Test Report  
No. : CE/2018/37463  
Date : 2018/04/09  

KESTER AN ILLINOIS TOOL WORKS COMPANY  
800 W. THORNDALE AVE. ITASCA, IL 60143

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By : KESTER AN ILLINOIS TOOL WORKS COMPANY  
Sample Description : 950E  
Style/Item No. : IC180221  
Sample Receiving Date : 2018/03/29  
Testing Period : 2018/03/29 TO 2018/04/09

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 Result(s) : 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 and amending Directive (EU) 2015/863.

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## Test Result(s)

**PART NAME No.1 : TRANSPARENT LIQUID**

<table>
<thead>
<tr>
<th>Test Item(s)</th>
<th>Unit</th>
<th>Method</th>
<th>MDL</th>
<th>Result No.1</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-5 (2013) and performed by ICP-AES.</td>
<td>2</td>
<td>n.d.</td>
<td>100</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-4 (2013) and performed by ICP-AES.</td>
<td>2</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.</td>
<td>8</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>Sum of PBBs</td>
<td>mg/kg</td>
<td></td>
<td></td>
<td>-</td>
<td>1000</td>
</tr>
<tr>
<td>Monobromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Dibromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Tribromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Tetrabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Pentabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Hexabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Heptabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Octabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Nonabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Decabromobiphenyl</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Sum of PBDEs</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6 (2015) and performed by GC/MS.</td>
<td>5</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>Monobromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Dibromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Tribromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Tetrabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Pentabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Hexabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Heptabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Octabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Nonabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Decabromodiphenyl ether</td>
<td>mg/kg</td>
<td></td>
<td>5</td>
<td>n.d.</td>
<td>-</td>
</tr>
</tbody>
</table>

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*Note: MDL stands for Method Detection Limit.*
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<table>
<thead>
<tr>
<th>Test Item(s)</th>
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<th>Method</th>
<th>MDL</th>
<th>Result No.1</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Halogen</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halogen-Fluorine (F) (CAS No.: 14762-94-8)</td>
<td>mg/kg</td>
<td>With reference to BS EN 14582 (2016).</td>
<td>50</td>
<td>128</td>
<td>-</td>
</tr>
<tr>
<td>Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)</td>
<td>mg/kg</td>
<td>Analysis was performed by IC.</td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Halogen-Bromine (Br) (CAS No.: 10097-32-2)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>Halogen-Iodine (I) (CAS No.: 14362-44-8)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>DBP (Dibutyl phthalate) (CAS No.: 84-74-2)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>1000</td>
</tr>
<tr>
<td>DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.</td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>DNP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>-</td>
</tr>
<tr>
<td>DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)</td>
<td>mg/kg</td>
<td></td>
<td>50</td>
<td>n.d.</td>
<td>1000</td>
</tr>
</tbody>
</table>

**Note:**
1. mg/kg = ppm; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected = less than MDL
4. "-" = Not Regulated
**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)

- Technician: JR Wang
- Supervisor: Troy Chang

**Cutting - Preparation**

**Sample Measurement**

- Pb/Cd/Hg
  - Acid digestion with microwave / hotplate
  - Filtration
  - Solution
  - Residue
  - 1) Alkali fusion
  - 2) HCl to dissolve
  - ICP-AES

- Non-metal
  - Dissolving by ultrasonication
  - Digesting at 60°C by ultrasonication
  - Digesting at 150~160°C
  - Separating to get aqueous phase
  - pH adjustment
  - Add diphenyl-carbazide for color development
  - Measure the absorbance at 540 nm by UV-VIS

- Metal
  - Boiling water extraction
  - Cool, filter digestate through filter
  - Add diphenyl-carbazide for color development
  - Measure the absorbance at 540 nm by UV-VIS

- ABS / PC / PVC

- Others
Analytical flow chart – PBB / PBDE

First testing process →
Optional screen process
Confirmation process →

Sample

Sample pretreatment

Screen analysis

Sample extraction / Soxhlet method

Concentrate/Dilute
Extracted solution

Filter

GC/MS

Technician: Yaling Tu
Supervisor: Troy Chang
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Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang

Sample pretreatment / Separation

Weighting and putting sample in cell

Oxygen Bomb Combustion / Absorption

Dilution to fixed volume

Analysis was performed by IC
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Analytical flow chart - Phthalate

- Technician: Andy Hsu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】

Sample pretreatment/separation

Sample dissolved/extracted by THF

Dilute Extracted solution

Analysis was performed by GC/MS
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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 **