

TEST REPORT

APPLICANT : HYOSUNG CHEMICAL CORPORATION
ADDRESS : 235, Banpo-daero, Seocho-gu,
Seoul, Korea

PAGE: 1 of 5

REPORT NO. RT18R-S4186-011-E

DATE: Oct. 02, 2018

SAMPLE DESCRIPTION : The following submitted sample(s) said to be:-

NAME/TYPE OF PRODUCT : TOPILENE
NAME OF MATERIAL : Polypropylene
SAMPLE ID NO. : RT18R-S4186-011
ITEM NO. : J640A
MANUFACTURER/VENDOR : HYOSUNG CHEMICAL CORPORATION

SAMPLE RECEIVED : Sep. 19, 2018
TESTING DATE : Sep. 19, 2018 ~ Oct. 02, 2018

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.
- * Note 4 : The item no. is assigned by client and indicated according to their requirement and guarantee letter.

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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REPORT NO. RT18R-S4186-011-E

SAMPLE ID NO. : RT18R-S4186-011

SAMPLE DESCRIPTION : TOPILENE

| 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, Sujung Lee

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

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DATE: Oct. 02, 2018

REPORT NO. RT18R-S4186-011-E

SAMPLE ID NO. : RT18R-S4186-011

SAMPLE DESCRIPTION : TOPILENE

| 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 : Sujung Lee

Notes : mg/kg = ppm = parts per million
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* View of sample as received;-



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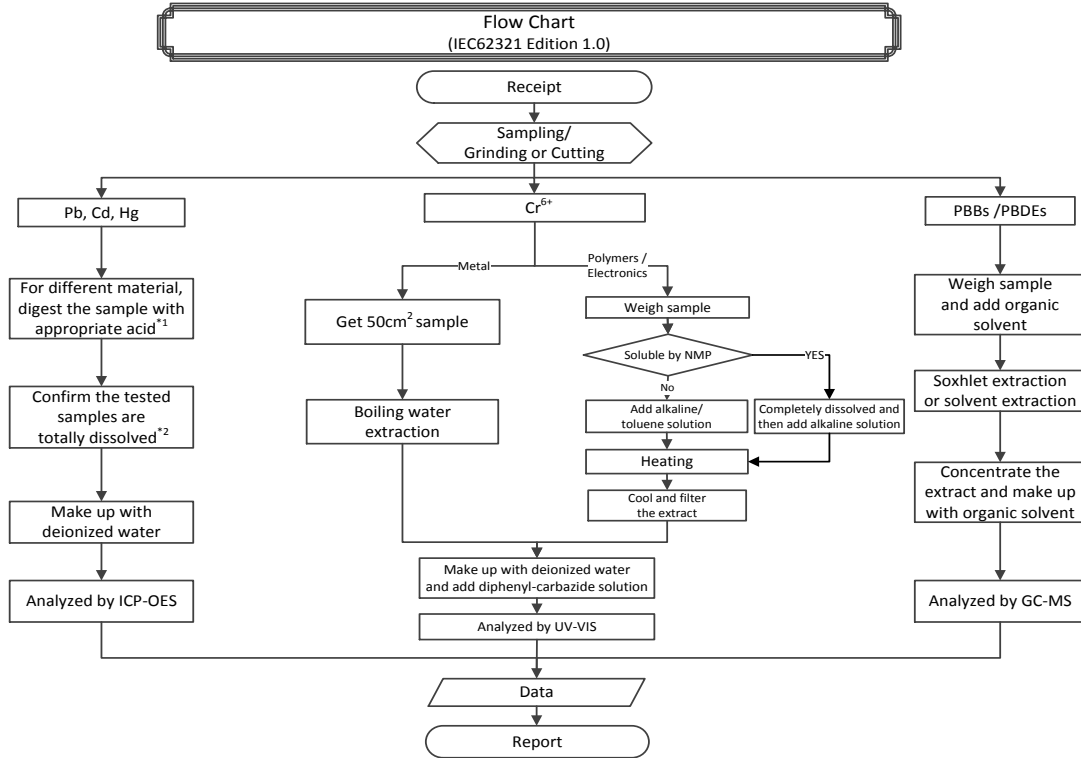
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SAMPLE DESCRIPTION : TOPILENE



Remarks :

*1 : List of appropriate acid :

| Material | Acid added for digestion |
|-------------|--|
| Polymers | HNO ₃ , HCl, HF, H ₂ O ₂ , H ₃ BO ₃ |
| Metals | HNO ₃ , HCl, HF |
| Electronics | HNO ₃ , HCl, H ₂ O ₂ , HBF ₄ |

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

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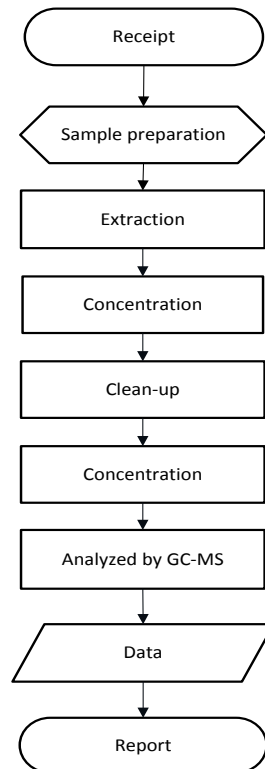
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Flow Chart (Phthalates)



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

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