

MUIL CHEMICAL CO., LTD.237, Yeosusandan-ro
Yeosu-si, Jeonnam
Korea

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

SGS File No. : AYAA19-28666
Product Name : Carbon black master batch
Item No./Part No. : 9193
Received Date : 2019. 05. 02
Test Period : 2019. 05. 02 to 2019. 05. 10
Test Results : For further details, please refer to following page(s)

SGS Korea Co., Ltd.



Tommy Oh / Chemical Lab Mgr

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Test Report No. F690101/LF-CTSAYAA19-28666

Issued Date : 2019. 05. 10

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Sample No. : AYAA19-28666.001
Sample Description : Carbon black master batch
Item No./Part No. : 9193
Materials : N/A

Heavy Metals

| Test Items | Unit | Test Method | MDL | Results |
|------------------------------|-------|---|-----|---------|
| Cadmium (Cd) | mg/kg | With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES) | 0.5 | N.D. |
| Lead (Pb) | mg/kg | With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES) | 5 | N.D. |
| Mercury (Hg) | mg/kg | With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES) | 2 | N.D. |
| Hexavalent Chromium (Cr VI)* | mg/kg | With reference to IEC 62321-7-2:2017, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis and Microwave system/or with reference to IEC 62321-5:2013, determination of Chromium by ICP-OES. | 8 | N.D. |
| Cobalt (Co) | mg/kg | With reference to EPA 3052(1996), US EPA 6010B(1996), ICP | 5 | N.D. |

Flame Retardants-PBBs/PBDEs

| Test Items | Unit | Test Method | MDL | Results |
|-------------------------|-------|--|-----|---------|
| Monobromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Dibromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tribromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tetrabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Pentabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Hexabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Heptabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Octabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Nonabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Decabromobiphenyl | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Monobromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |

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Sample Description : Carbon black master batch
Item No./Part No. : 9193
Materials : N/A

Flame Retardants-PBBs/PBDEs

| Test Items | Unit | Test Method | MDL | Results |
|--------------------------|-------|--|-----|---------|
| Dibromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tribromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Tetrabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Pentabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Hexabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Heptabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Octabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Nonabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |
| Decabromodiphenyl ether | mg/kg | With reference to IEC 62321-6:2015 (Determination of PBBs and PBDEs by GC-MS) | 5 | N.D. |

Phthalates

| Test Items | Unit | Test Method | MDL | Results |
|------------------------------------|-------|--|-----|---------|
| Di-(2-ethylhexyl) phthalate (DEHP) | mg/kg | With reference to IEC 62321-8 ; 2017 , GC/MS | 50 | N.D. |
| Di-butyl phthalate (DBP) | mg/kg | With reference to IEC 62321-8 ; 2017 , GC/MS | 50 | N.D. |
| Benzyl butyl phthalate (BBP) | mg/kg | With reference to IEC 62321-8 ; 2017 , GC/MS | 50 | N.D. |
| Di-isobutyl phthalate (DIBP) | mg/kg | With reference to IEC 62321-8 ; 2017 , GC/MS | 50 | N.D. |

Halogen Content

| Test Items | Unit | Test Method | MDL | Results |
|--------------|-------|-------------------------------------|-----|---------|
| Bromine(Br) | mg/kg | With reference to EN 14582:2016, IC | 30 | N.D. |
| Chlorine(Cl) | mg/kg | With reference to EN 14582:2016, IC | 30 | N.D. |

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- NOTE:
- (1) N.D. = Not detected.(<MDL)
 - (2) mg/kg = ppm
 - (3) MDL = Method Detection Limit
 - (4) - = No regulation
 - (5) Negative = Undetectable / Positive = Detectable
 - (6) ** = Qualitative analysis (No Unit)
 - (7) * = a. The result of Hexavalent Chromium (Cr(VI)) is "ND" as the result of Chromium (Cr) is "ND", and confirmation test of Hexavalent Chromium (Cr(VI)) is not required.
 b. If the Chromium (Cr) content is greater than the MDL of Hexavalent Chromium (Cr(VI)), confirmation test of Hexavalent Chromium (Cr(VI)) is required.

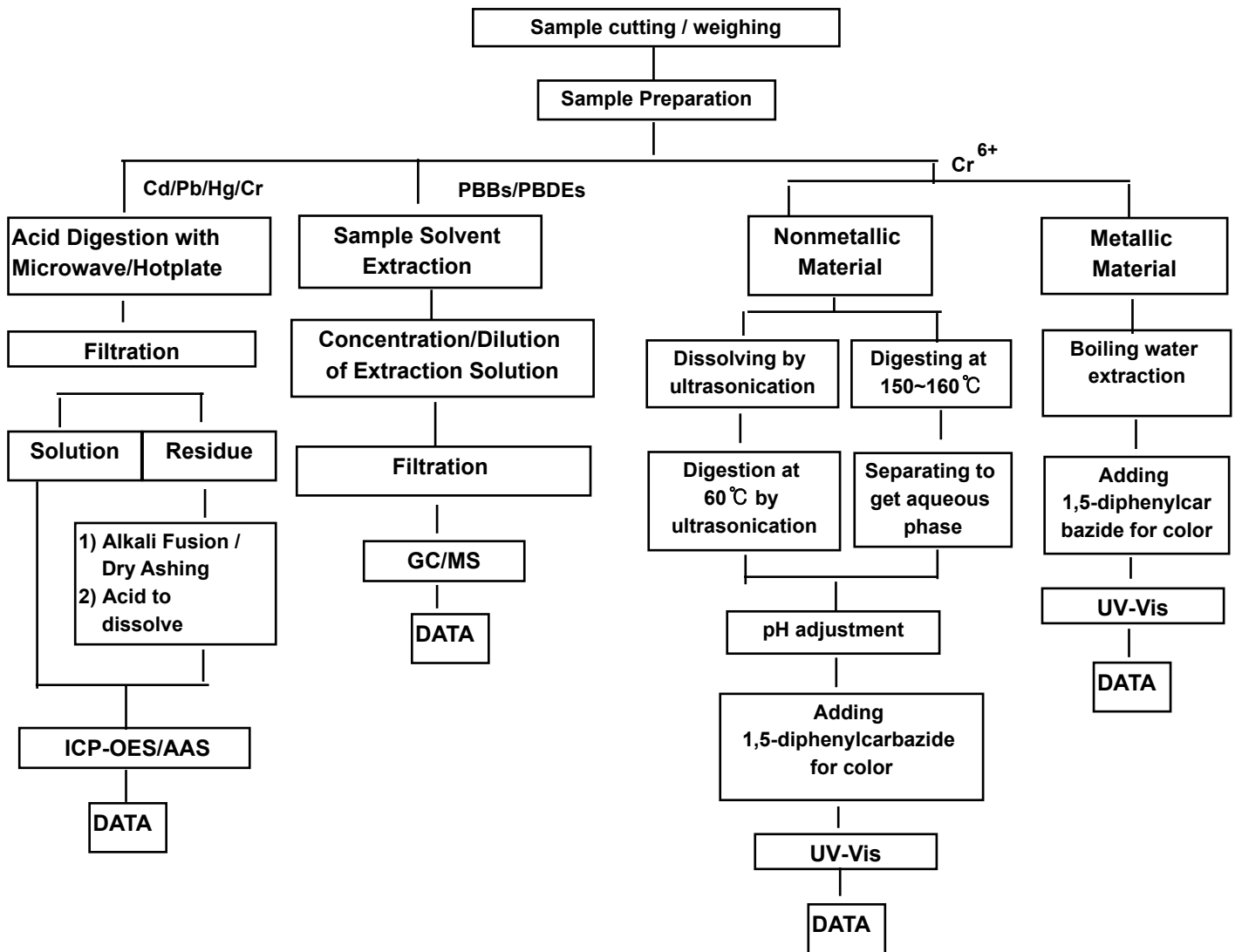
Picture of Sample as Received:



AYAA19-28666.001

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Testing Flow Chart for RoHS: Cd/Pb/Hg/Cr⁶⁺ /PBBs&PBDEs Testing

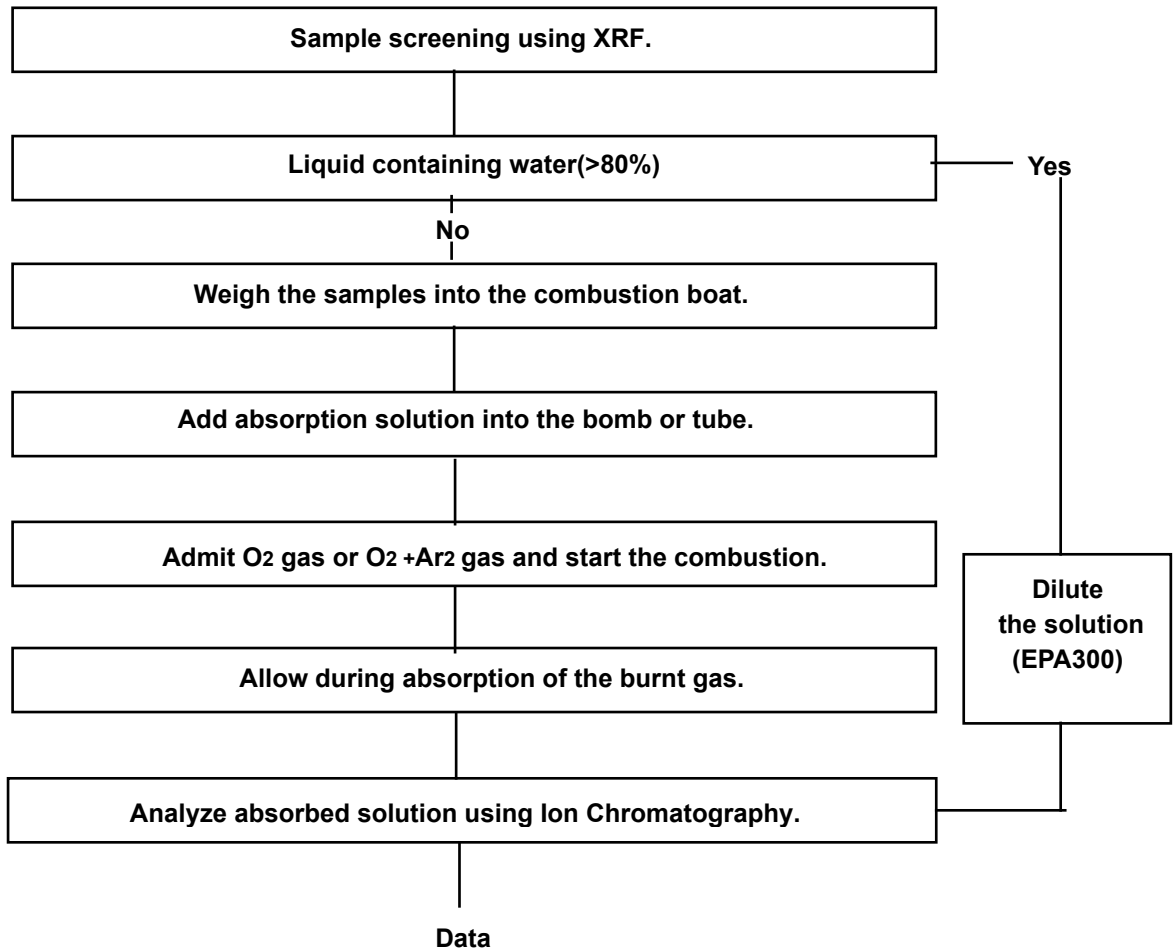


The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg
Section Chief : Minkyu Park

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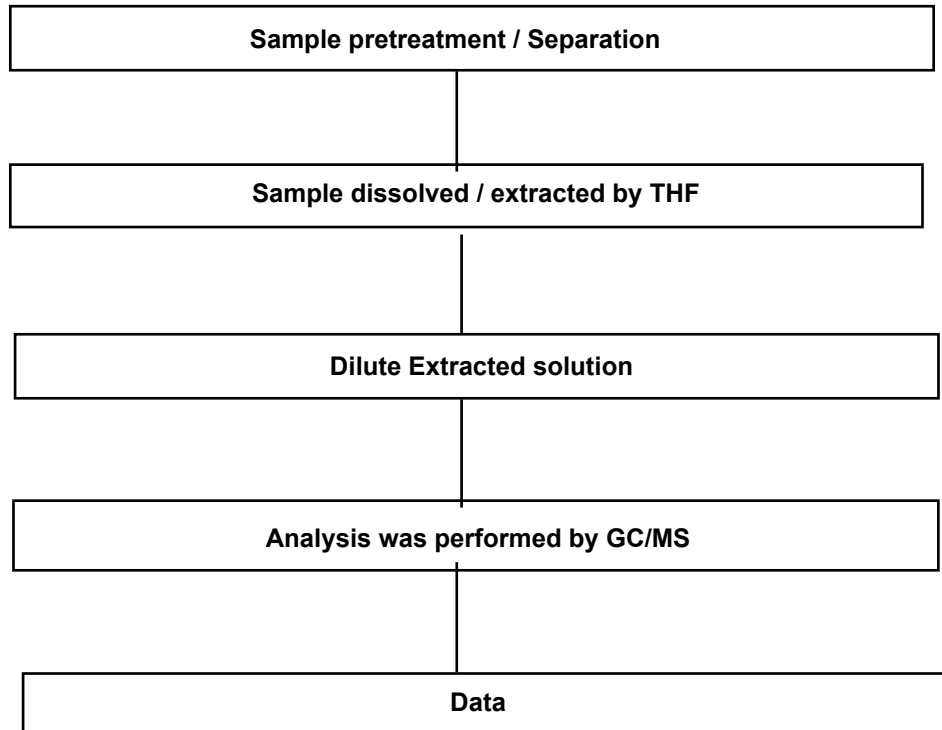
Flow Chart for Halogen Test



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Flow Chart for Phthalate Test



*** End of Report ***

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