

TEST REPORT:

No. CPSA/240331211-CB46272

REPORTED DATE: 08 Mar 2024

DYNACRAFT INDUSTRIES SDN. BHD.

NO. 255-A, BLOCK D, PHASE II,
BAYAN LEPAS INDUSTRIAL ZONE,
11900 PENANG, MALAYSIA.

The following sample(s) was/were submitted and identified by applicant as:

SAMPLE DESCRIPTION : MEG AG PLATING LEADFRAME C194 (AG PLATING, MEP AG PLATING, MEP NO PLATING, NO PLATING & COPPER CLIP)

JOB REF. : C&P/2024-02-29-015

SAMPLE RECEIVED : 29 Feb 2024

TESTING PERIOD : 29 Feb 2024 to 08 Mar 2024

TEST REQUESTED : Selected test(s) as requested by customer

TEST METHOD : -PLEASE REFER TO NEXT PAGE(S)-

TEST RESULTS : -PLEASE REFER TO NEXT PAGE(S)-

CONCLUSION : Based on the performed tests on submitted sample(s), the result(s) of Cadmium (Cd), Lead (Pb), Mercury (Hg), Hexavalent Chromium (CrVI), Polybrominated biphenyl, PBB, Polybrominated diphenyl ether, PBDE, Dibutyl phthalate (DBP), Benzyl butyl phthalate (BBP), Di(2-ethylhexyl) phthalate (DEHP), Diisobutyl phthalate (DIBP) complies/comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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TAY SIAM PINE
TECHNICAL MANAGER
IKM No. M/3452/6047/11/12



Test Report Form No.: SGS/TR/CP/013, Ver: 6.0, Effective Date: 07/07/2021

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TEST RESULTS:

Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Parameter(s):	Unit	Test Method	Result	MDL	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 3)	N.D.	2	Max 100
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 3)	N.D.	2	Max 1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+A1:2017. Analysis performed by ICP-OES. (Decision rule: refer Appendix, category 3)	N.D.	2	Max 1000
Hexavalent Chromium (CrVI)	µg/cm²	With reference to IEC 62321-7-1:2015. Analysis performed by Colorimetric Method using UV-Vis. (Decision rule: Refer Appendix category 2)	N.D.	0.10	Max 1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	Max 1000
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Dibromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Pentabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Hexabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Heptabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-
Octabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS. (Decision rule: refer to Appendix, category 3)	N.D.	5	-

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RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Parameter(s):	Unit	Test Method	Result	MDL	Limit
Nonabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Sum of PBDEs	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	Max 1000
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015. Analysis performed by GC-MS.(Decision rule: refer to Appendix, category 3)	N.D.	5	-

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- Note :
- (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm
 - (b) N.D. = Not Detected
 - (c) MDL = Method Detection Limit
 - (d) - = Not regulated
 - (e) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
 - (f) a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 $\mu\text{g}/\text{cm}^2$. 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 $\mu\text{g}/\text{cm}^2$). The coating is considered a non-CrVI based coating.
 - c. The result between 0.10 $\mu\text{g}/\text{cm}^2$ and 0.13 $\mu\text{g}/\text{cm}^2$ 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.

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TEST RESULTS:

Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

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

Test Parameter(s):	Unit	Test Method	Result	MDL
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α -HBCDD, β -HBCDD, γ -HBCDD) (CAS No.: 25637-99-4, 3194-55-6(134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	In-house method, SGS-TM-RSTS-O-012, with reference to IEC 62321-6:2015. Analysis was performed by GCMS	N.D.	5

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), Dibutyl phthalate (DBP) are considered as a priority for risk evaluation and substance restriction.

(b) N.D. = Not Detected

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TEST RESULTS:

Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU

Test Parameter(s):	Unit	Test Method	Result	MDL	Limit
Dibutyl phthalate (DBP) (CAS No. 84-74-2)	mg/kg	With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 3)	N.D.	50	Max 1000
Benzyl butyl phthalate (BBP) (CAS No. 85-68-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 3)	N.D.	50	Max 1000
Di(2-ethylhexyl) phthalate (DEHP) (CAS No. 117-81-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 3)	N.D.	50	Max 1000
Diisobutyl phthalate (DIBP) (CAS No. 84-69-5)	mg/kg	With reference to IEC 62321-8:2017. Analysis performed by GC-MS.(Decision rule:refer Appendix, category 3)	N.D.	50	Max 1000

- Note :
- (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm
 - (b) N.D. = Not Detected
 - (c) MDL = Method Detection Limit
 - (d) - = Not regulated
 - (e) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
 - (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.

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TEST RESULTS BY CHEMICAL METHOD:

Test Part Description

Sample Description: -PLEASE REFER TO PAGE 1-

Test Parameter(s):	Unit	Test Method	Result	MDL
Beryllium (Be)	mg/kg	With reference to EPA Method 3051A, and performed by ICP-OES.	N.D.	2
Halogen	-	-	-	-
Halogen-Fluorine (F)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Fluorine content.	N.D.	50
Halogen-Chlorine (Cl)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Chlorine content.	N.D.	50
Halogen-Bromine (Br)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Bromine content.	N.D.	50
Halogen-Iodine (I)	mg/kg	With reference to BS EN 14582:2016, analysis performed by IC method for Iodine content.	N.D.	50

Note : (a) mg/kg = ppm ; ug/kg = ppb (0.01 mg/kg = 10 ug/kg); 0.1wt% = 1000ppm

(b) N.D. = Not Detected

(c) MDL = Method Detection Limit

(d) Negative = Undetectable / Positive = Detectable

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Test Method: With reference to CEN/TS 15968:2010. Analysis was performed by LC-MS

Test Parameter(s):	Result (%)	Max. Limit (µg/m²) (Textile/Coated material)	Max.Limit(%) (Plastic)	Max. Limit(%) (Substances/ in mixtures)
Perfluorooctanesulfonic acid (PFOS)	N.D.	1	0.1	0.001
Perfluorooctanoic acid (PFOA) (CAS No. 335-67-1)	N.D.	/	/	/
Conclusion	PASS			

Note: (a) N.D. = Not Detected

(b) Detection limit = 1 µg/m² for Textile / Coated Material

= 0.001% for Plastic, substances or mixtures

(c) Recommended requirement with reference to Commission Regulation (EU) 2019/1021 on Persistent Organic Pollutant.

(d) PFOS refers to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

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Appendix

Category	Decision Rule Statement
1	Based on binary statement with guard band (equal to the expanded measurement uncertainty with a 95% coverage probability, w=U95) in ILAC-G8:09/2019 Clause 4.2.2.
2	According to IEC 62321-7-1 Edition 1.0 2015-09 Section 7: Table 1- Comparison to standard and interpretation of result.
3	Based on binary statement for simple acceptance rule (w=0) in ILAC-G8:09/2019 Clause 4.2.1.
4	<p>Based on non-binary statement with guard band (equal to the expanded measurement uncertainty with a 95% coverage probability, w=U95) in ILAC-G8:09/2019 Clause 4.2.3.</p> <p>A. "Pass - the measured value is within (or below / above) the acceptance limit, where the acceptance limit is below / above to the guard band." or "Pass - The measured values were observed in tolerance at the points tested. The specific false accept risk is up to 2.5%."</p> <p>B. "Conditional Pass - The measured values were observed in tolerance at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values exceeded / out of tolerance. When the measured result is close to the tolerance, the specific false accept risk is up to 50%."</p> <p>C. "Conditional Fail - One or more measured values were observed out of tolerance at the points tested. However, a portion of the expanded measurement uncertainty intervals about one or more measured values were in tolerance. When the measured result is close to the tolerance, the specific false reject risk is up to 50%."</p> <p>D. "Fail - the measured value is out of (or below / above) the tolerance limit added / subtracted to the guard band." or "Fail - One or more measured values were observed out of tolerance at the points tested". The specific false reject risk is up to 2.5%.</p>
5	According to IEC 62321-3-1 Edition 1.0 2013-06 Annex A.3 Interpretation of result.
Remark	When decision rule is not feasible to be used and the uncertainty of the result is available to be provided, the uncertainty range of result will be shown in the report. Otherwise, only result will be shown in the report.

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IKM No. M/3452/6047/11/12



Test Report Form No.: SGS/TR/CP/013, Ver: 6.0, Effective Date: 07/07/2021

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SGS (Malaysia) Sdn.Bhd.
(Company No. 10871-T)

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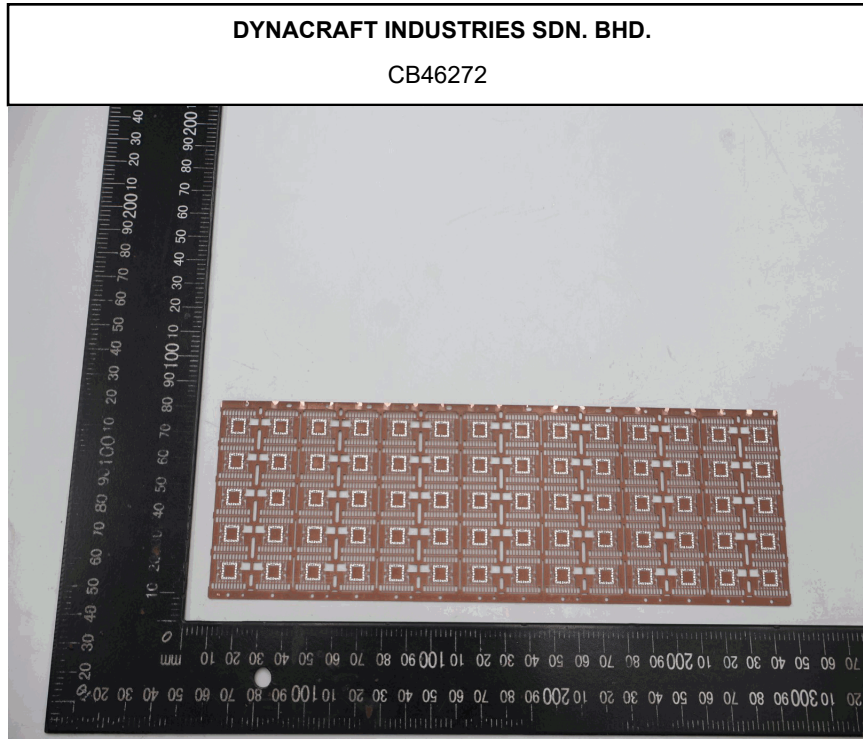
TEST REPORT:

No. CPSA/240331211-CB46272

REPORTED DATE: 08 Mar 2024

Test Part Description :

Sample Description: -PLEASE REFER TO PAGE 1-



SGS authenticate the photo on original report only

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SGS (MALAYSIA) SDN BHD

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1. DETERMINATION OF CADMIUM CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration
↓
Sample Preparation
↓
Weigh sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Hotplate)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

2. DETERMINATION OF LEAD CONTENT BY IEC 62321-5 2013

Sample Receiving and Registration
↓
Sample Preparation
↓
Weigh sample (0.2-0.5g) into digestion vessel
↓
Acid digestion (Hotplate)
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

3. DETERMINATION OF MERCURY CONTENT BY IEC 62321-4 2013/AMD1 2017

Sample Receiving and Registration
↓
Sample Preparation
↓
Weigh sample (0.1-0.5g) into digestion vessel
↓
Acid digestion (Hotplate)
↓
"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

Sample Preparation
↓
Weigh 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)

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DETERMINATION OF HBCDD CONTENT

Sample preparation
↓
Weigh sample (0.5 – 4.0g) into extraction thimble
↓
Solvent extraction with Toluene
↓
Filter through 0.45 µm membrane filter
↓
Analysis by GC-MS (with appropriate dilution)

DETERMINATION OF PHTHALATES WITH GC-MS BY IEC 62321-8:2017

Sample Cutting / Preparation
↓
Sample Measurement
↓
Solvent Extraction
↓
Concentrate / Dilute extracted solution
↓
GC-MS analysis
↓
DATA

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MICROWAVE ASSISTED ACID DIGESTION OF ORGANICALLY BASED METRICES BY US EPA 3051A

Sample Preparation
↓
Weight sample (0.2-0.5g) into digestion vessel
↓
Acid digestion
↓
"Totally Dissolved"
↓
Filtration
↓
Analyses by ICP

DETERMINATION OF HALOGEN CONTENT

Sample pre-treatment
↓
Weighting and putting sample in cell
↓
Combustion / Absorption
↓
Dilution to fixed volume
↓
Analyses by IC

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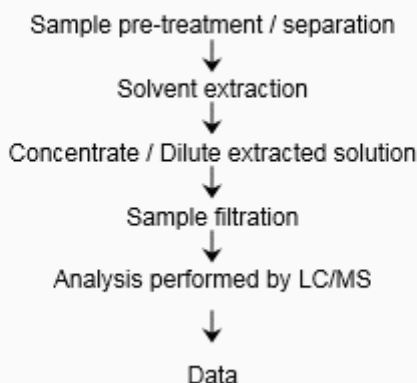
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DETERMINATION OF PFOS AND PFOA CONTENTS



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*** End of test report ***

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