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SHINKO ELECTRIC INDUSTRIES CO., LTD. 80 OSHIMADA-MACHI, NAGANO-SHI, 381-2287 JAPAN

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

Sample Submitted By Sample Name	/	:	SHINKO ELECTRIC INDUSTRIES CO., LTD. C194+Ag
Sample Receiving Da Testing Period	te	:	23-Nov-2020 23-Nov-2020 to 30-Nov-2020
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 Results	:		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 Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.





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TEST PART DESCRIPTION

No.1 : COPPER/SILVER COLORED METAL (INCLUDING THE PLATING LAYER)

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Cadmium (Cd) (CAS No.: 7440-43- 9)	With reference to IEC 62321-5:	mg/kg	2	n.d.	100
Lead (Pb) (CAS No.: 7439-92-1)	2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Mercury (Hg) (CAS No.: 7439-97-6)	With reference to IEC 62321-4: 2013 + AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000
Chromium VI (CrVI) (CAS No.: 18540-29-9) (#2)	With reference to IEC 62321-7-1: 2015, analysis was performed by UV-VIS.	µg/cm²	0.1	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	With reference to IEC 62321-6:	mg/kg	5	n.d.	-
Sum of PBBs	2015, analysis was performed by	mg/kg	-	n.d.	1000
Monobromodiphenyl ether	GC/MS.	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.	-
Sum of PBDEs		mg/kg	-	n.d.	1000

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Test Item(s)	Method	Unit	MDL	Result No.1	Limit
PFOS and its salts (CAS No.: 1763- 23-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.	-
PFOA and its salts (CAS No.: 335- 67-1 and its salts)	With reference to CEN/TS 15968: 2010, analysis was performed by LC/MS/MS.	mg/kg	0.01	n.d.	-
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Chlorine (Cl) (CAS No.: 22537-15-1)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Bromine (Br) (CAS No.: 10097-32-2)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Iodine (I) (CAS No.: 14362-44-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Polyvinyl chloride (PVC)	With reference to ASTM E1252: 2013, analysis was performed by FT-IR and Flame Test.	**	-	Negative	-
Antimony (Sb) (CAS No.: 7440-36- 0)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.	-
Arsenic (As) (CAS No.: 7440-38-2)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.	-
Beryllium (Be) (CAS No.: 7440-41-7)	With reference to US EPA 3052: 1996, analysis was performed by ICP-OES.	mg/kg	2	n.d.	-
Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Dibutyl phthalate (DBP) (CAS No.: 84-74-2)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000

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Test Item(s)	Method	Unit	MDL	Result No.1	Limit
Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Diisopentyl phthalate (DIPP) (CAS No.: 605-50-5)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Di-n-hexyl phthalate (CAS No.: 84- 75-3)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
1,2-Benzenedicarboxylic acid, di- C6-8-branched alkyl esters, C7-rich (DIHP) (CAS No.: 71888-89-6)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
1,2-Benzenedicarboxylic acid, di- C7-11-branched and linear alkyl esters (DHNUP) (CAS No.: 68515- 42-4)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-
Bis(2-methoxyethyl) phthalate (DMEP) (CAS No.: 117-82-8)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	-

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Test Item(s)	Method	Unit	MDL	Result	Limit
		4		No.1	
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))	With reference to IEC 62321: 2008, analysis was performed by GC/MS.	mg/kg	5	n.d.	-
Polychlorinated biphenyls (PCBs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	0.5	n.d.	-
Polychlorinated naphthalene (PCNs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	5	n.d.	-
Polychlorinated terphenyls (PCTs)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	0.5	n.d.	-
Short Chain Chlorinated Paraffins(C10-C13) (SCCP) (CAS No.: 85535-84-8)	With reference to US EPA 3550C: 2007, analysis was performed by GC/MS.	mg/kg	100	n.d.	-
Tributyl tin (TBT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.	-
Triphenyl tin (TPhT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.	-
Bis(tributyltin) oxide (TBTO) (CAS No.: 56-35-9)	Calculated from the result of Tributyl Tin (TBT).	mg/kg	0.03	n.d.	-
Dibutyl tin (DBT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.	-
Dioctyl tin (DOT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.	-

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Note :

- 1. mg/kg = ppm ; 0.1wt% = 1000ppm
- 2. MDL = Method Detection Limit
- 3. n.d. = Not Detected (Less than MDL)
- 4. "-" = Not Regulated
- 5. **= Qualitative analysis (No Unit)
- 6. Negative = Undetectable ; Positive = Detectable
- 7. PFOS and its salts including :

CAS No.: 29081-56-9, 2795-39-3, 29457-72-5, 70225-14-8, 56773-42-3, 251099-16-8, 307-35-7.

- PFOA and its salts including : CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.
- 9. (#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.

10. \blacktriangle : The MDL was evaluated for element / tested substance.

Conversion Formula : $AX = A \times F$

AX	Α	F
Bis(tributyltin)oxide (TBTO)	Tributyl Tin	1.024

Parameter Conversion Table : https://eecloud.sgs.com/Region_TW/DocDownload.aspx#otherDoc

- 11. The statement of compliance conformity is based on comparison of testing results and limits.
- 12. This is the additional test report of ETR20B03946.

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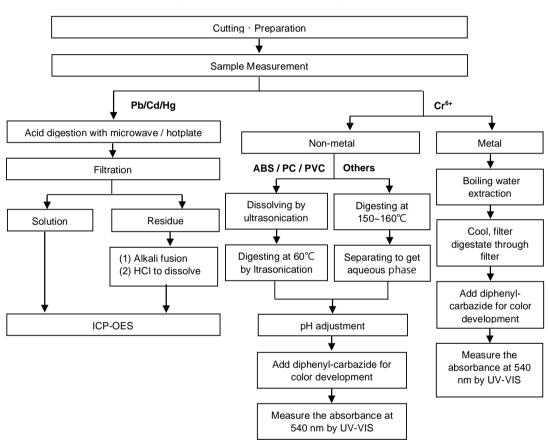
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SHINKO ELECTRIC INDUSTRIES CO., LTD. 80 OSHIMADA-MACHI, NAGANO-SHI, 381-2287 JAPAN

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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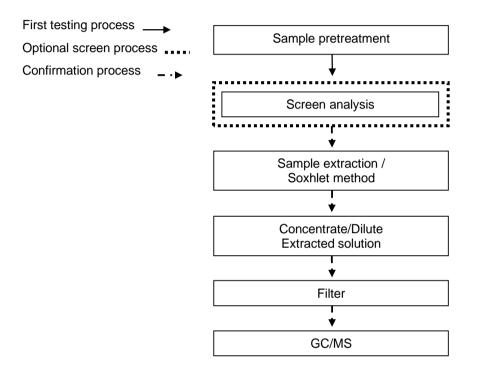
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Analytical flow chart – PBBs / PBDEs



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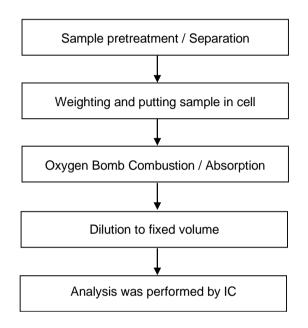
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Analytical flow chart - Halogen



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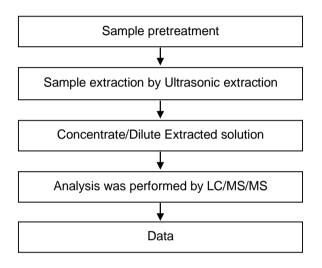
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Analytical flow chart - PFOA/PFOS



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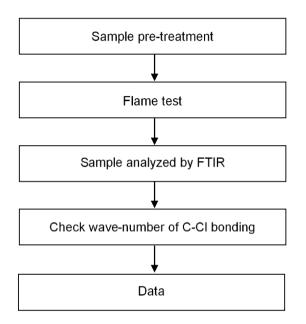
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Analysis flow chart - PVC



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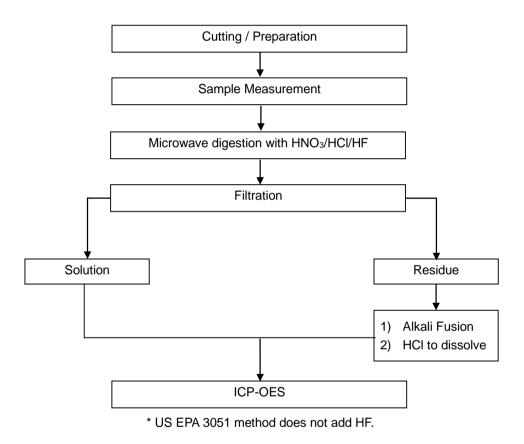
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Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. [Reference method : US EPA 3051 \ US EPA 3052]



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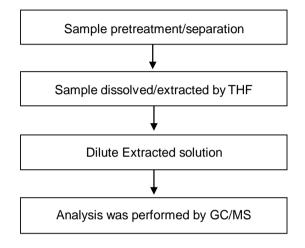
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SHINKO ELECTRIC INDUSTRIES CO., LTD. 80 OSHIMADA-MACHI, NAGANO-SHI, 381-2287 JAPAN

Analytical flow chart - Phthalate

[Test method: IEC 62321-8]



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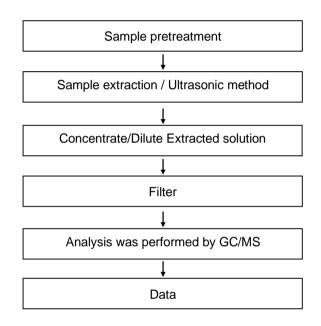
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SHINKO ELECTRIC INDUSTRIES CO., LTD. 80 OSHIMADA-MACHI, NAGANO-SHI, 381-2287 JAPAN

Analytical flow chart - HBCDD



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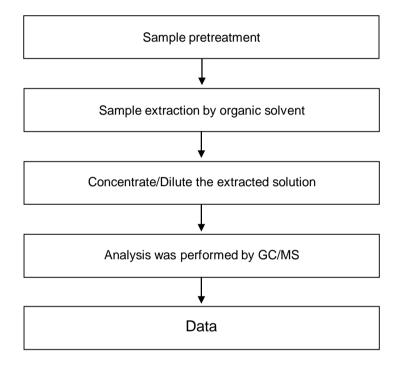
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SHINKO ELECTRIC INDUSTRIES CO., LTD. 80 OSHIMADA-MACHI, NAGANO-SHI, 381-2287 JAPAN

Analytical flow chart

* Apply to: PCBs, PCNs, PCTs, Mirex, Chlorinated Paraffins, DBBT



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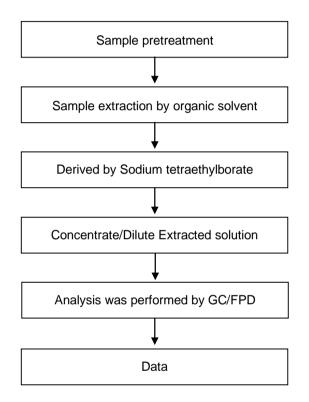
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Analytical flow chart - Organic-Tin



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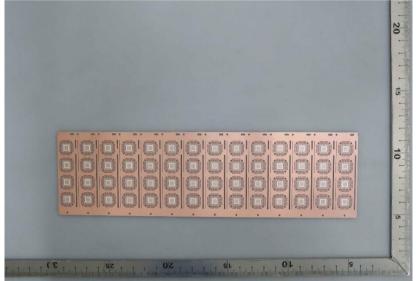
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

ETR20B03946



** End of Report **

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