# TEST REPORT

APPLICANT : SAMSUNG ELECTRONICS
ADDRESS : 1, Samsung-ro, Giheung-gu,
Yongin-si, Gyeonggi-do, Korea



REPORT NO. RT19R-S1494-006-E1 DATE: Apr. 05, 2019

| | |
|---|---|
| SAMPLE DESCRIPTION | : The following submitted sample(s) said to be:- |
| NAME/TYPE OF PRODUCT | : 12inch-Wp |
| SAMPLE ID NO. | : RT19R-S1494-006 |
| MANUFACTURER/VENDOR | : SAMSUNG ELECTRONICS |
| SAMPLE RECEIVED | : Apr. 02, 2019 |
| TESTING DATE | : Apr. 02, 2019 ~ Apr. 05, 2019 |
| TEST METHOD(S) | : Please see the following page(s). |
| TEST RESULT(S) | : Please see the following page(s). |

* Note 1 : The test results presented in this report refer only to the object tested.
* Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.
* Note 3 : This report is not related to the scope of Korea laboratory accreditation scheme.

Approved by,

Jade Jang / Lab. Technical Manager

Authorized by,

Bo Park / Lab. General Manager

Authenticity check

Intertek Testing Services Korea Ltd.
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SAMPLE ID NO. : RT19R-S1494-006
SAMPLE DESCRIPTION : 12inch-Wp

| TEST ITEM | UNIT | TEST METHOD | MDL | RESULT |
|---|---|---|---|---|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321-5 Edition 1.0 : 2013, by acid digestion and determined by ICP-OES | 0.5 | N.D. |
| Lead (Pb) | mg/kg | | 5 | N.D. |
| Mercury (Hg) | mg/kg | With reference to IEC 62321-4 Edition 1.0 : 2013, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Hexavalent Chromium ($Cr^{6+}$) | mg/kg | With reference to IEC 62321-7-2 Edition 1.0 : 2017, by alkaline/toluene digestion and determined by UV-VIS Spectrophotometer | 8 | N.D. |
| Polybrominated Biphenyl (PBBs) | | | | |
| Monobromobiphenyl | mg/kg | With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS | 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. |
| Polybrominated Diphenyl Ether (PBDEs) | | | | |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS | 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. |

Tested by : Jooyeon Lee, Seulgi Park, Miseon Lee

Notes : mg/kg = ppm = parts per million
< = Less than
N.D. = Not detected ( <MDL )
MDL = Method detection limit

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# TEST REPORT



REPORT NO. RT19R-S1494-006-E1 DATE: Apr. 05, 2019

SAMPLE ID NO. : RT19R-S1494-006
SAMPLE DESCRIPTION : 12inch-Wp

| TEST ITEM | UNIT | TEST METHOD | MDL | RESULT |
|---|---|---|---|---|
| Bromine (Br) | mg/kg | With reference to EN 14582, by oxygen combustion with bomb and determined by IC | 30 | N.D. |
| Chlorine (Cl) | mg/kg | With reference to EN 14582, by oxygen combustion with bomb and determined by IC | 30 | N.D. |
| Beryllium (Be) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Cobalt (Co) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Indium (In) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Nickel (Ni) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | 16 |
| Phosphorus (P) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Antimony (Sb) | mg/kg | With reference to US EPA 3052, by acid digestion and determined by ICP-OES | 2 | N.D. |
| Tetrabromobisphenol-A (TBBP-A) | mg/kg | With reference to US EPA 3540C, by solvent extraction and determined by LC/MS/MS | 5 | N.D. |
| Medium-chain chlorinated paraffin (MCCP) | mg/kg | With reference to US EPA 3540C, by solvent extraction and determined by LC/MS/MS and/or GC/ECD | 100 | N.D. |

Tested by : Hyojoo Kim, Jooyeon Lee, Miseon Lee

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# TEST REPORT



REPORT NO. RT19R-S1494-006-E1 DATE: Apr. 05, 2019

SAMPLE ID NO. : RT19R-S1494-006
SAMPLE DESCRIPTION : 12inch-Wp

| TEST ITEM | CAS NO. | UNIT | TEST METHOD | MDL | RESULT |
|---|---|---|---|---|---|
| Dibutyl phthalate (DBP) | 84-74-2 | mg/kg | With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS | 50 | N.D. |
| Di(2-ethylhexyl) phthalate (DEHP) | 117-81-7 | mg/kg | | 50 | N.D. |
| Benzyl butyl phthalate (BBP) | 85-68-7 | mg/kg | | 50 | N.D. |
| Diisobutyl phthalate (DIBP) | 84-69-5 | mg/kg | | 50 | N.D. |

Tested by : Miseon Lee

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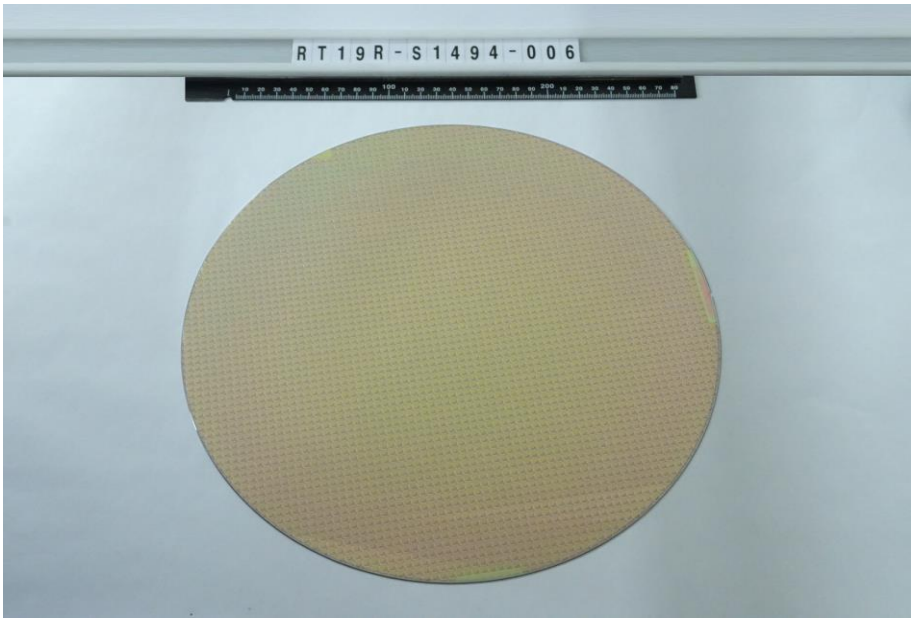
* View of sample as received;-

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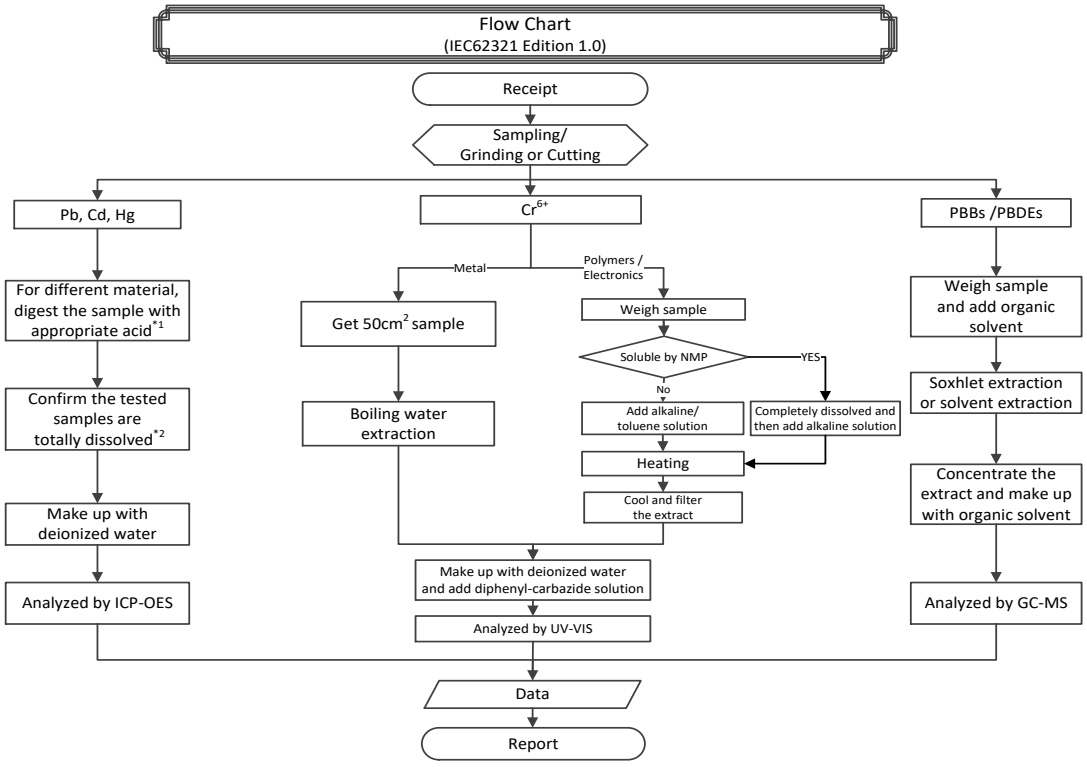
SAMPLE DESCRIPTION : 12inch-Wp




Remarks :
*1 : List of appropriate acid :

| Material | Acid added for digestion |
|---|---|
| Polymers | $HNO_3$, HCl, HF, $H_2O_2$, $H3BO_3$ |
| Metals | $HNO_3$, HCl, HF |
| Electronics | $HNO_3$, HCl, $H_2O_2$, $HBF_4$ |

*2 : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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# TEST REPORT



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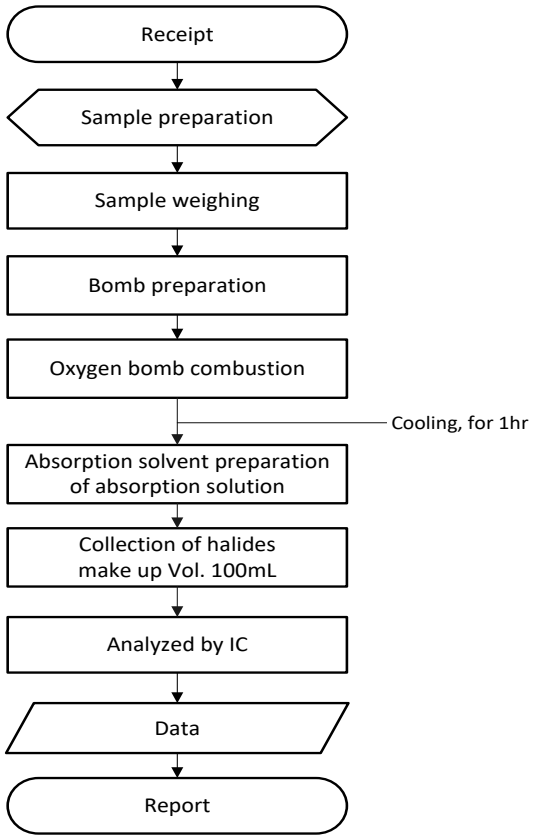
SAMPLE ID NO. : RT19R-S1494-006
SAMPLE DESCRIPTION : 12inch-Wp

## Flow Chart (EN14582)



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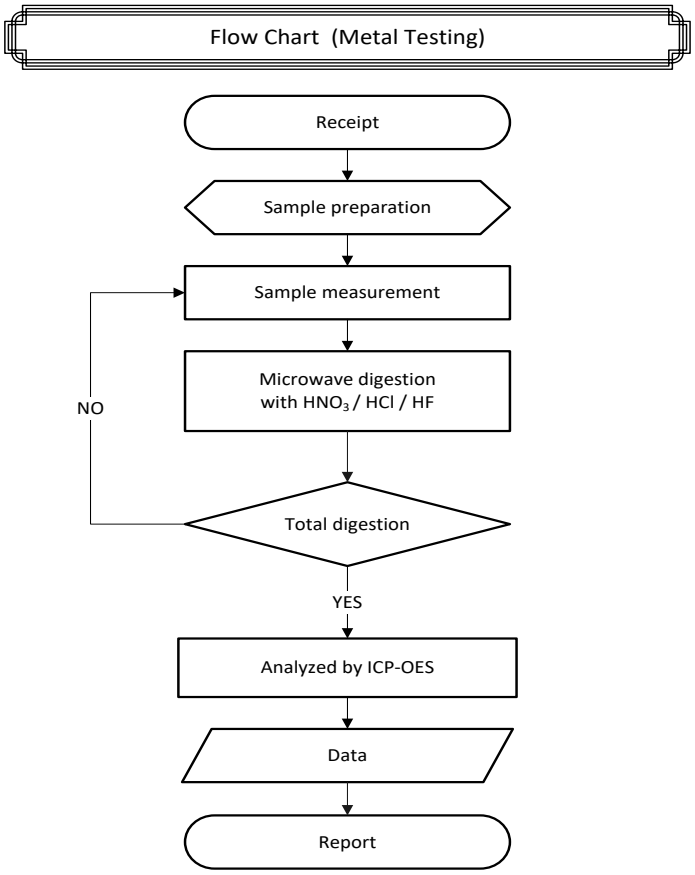
SAMPLE DESCRIPTION : 12inch-Wp




** Remarks : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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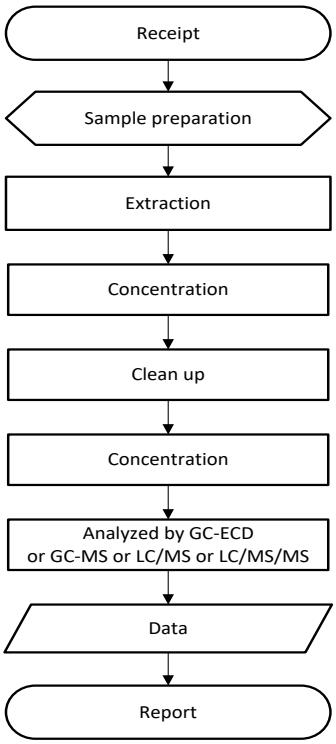
SAMPLE DESCRIPTION : 12inch-Wp

## Flow Chart (EPA 3540C)



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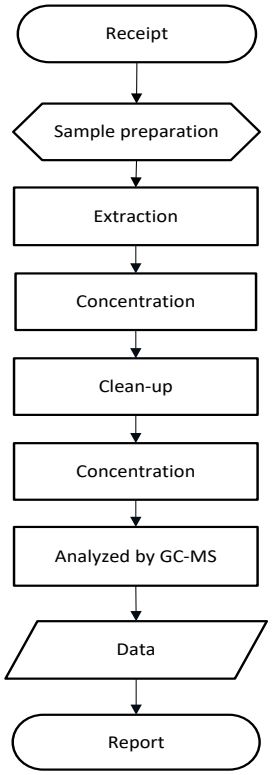
SAMPLE ID NO. : RT19R-S1494-006
SAMPLE DESCRIPTION : 12inch-Wp

## Flow Chart (Phthalates)




***** End of Report *****



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