Test Report

No. CRSSA/02575/18 Date: 09/03/2018 Page: 1 of 13
CRS Ref. CRSSA/18/0530/Dynacraft

DYNACRAFT INDUSTRIES SDN. BHD.
255-A, BLOCK D, PHASE II, BAYAN LEPAS INDUSTRIAL ZONE,
11900 PENANG, MALAYSIA.

The following merchandise was (were) submitted and identified by the client as:

Sample Description : Ag Plating Leadframe using Copper Blank C194
Sample Receiving Date : 01/03/2018
Testing Period : 01/03/2018 to 07/03/2018
Date Completed : 07/03/2018
Reporting Date : 09/03/2018

Test Requested : Selected test(s) as requested by client
Test Method : Please refer to next page(s).
Test Results : Please refer to next page(s).
Analysts : Tan Mei Ann, Ling Yii Ming, Nurfarahima Ibrahim & Chew Jia Jia

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON
B.Sc. MMIC
SECTION HEAD
Test Report

Test Part Description:

Sample Description: Ag Plating Leadframe using Copper Blank C194

RoHS Directive 2011/65/EU Annex II

<table>
<thead>
<tr>
<th>Test Item(s):</th>
<th>Unit</th>
<th>Test Method</th>
<th>Results</th>
<th>MDL</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-5:2013 (Determination of Cd by ICP-OES)</td>
<td>N.D.</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-5:2013 (Determination of Pb by ICP-OES)</td>
<td></td>
<td>29</td>
<td>1000</td>
</tr>
<tr>
<td>Mercury (Hg)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-4:2013/AMD 1:2017 (Determination of Hg by ICP-OES)</td>
<td>N.D.</td>
<td>2</td>
<td>1000</td>
</tr>
<tr>
<td>Hexavalent Chromium (CrVI) #</td>
<td>µg/cm²</td>
<td>With reference to IEC 62321-7:1:2015 (Determination of CrVI by UV-VIS)</td>
<td>N.D.</td>
<td>0.10</td>
<td>-</td>
</tr>
<tr>
<td>Sum of PBBs</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>-</td>
<td>1000</td>
</tr>
<tr>
<td>Monobromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Dibromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Tribromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Tetrabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Pentabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Hexabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Heptabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Octabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Nonabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Decabromobiphenyl</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBB by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
<td>-</td>
</tr>
</tbody>
</table>

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON
B.Sc. MMIC
SECTION HEAD
<table>
<thead>
<tr>
<th>Sum of PBDEs</th>
<th>mg/kg</th>
<th>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</th>
<th>N.D.</th>
<th>1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monobromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Dibromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Tribromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Tetrabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Pentabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Hexabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Heptabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Octabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Nonabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
<tr>
<td>Decabromodiphenyl ether</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-6:2015 (Determination of PBDE by GC-MS)</td>
<td>N.D.</td>
<td>5</td>
</tr>
</tbody>
</table>

Note:
(a) mg/kg = ppm; 0.1wt% = 1000ppm
(b) N.D. = Not Detected
(c) MDL = Method Detection Limit
(d) # =
   a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 µg/cm². The sample coating is considered to contain CrVI
   b. The sample is negative for CrVI if CrVI is N.D. (concentration less than 0.10 µg/cm²). The coating is considered a non-CrVI based coating
   c. The result between 0.10 µg/cm² and 0.13 µg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination
For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of testing.
(e) - = not regulated
Test results by chemical method:

<table>
<thead>
<tr>
<th>Test Item(s)</th>
<th>Unit</th>
<th>Method</th>
<th>Results</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antimony (Sb)</td>
<td>mg/kg</td>
<td>With reference to EPA Method 3051A, and performed by ICP-OES</td>
<td>N.D.</td>
<td>2</td>
</tr>
<tr>
<td>Beryllium (Be)</td>
<td>mg/kg</td>
<td>With reference to EPA Method 3051A, and performed by ICP-OES</td>
<td>N.D.</td>
<td>2</td>
</tr>
<tr>
<td>Halogen</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Halogen-Fluorine (F)</td>
<td>mg/kg</td>
<td>With reference to BS EN 14582:2016. Analysis was performed by IC method for Fluorine content.</td>
<td>N.D.</td>
<td>50</td>
</tr>
<tr>
<td>Halogen-Chlorine (Cl)</td>
<td>mg/kg</td>
<td>With reference to BS EN 14582:2016. Analysis was performed by IC method for Chlorine content.</td>
<td>N.D.</td>
<td>50</td>
</tr>
<tr>
<td>Halogen-Bromine (Br)</td>
<td>mg/kg</td>
<td>With reference to BS EN 14582:2016. Analysis was performed by IC method for Bromine content.</td>
<td>N.D.</td>
<td>50</td>
</tr>
<tr>
<td>Halogen-Iodine (I)</td>
<td>mg/kg</td>
<td>With reference to BS EN 14582:2016. Analysis was performed by IC method for Iodine content.</td>
<td>N.D.</td>
<td>50</td>
</tr>
</tbody>
</table>

Test Part Description:

Sample Description : Ag Plating Leadframe using Copper Blank C194

Note :  
(a) mg/kg = ppm  
(b) N.D. = Not Detected  
(c) MDL = Method Detection Limit  
(d) --- = Not Conducted  

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON  
B.Sc. MMIC  
SECTION HEAD
Test Report

Test result:

Test Part Description:

Sample Description: Ag Plating Leadframe using Copper Blank C194

Optional: RoHS Directive 2011/65/EU, priority substances

<table>
<thead>
<tr>
<th>Test Item (s):</th>
<th>Unit</th>
<th>Method</th>
<th>Result</th>
<th>MDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexabromocyclododecane (HBCDD)</td>
<td>mg/kg</td>
<td>In-house method with reference to IEC 62321-6: 2015. Analysis was performed by GC-MS</td>
<td>N.D.</td>
<td>5</td>
</tr>
</tbody>
</table>

Note:
(a) Reference Information: Directive 2011/65/EU recasting RoHS directive 2002/95/EC: Hexabromocyclododecane (HBCDD), Bis (2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP) and Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.
(b) - = not regulated
(c) N.D = Not Detected

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON
B.Sc. MMIC
SECTION HEAD
Test result:

Test Part Description:

Sample Description: Ag Plating Leadframe using Copper Blank C194


<table>
<thead>
<tr>
<th>Test Item(s):</th>
<th>Unit</th>
<th>Test Method</th>
<th>Results</th>
<th>MDL</th>
<th>Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bis (2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.</td>
<td>N.D.</td>
<td>50</td>
<td>1000</td>
</tr>
<tr>
<td>Butyl benzyl phthalate (BBP) (CAS No. 85-68-7)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.</td>
<td>N.D.</td>
<td>50</td>
<td>1000</td>
</tr>
<tr>
<td>Dibutyl phthalate (DBP) (CAS No. 84-74-2)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.</td>
<td>N.D.</td>
<td>50</td>
<td>1000</td>
</tr>
<tr>
<td>Diisobutyl phthalate (DIBP) (CAS No. 84-69-5)</td>
<td>mg/kg</td>
<td>With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.</td>
<td>N.D.</td>
<td>50</td>
<td>1000</td>
</tr>
</tbody>
</table>

Note:  
(a) mg/kg = ppm; (0.1wt% = 1000ppm)  
(b) N.D. = Not Detected  
(c) MDL = Method Detection Limit  
(d) - = Not regulated  
(e) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the RoHS Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.  
(f) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.  
(g) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.  
(h) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.
Test Method: With reference to CEN/TS 15968. Analysis was conducted by LC-MS.

<table>
<thead>
<tr>
<th>Result (%)</th>
<th>Max. Limit (µg/m²)</th>
<th>Max. Limit (%)</th>
<th>Max. Limit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Textile/Coated material)</td>
<td>(Plastic)</td>
<td>(Substances or in mixtures)</td>
</tr>
<tr>
<td>1</td>
<td>N.D.</td>
<td>0.1</td>
<td>0.001</td>
</tr>
</tbody>
</table>

PFOS ^ N.D. 1 0.1 0.001
PFOA N.D. / / /

Conclusion PASS

Note: N.D. = Not Detected
* = exceeds the limit

Detection limit = 1 µg/m² for Textile / Coated Material
= 0.001% for Plastic, substances or mixtures


^ PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorocanesulfonic acid, Perfluorocane sulfonamide, N-Methylperfluorocane sulfonamide, N-Ethylperfluorocane sulfonamide, N-Methylperfluorocane sulfonamidoethanol and N-Ethylperfluorocane sulfonamidoethanol

Test Part Description:

Sample Description: Ag Plating Leadframe using Copper Blank C194

Note:
(a) N.D. = Not Detected = < MDL
(b) MDL = Method Detection Limit
(c) --- = Not Conducted

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOOON
B.Sc. MMIC
SECTION HEAD
Test Report

No. CRSSA/02575/18  Date: 09/03/2018  Page: 8 of 13
CRS Ref. CRSSA/18/0530/Dynacraft

Test Part Description:

Sample Description: Ag Plating Leadframe using Copper Blank C194

SGS authenticate the photo on the original report only

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON
B.Sc. MMIC
SECTION HEAD
## Test Report

<table>
<thead>
<tr>
<th>Test Report No.</th>
<th>Date: 09/03/2018</th>
<th>Page: 9 of 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRS Ref. CRSSA/18/0530/Dynacraft</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321-5 2013
- **Sample Receiving and Registration**
  - Cut sample in small pieces
  - Weight sample (0.2-0.5g) into digestion vessel
- **Acid digestion (Microwave)**
  - "Totally Dissolved"
- **Filtration**
- **Analyses by ICP**

### 2. DETERMINATION OF LEAD CONTENT BY IEC 62321-5 2013
- **Sample Receiving and Registration**
  - Cut sample in small pieces
  - Weight sample (0.2-0.5g) into digestion vessel
- **Acid digestion (Microwave)**
  - "Totally Dissolved"
- **Filtration**
- **Analyses by ICP**

### 3. DETERMINATION OF MERCURY CONTENT BY IEC 62321-4 2013/AMD 1 2017
- **Sample Receiving and Registration**
  - Cut sample in small pieces
  - Weight sample (0.1-0.5g) into digestion vessel
- **Acid digestion (Microwave)**
  - "Totally Dissolved"
- **Filtration**
- **Analyses by ICP**

### 4. DETERMINATION OF HEXAVALENT CHROMIUM BY IEC 62321-7-1 2015
- **Sample Receiving and Registration**
- **Sample Preparation**
  - Boiling-water-extraction
- **Analyses by UV- Spectrophotometer**
- **Test Report**

### 5. DETERMINATION OF PBB/PBDE WITH GC-MS BY IEC 62321-6 2015
- **Cut sample in small pieces**
- **Weight sample (0.5-4.0g) into extraction thimble**
- **Soxhlet Extraction with Toluene**
  - Filter through 0.45 um membrane filter
- **Analyses by GC-MS (with appropriate dilution)**

### 6. DETERMINATION OF HALOGEN CONTENT BY EN 14582 2016
- **Sample pretreatment**
- **Weighting and putting sample in cell**
- **Combustion / Absorption**
  - Dilution to fixed volume
- **Analyses by IC**

---

This document is issued by the Company subject to its General Conditions of Service printed overhead, available on request or accessible at [http://www.sgs.com/en/Terms-and-Conditions.aspx](http://www.sgs.com/en/Terms-and-Conditions.aspx) and, for electronic format documents, subject to Terms and Conditions for Electronic Documents at [http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx](http://www.sgs.com/en/Terms-and-Conditions/Terms-e-Document.aspx). Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for seven days (perishable food sample) or three months only.

---

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON  
B.Sc. MMIC  
SECTION HEAD

Member of the SGS Group (SGS SA)
MICROWAVE ASSISTED ACID DIGESTION OF ORGANICALLY BASED METRICS (US EPA 3051A)

1. Cut sample in small pieces
2. Weight sample (0.2-0.5g) into digestion vessel
3. Acid digestion (HNO₃) – Microwave
   - “Totally Dissolved”
4. Filtration
5. Analyses by ICP

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOOON
B.Sc. MMIC
SECTION HEAD
Test Report

No. CRSSA/02575/18           Date : 09/03/2018          Page: 11 of 13
CRS Ref. CRSSA/18/0530/Dynacraft

Analytical flow chart of PFOS and PFOA

Sample pre-treatment/separation

Solvent extraction

Concentrate/Dilute Extracted solution

Sample filtration

Analysis was performed by LC/MS

Data

SGS (MALAYSIA) SDN. BHD.

CHEE TUCK CHOON
B.Sc. MMIC
SECTION HEAD

This document is issued by the Company subject to its General Conditions of Service printed overleaf, available on request or accessible at http://www.sgs.com/en/Terms-and-Conditions.aspx. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company’s findings at the time of its intervention only and within the limits of Client’s instructions, if any. The Company’s sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for seven days (perishable food sample) or three months only.
**SGS (MALAYSIA) SDN. BHD.**

CHEE TUCK CHOON  
B.Sc. MMIC  
SECTION HEAD

---

**TEST REPORT**  
No. CRSSA/02575/18  
Date: 09/03/2018  
Page: 12 of 13  
CRS Ref. CRSSA/18/0530/Dynacraft

---

**DETERMINATION OF HBCDD CONTENT**

1. Cut sample in small pieces
2. Weight sample (0.5-4.0g) into extraction thimble
3. Soxhlet Extraction with Toluene
4. Filter through 0.45 um membrane filter
5. Analyses by GC-MS (with appropriate dilution)

---

SGS (Malaysia) Sdn. Bhd.  
Lot 4, Persiaran Jubli Perak, Seksyen 22, 40300 Shah Alam, Selangor, Malaysia  
t +6 (03) 5481 8282  
Fax +6 (03) 5481 8215  
www.sgs.com

Member of the SGS Group (SGS SA)
Flowchart for Phthalates Measurement

Method: IEC62321

Sample Cutting / Preparation

Sample Measurement

Solvent Extraction

Concentrate / Dilute extracted solution

GC-MS analysis

DATA

****End of Report****