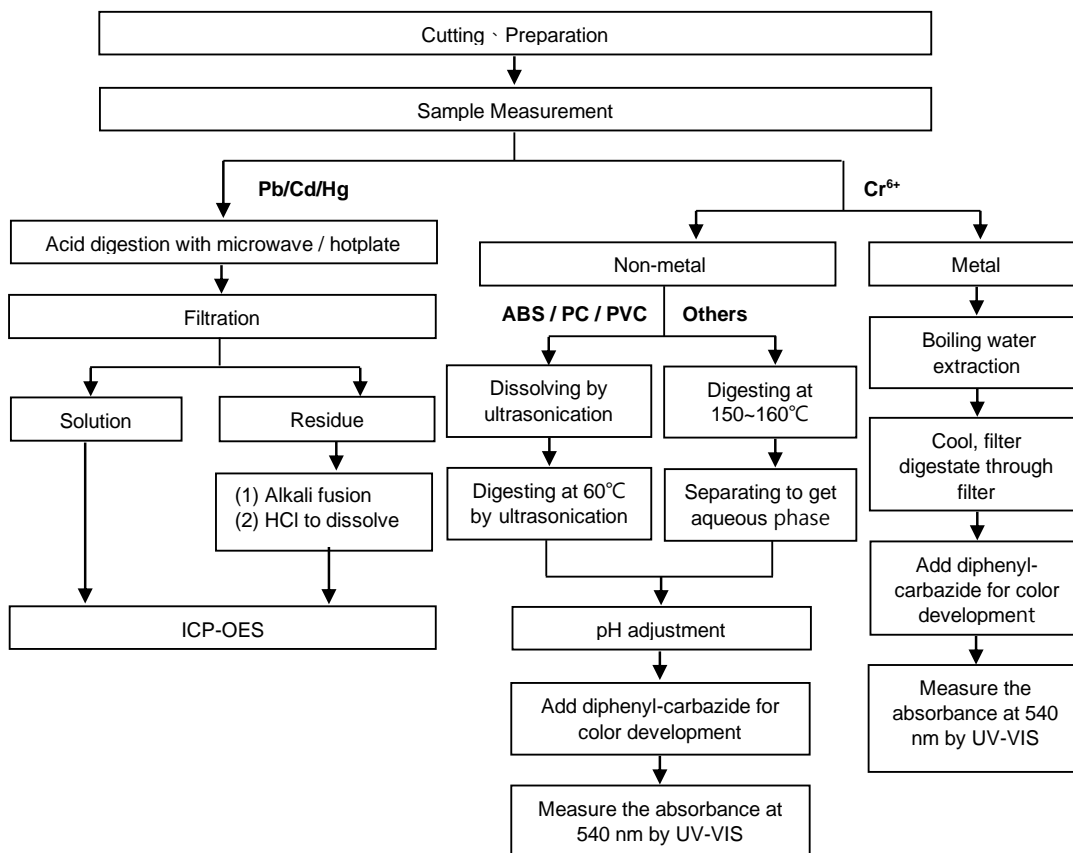
Note :

1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)
4. "-" = Not Regulated
5. Unless otherwise stated , the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

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Analytical flow chart of Heavy Metal

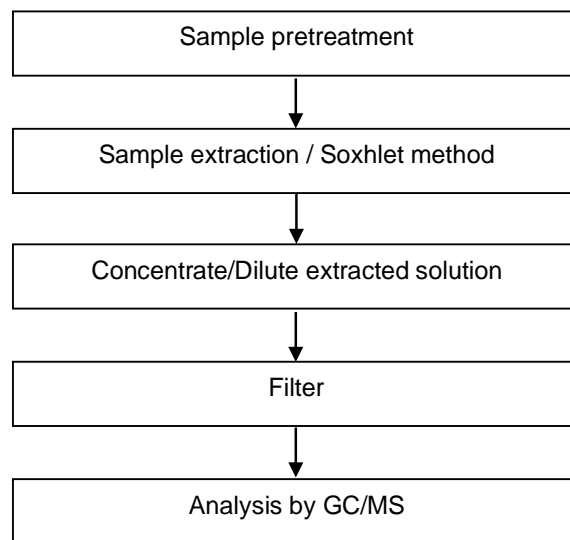
These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)



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PBB/PBDE analytical FLOW CHART

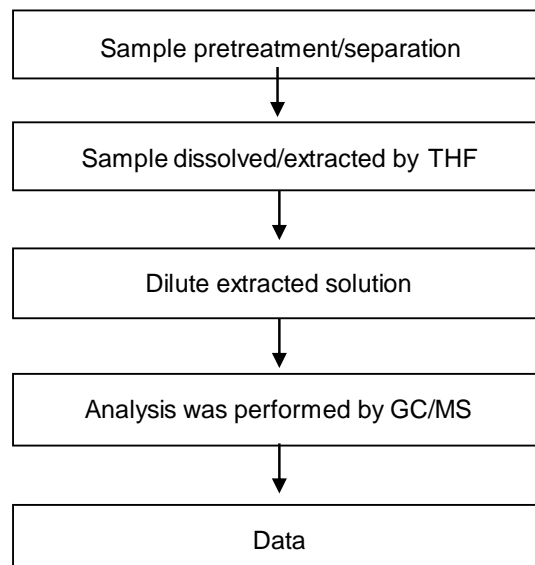


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Analytical flow chart of phthalate content

【Test method: IEC 62321-8】

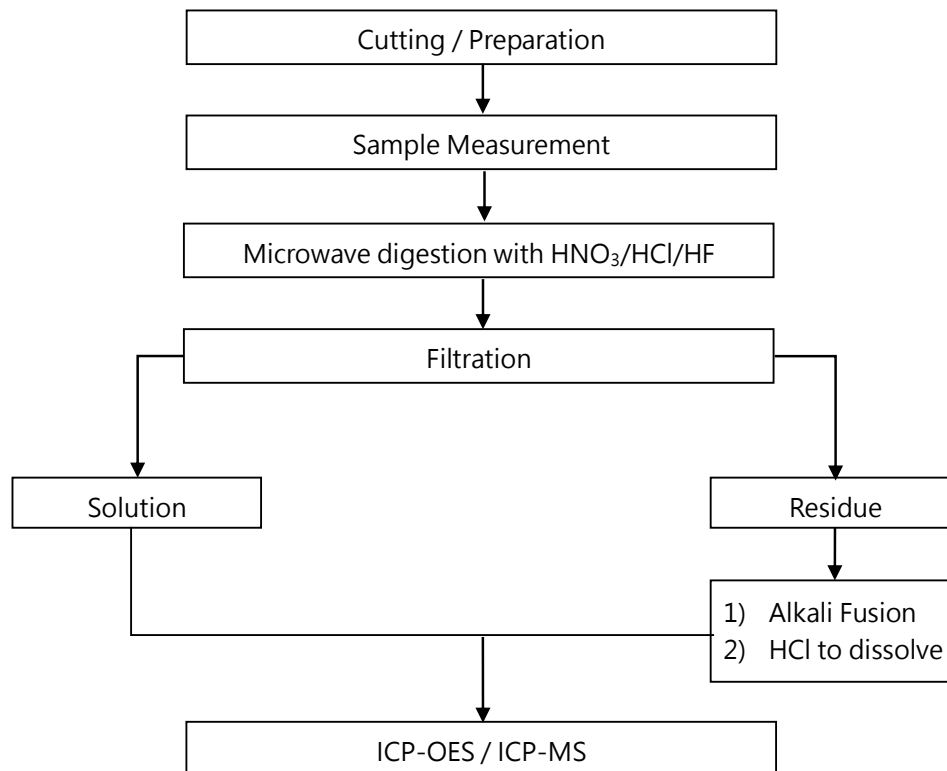


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Analytical flow chart of Elements (Heavy metal included)

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

【 Reference method : US EPA 3051 · US EPA 3052 】

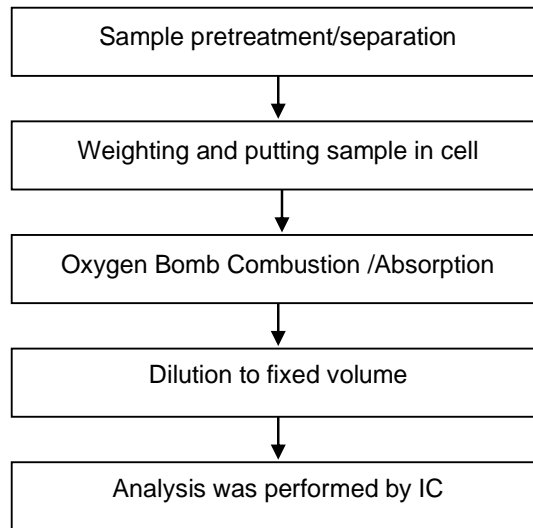


* US EPA 3051 method does not add HF.

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Analytical flow chart of Halogen

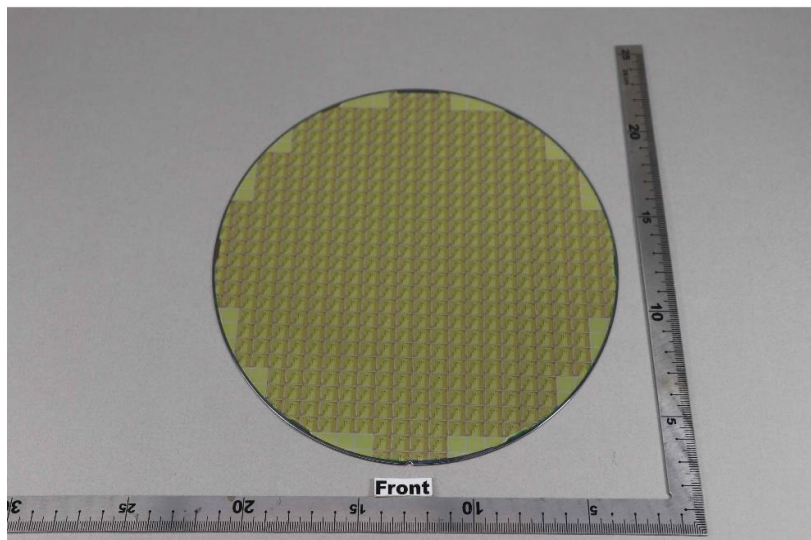


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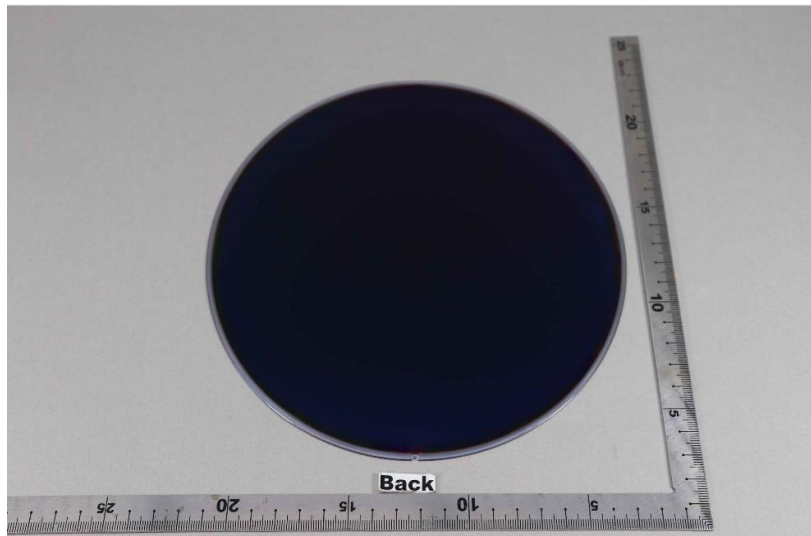
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

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** End of Report **

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