



Test Report

No.: ETR20C01369A01

Date: 22-Dec-2020

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HAESUNGDS CO., LTD.

(SEONGJU-DONG) 726, UNGNAM-RO, SEONGSAN-GU, CHANG-WON-SI, GYEONGSANGNAM-DO, KOREA

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

Sample Submitted By : HAESUNGDS CO., LTD.
Sample Name : LEAD FRAME
Style/Item No. : C194 UPG RT
Sample Material : METAL ALLOY
SGS File No. : AYGA20-05978

Sample Receiving Date : 07-Dec-2020
Testing Period : 07-Dec-2020 to 22-Dec-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.


Troy Chang, Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



PIN CODE: D46C3832

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TEST PART DESCRIPTION

No.1 : SILVER COLORED METAL SHEET

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result
				No.1
Cadmium (Cd) (CAS No.: 7440-43-9)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.
Lead (Pb) (CAS No.: 7439-92-1)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	12.7
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.
Hexavalent Chromium Cr(VI) (CAS No.: 18540-29-9)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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	5	n.d.
Sum of PBBs		mg/kg	-	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.
Sum of PBDEs		mg/kg	-	n.d.

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Test Item(s)	Method	Unit	MDL	Result
				No.1
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.
Butyl benzyl phthalate (BBP) (CAS No.: 85-68-7)		mg/kg	50	n.d.
Di-(2-ethylhexyl) phthalate (DEHP) (CAS No.: 117-81-7)		mg/kg	50	n.d.
Diisobutyl phthalate (DIBP) (CAS No.: 84-69-5)		mg/kg	50	n.d.
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP) (CAS No.: 71888-89-6)		mg/kg	50	n.d.
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP) (CAS No.: 68515-42-4)		mg/kg	50	n.d.
Bis(2-methoxyethyl) phthalate (DMEP) (CAS No.: 117-82-8)		mg/kg	50	n.d.
Di-n-pentyl phthalate (DNPP) (CAS No.: 131-18-0)		mg/kg	50	n.d.
Diisononyl phthalate (DINP) (CAS No.: 28553-12-0, 68515-48-0)		mg/kg	50	n.d.
Diisodecyl phthalate (DIDP) (CAS No.: 26761-40-0, 68515-49-1)		mg/kg	50	n.d.
Di-n-octyl phthalate (DNOP) (CAS No.: 117-84-0)		mg/kg	50	n.d.
Di-n-hexyl phthalate (DNHP) (CAS No.: 84-75-3)		mg/kg	50	n.d.
Diisopentyl phthalate (DIPP) (CAS No.: 605-50-5)		mg/kg	50	n.d.
N-pentyl iso-pentyl phthalate (NPIPP) (CAS No.: 776297-69-9)		mg/kg	50	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.

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Test Item(s)	Method	Unit	MDL	Result
				No.1
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.
Triphenyl tin (TPhT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.
Tributyl tin (TBT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	mg/kg	0.03	n.d.
Diocetyl tin (DOT)	With reference to ISO 17353: 2004, analysis was performed by GC/FPD.	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.
Bis(tributyltin) oxide (TBTO) (CAS No.: 56-35-9)	Calculated from the result of Tributyl Tin (TBT).	mg/kg	0.03▲	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.
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.
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.
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.
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.

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Test Item(s)	Method	Unit	MDL	Result
				No.1
Polyvinyl chloride (PVC)	With reference to ASTM E1252: 2013, analysis was performed by FT-IR and Flame Test.	**	-	Negative
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.

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.
8. PFOA and its salts including :
CAS No.: 3825-26-1, 335-95-5, 2395-00-8, 335-93-3, 335-66-0.
9. ▲ : The MDL was evaluated for element / tested substance.

Conversion Formula : $AX = A \times F$

AX	A	F
Bis(tributyltin)oxide (TBTO)	Tributyl Tin (TBT)	1.024

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

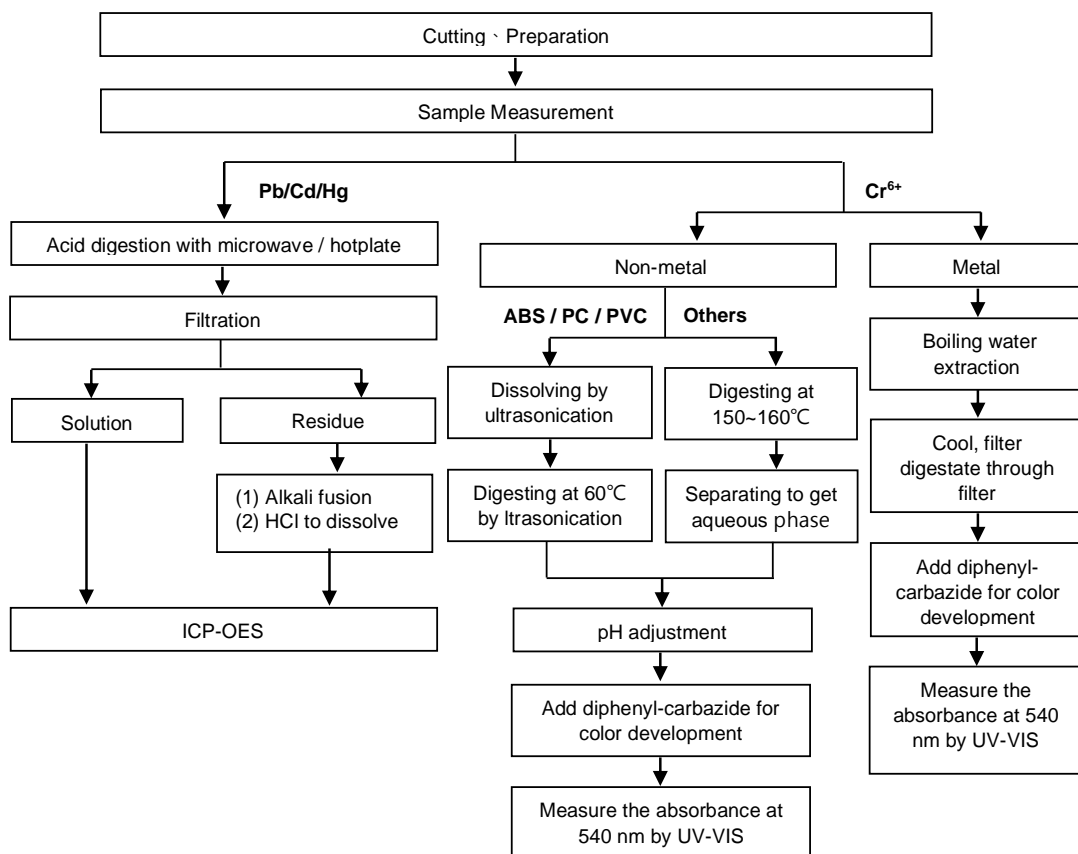
10. This report is added testing and combined with ETR20C01369.

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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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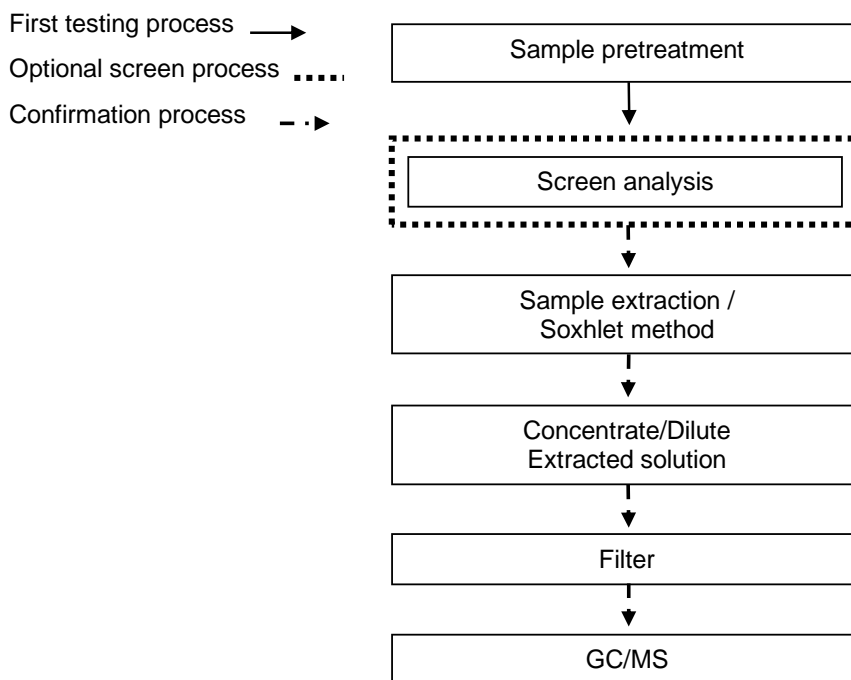
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Analytical flow chart – PBBs / PBDEs



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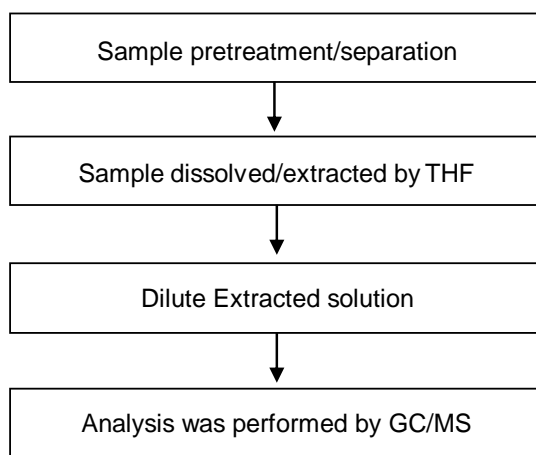
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Analytical flow chart - Phthalate

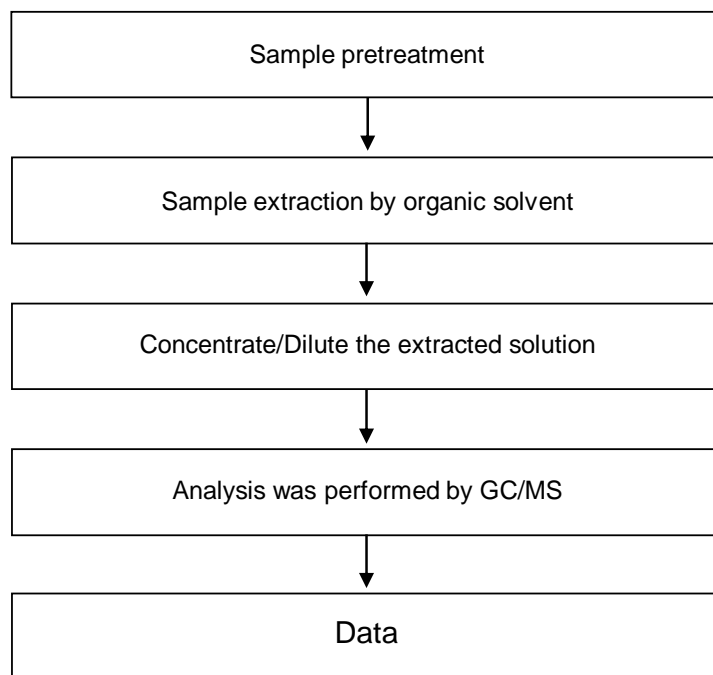
【Test method: IEC 62321-8】



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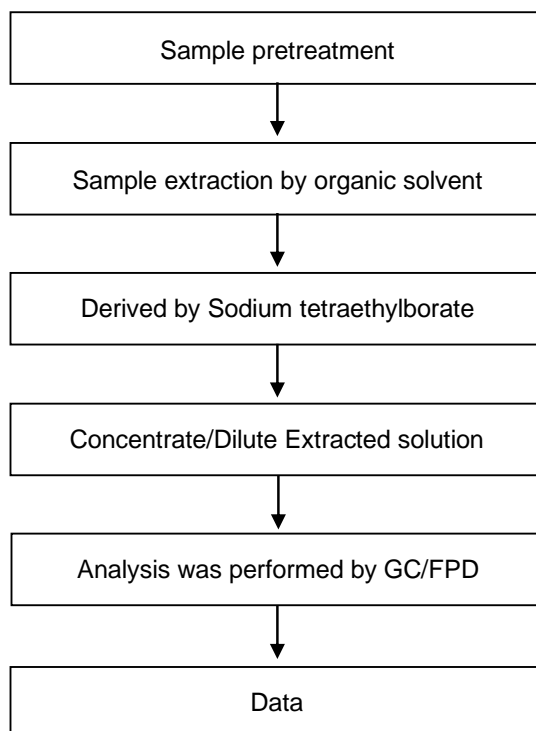
Analytical flow chart

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



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Analytical flow chart - Organic-Tin



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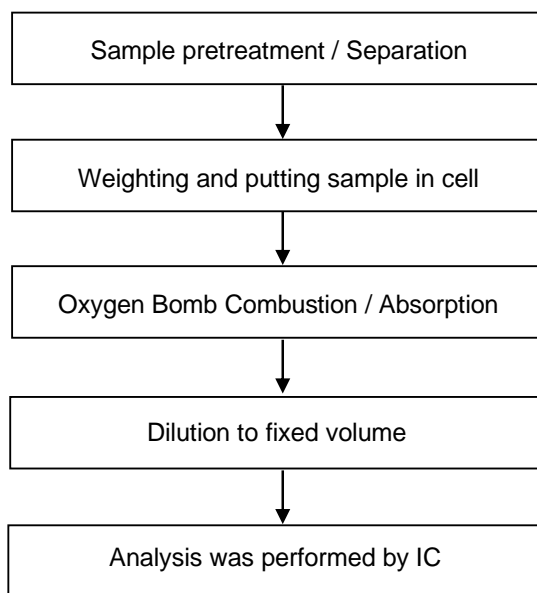
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Analytical flow chart - Halogen

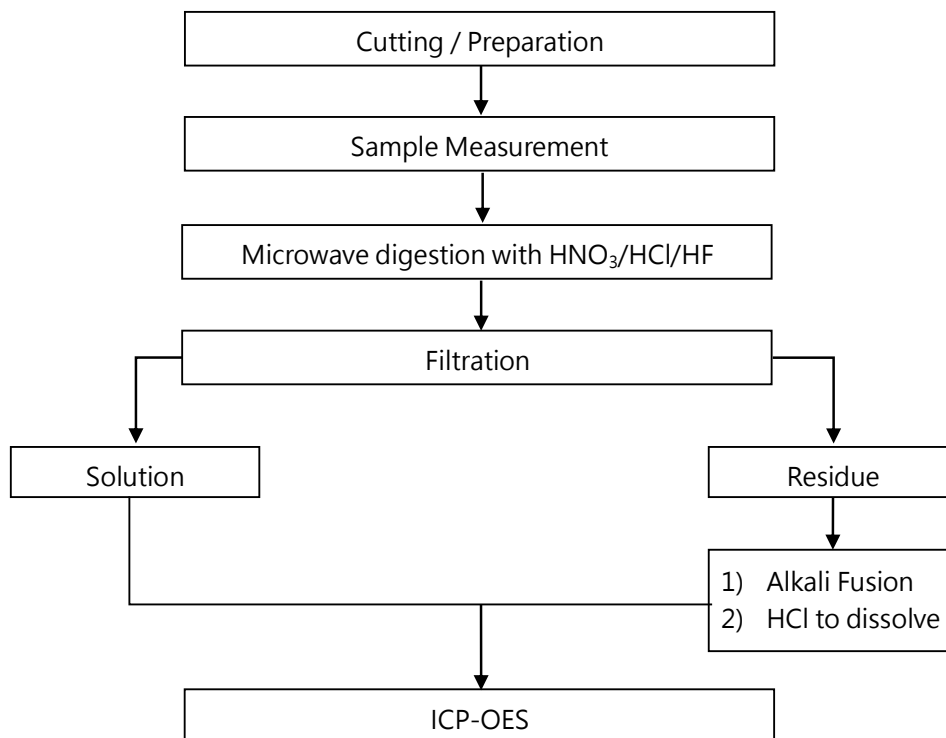


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Analytical flow chart of Heavy Metal

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

【Reference method : US EPA 3051 、US EPA 3052】



* US EPA 3051 method does not add HF.

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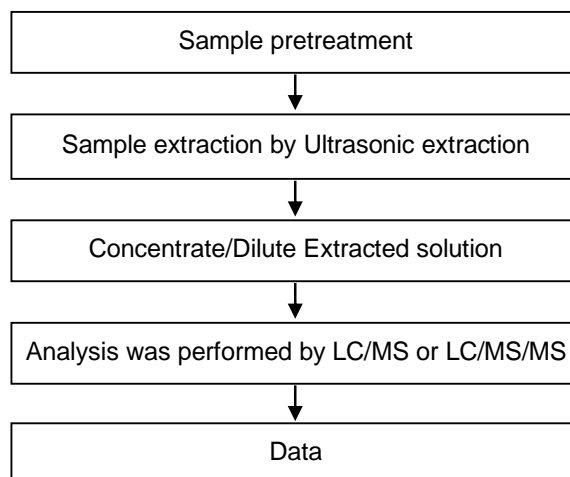
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Analytical flow chart - PFOA/PFOS



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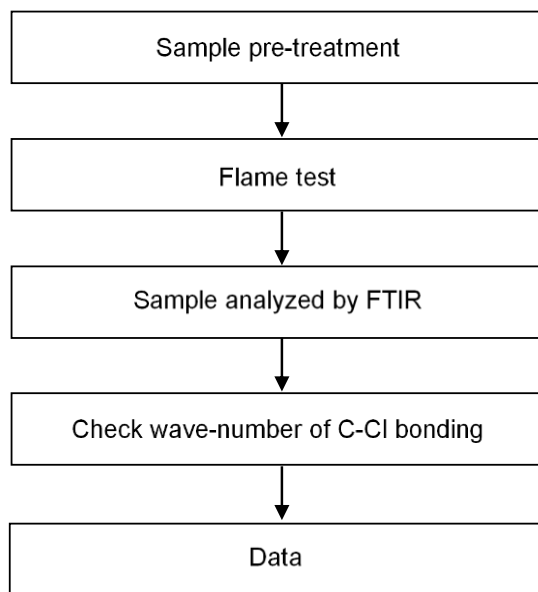
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Analysis flow chart - PVC



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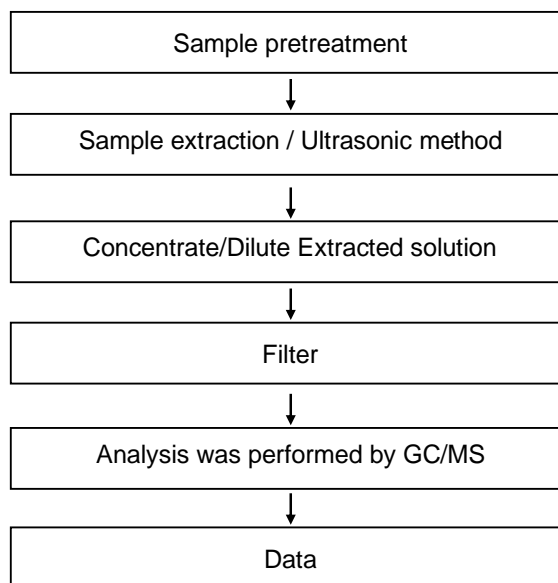
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(SEONGJU-DONG) 726, UNGNAM-RO, SEONGSAN-GU, CHANG-WON-SI, GYEONGSANGNAM-DO, KOREA

Analytical flow chart - HBCDD



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Test Report

No.: ETR20C01369A01

Date: 22-Dec-2020

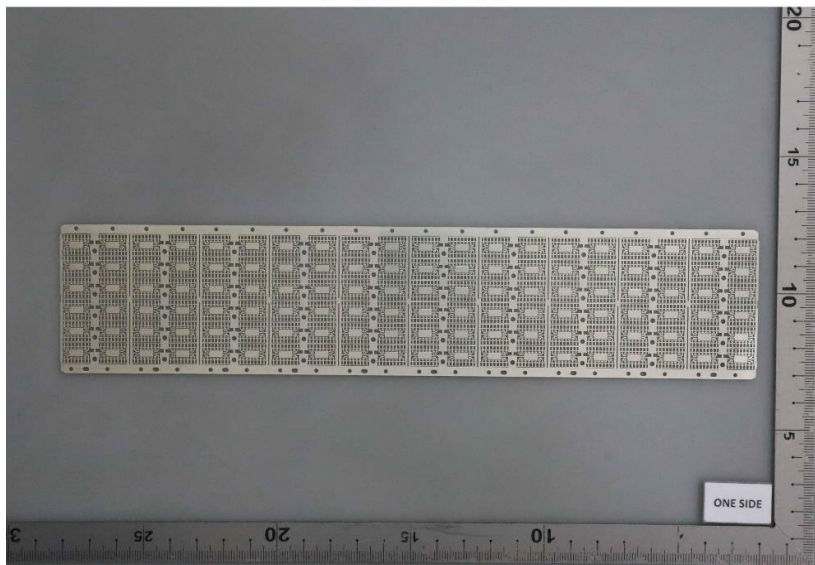
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HAESUNGDS CO., LTD.

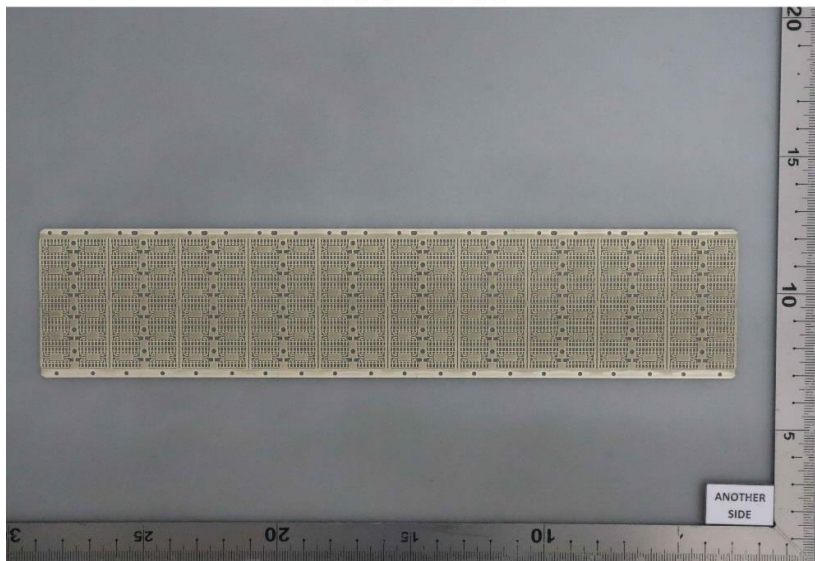
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

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** End of Report **

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