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DYNACRAFT INDUSTRIES SDN BHD

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

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

Sample Submitted By Sample Description CRS Reference No. Sample Receiving Date Testing Period	:	DYNACRAFT INDUSTRIES SDN BHD AG PLATING LEADFRAME USING COPPER BLANK C194 2020-02-20-015 2020/02/24 2020/02/24 to 2020/03/02
Test Requested : Test Result(s) :	()	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). Please refer to next pages for the other item(s). Please refer to next page(s).







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Test Result(s)

PART NAME NO.1

: GOLDEN/SILVER COLORED METAL SHEET (INCLUDING THE PLATING LAYER)

Test Item (s)	Unit	Method	MDL	Result No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-OES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-OES.	2	21.3
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP- OES.	2	n.d.
Hexavalent Chromium Cr(VI)(#2)	µg/cm²	With reference to IEC 62321-7-1:2015 and performed by UV-VIS.	0.10	n.d.
Sum of PBBs	mg/kg		-	n.d.
Monobromobiphenyl	mg/kg		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	With reference to IEC 62321-6:2015	5	n.d.
Sum of PBDEs	mg/kg	and performed by GC/MS.	-	n.d.
Monobromodiphenyl ether	mg/kg		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.



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Test Item (s)	Unit	Method	MDL	Result No.1
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0, 68515-48-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0, 68515-49-1)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DHNUP (1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters) (CAS No.: 68515-42-4)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DIHP (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich) (CAS No.: 71888-89-6)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.
Antimony (Sb)	mg/kg	With reference to US EPA 3052: 1996. Analysis was performed by ICP-OES.	2	n.d.
Beryllium (Be)	mg/kg	With reference to US EPA 3052: 1996. Analysis was performed by ICP-OES.	2	n.d.



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Test Item (s)	Unit	Method	MDL	Result
				No.1
Perfluorooctane sulfonates (PFOS- Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α - HBCDD, β - HBCDD, γ - HBCDD) (CAS No.: 25637-99-4 and 3194- 55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	With reference to IEC 62321: 2008. Analysis was performed by GC/MS.	5	n.d.
Polychlorinated Biphenyls (PCBs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	0.5	n.d.
Polychlorinated Naphthalene (PCNs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	5	n.d.
Polychlorinated Terphenyls (PCTs)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	0.5	n.d.
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins) (CAS No.:85535-84-8)	%	With reference to US EPA 3550C: 2007. Analysis was performed by GC/ECD.	0.01	n.d.
Tributyl Tin (TBT)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD.	0.03	n.d.
Bis(tributyltin)oxide (TBTO) (CAS No.: 56-35-9)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD. Calculated from the result of Tributyl Tin (TBT).	0.03 (▲)	n.d.
Triphenyl Tin (TphT)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD.	0.03	n.d.
Dibutyl Tin (DBT)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD.	0.03	n.d.
Dioctyl Tin (DOT)	mg/kg	With reference to ISO 17353: 2004. Analysis was performed by GC/FPD.	0.03	n.d.



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Test Item (s)	Unit	Method	MDL	Result
rest tielli (S)				No.1
PVC	**	Analysis was performed by FTIR and FLAME Test.	-	Negative
Halogen				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.

Note :

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. n.d. = Not Detected
- 3. MDL = Method Detection Limit
- 4. " " = Not Regulated
- 5. (#2) =

a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μ g/cm². The sample coating is considered to contain Cr(VI)

b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μ g/cm²). The coating is considered a non-Cr(VI) based coating

c. The result between 0.10 μ g/cm² and 0.13 μ g/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.

6. ** = Qualitative analysis (No Unit)

7. Negative = Undetectable / Positive = Detectable

8. (\blacktriangle) : The MDL was evaluated for element / tested substance.

Conversion Formula : $AX = A \times F$

AX	А	F
Bis(tributyItin)oxide (TBTO)	Tributyl Tin (TBT)	1.024

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PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semifinished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m².

PFOS refer to Perfluoroctanesulfonic acid and its derivatives including Perfluoroctanesulfonic acid, Perfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamidoethanol and N-Ethylperfluoroctane sulfonamidoethanol.

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Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)





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PBB/PBDE analytical FLOW CHART





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Analytical flow chart of phthalate content

- Technician: Dorothy Chen
- Supervisor: Ray Chang

[Test method: IEC 62321-8]





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Flow Chart of digestion for the elements analysis performed by ICP-OES

These samples were dissolved totally by pre-conditioning method according to below flow chart.

- Technician: Jony Liu
- Supervisor: Ray Chang





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Analytical flow chart of PFOA/PFOS content



Data



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HBCDD analytical flow chart

- Technician : Dorothy Chen
- Supervisor: Ray Chang





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Chlorinated Flame retardant analytical flow chart

- Technician: Dorothy Chen
- Supervisor: Ray Chang

[Reference method: US EPA 3550C]

【Test Items: PCBs, PCNs, PCTs 】





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Analytical flow chart - Chlorinated Paraffins

- Technician: Dorothy Chen
- Supervisor: Ray Chang

[Reference method: US EPA 3550C]





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Analytical flow chart of Organic-Tin content

- Technician: Dorothy Chen
- Supervisor: Ray Chang





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Analysis flow chart for determination of PVC in polymer material

- Technician: Jin Tu
- Supervisor: Roger Lin





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Analytical flow chart of halogen content



Dilution to fixed volume

Analysis was performed by IC



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* The tested sample / part is marked by an arrow if it's shown on the photo. *



** End of Report **