



Test Report

No. 4918287-CH01-R1

Date: June 13, 2022

Page 1 of 19

Palm Commodities International LLC
1717 JP Hennessy Drive
LaVergne, TN 37086
United States

This report supersedes all previous documents bearing the test report number 4918287-CH01-R1.

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

Nickel Sulfamate Solution

Sample Received Date:

05/26/2022

Testing Period:

05/26/2022 – 06/08/2022

Revision Date

: R1: 06/16/2022

Revision Summary

: R1: Organotin & Phthalates Test Results Updated.

Test Requested

: Please refer to the result summary.

Test Method & Results

: Please refer to next page(s).

Result Summary

:

Test Requested	Conclusion
1. RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU	PASS
2. Organotin Content	PASS
3. Per- and Polyfluoroalkyl Substances (PFAS)	See Test Results
4. Hexabromocyclododecane (HBCDD) Content	See Test Results
5. Phthalate Content (As requested by Client)	See Test Results
6. US California Proposition 65 – Bisphenol A (BPA) Content	See Test Results
7. Halogen Content	See Test Results
8. Element Analysis (As requested by Client)	See Test Results
9. Flame Retardant Content (As requested by Client)	See Test Results
10. PVC Identification	See Test Results

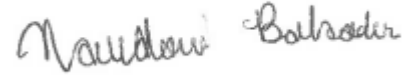
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Signed for and on behalf of SGS North America, Inc.



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

Test Item(s):	Unit	Test Method	Results	MDL	Limit
			1		
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cd and Pb by ICP-OES and /or ICP-MS)	ND	2	100
Lead (Pb)	mg/kg		ND	2	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+A1:2017 (Determination of Hg by ICP-OES and/ or ICP-MS)	ND	2	1000
Hexavalent Chromium (CrVI)	mg/kg	With reference to IEC 62321-7-2:2017 (Determination of CrVI by UV-Vis)	ND*	8	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6:2015 (Determination of PBB and PBDE by GC-MS)	ND	-	1000
Monobromobiphenyl	mg/kg		ND	5	-
Dibromobiphenyl	mg/kg		ND	5	-
Tribromobiphenyl	mg/kg		ND	5	-
Tetrabromobiphenyl	mg/kg		ND	5	-
Pentabromobiphenyl	mg/kg		ND	5	-
Hexabromobiphenyl	mg/kg		ND	5	-
Heptabromobiphenyl	mg/kg		ND	5	-
Octabromobiphenyl	mg/kg		ND	5	-
Nonabromobiphenyl	mg/kg		ND	5	-
Decabromobiphenyl	mg/kg		ND	5	-
Sum of PBDEs	mg/kg		ND	-	1000
Monobromodiphenyl ether	mg/kg		ND	5	-
Dibromodiphenyl ether	mg/kg		ND	5	-
Tribromodiphenyl ether	mg/kg	ND	5	-	
Tetrabromodiphenyl ether	mg/kg	ND	5	-	
Pentabromodiphenyl ether	mg/kg	ND	5	-	
Hexabromodiphenyl ether	mg/kg	ND	5	-	
Heptabromodiphenyl ether	mg/kg	ND	5	-	
Octabromodiphenyl ether	mg/kg	ND	5	-	
Nonabromodiphenyl ether	mg/kg	ND	5	-	
Decabromodiphenyl ether	mg/kg	ND	5	-	
Bis (2-ethylhexyl) Phthalate (DEHP)	mg/kg	IEC 62321-8:2017 (Determination of DEHP, BBP, DBP and DIBP by GC-MS)	ND	50	1000
Butyl Benzyl Phthalate (BBP)	mg/kg		ND	50	1000
Dibutyl Phthalate (DBP)	mg/kg		ND	50	1000
Diisobutyl Phthalate (DIBP)	mg/kg		ND	50	1000
Conclusion	/	/	PASS	/	/

Sample Description:

1. Nickel Sulfamate Solution

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Note:

- (a) mg/kg = ppm ; 0.1wt% = 1000ppm
- (b) ND= not detected
- (c) MDL = Method Detection Limit
- (d) - = not regulated
- (e) * = Total Chromium analysis by ICP-MS and/or ICP-OES was not detected in submitted sample. Therefore, Hexavalent Chromium determination using UV-Visible Spectroscopy was not performed.
- (f) IEC 62321 series is equivalent to EN 62321 series
http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101:::FSP_ORG_ID,FSP_LANG_ID:1258637,25

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2. Organotin Content

Test Method: With reference to ISO 17353. Analysis was conducted by GC-MS.

Organotin	Results (% by Weight of Tin)	Recommended Max. Limit (% by Weight of Tin)
	1	
Triphenyltin (TPhT) calculated as tin	ND	---
Tricyclohexyltin (TCyT) calculated as tin	ND	---
Total	ND	0.1
Conclusion	PASS	

Organotin	Results (% by Weight of Tin)	Recommended Max. Limit (% by Weight of Tin)
	1	
Dibutyltin (DBT) calculated as tin	ND	0.1
Diocetyl tin (DOT) calculated as tin	ND	0.1
n-butyltin trichloride (MBT)* calculated as tin	ND	---
Tetra-n-butyltin (TeBT)* calculated as tin	ND	---
n-Octyltin trichloride (MOT)* calculated as tin	ND	---
Diphenyltin (DPhT)* calculated as tin	ND	---
Monophenyltin (MPhT)* calculated as tin	ND	---
Conclusion	PASS	

Sample Description:

- Nickel Sulfamate Solution

Note:

- % = percentage by weight
- 1% = 10000 ppm (mg/kg)
- ND = Not Detected, reported when the reading is less than the reporting limit value.

Remark: Recommended Max Limit with reference to Entry 20 of Regulation (EC) No 276-2010 amending Annex XVII of REACH Regulation (EC) No 1907/2006
*client's request test

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3. Per- and Polyfluoroalkyl Substances (PFAS)

Test Method:

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

Test Item	CAS-No.	Results (mg/kg)	Report Limit (mg/kg)
PFAS below C₈^a			
Perfluorobutane Acid (PFBA)	375-22-4	ND	1
Perfluorobutane Sulfonate (PFBS)	375-73-5	ND	1
Perfluoropentane Acid (PFPeA)	2706-90-3	ND	1
Perfluorohexane Acid (PFHxA)	307-24-4	ND	1
Perfluorohexane Sulfonate (PFHxS)	355-46-4	ND	1
Perfluoroheptane Acid (PFHpA)	375-85-9	ND	1
Perfluoroheptane Sulfonate (PFHpS)	375-92-8	ND	1
7H-Dodecanefluoroheptane Acid (HPFHpA)	1546-95-8	ND	1
2H,2H-Perfluorodecane Acid (H2PFDA)	882489-14-7	ND	1
2H,2H,3H,3H-Perfluoroundecanoic Acid (H4PFUnA)	34598-33-9	ND	1
Perfluorooctanesulphonic Acid 1H,1H,2H,2H (H4PFOS; 6:2)	27619-97-2	ND	1
PFOA and its salts			
Perfluorooctanoic Acid (PFOA) ^b	335-67-1	ND	0.025
PFOS and its salts			
Perfluorooctane Sulfonate (PFOS) ^c	1763-23-1	ND	0.025
PFOS related substances^d			
N-methylperfluoro-1-octanesulfonamide (MeFOSA)	31506-32-8	ND	1
N-ethylperfluoro-1-octanesulfonamide (EtFOSA)	4151-50-2	ND	1
2-(N-methylperfluoro-1-octanesulfonamido) - ethanol (MeFOSE)	24448-09-7	ND	1
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (EtFOSE)	1691-99-2	ND	1
Perfluorooctane Sulfonamide (PFOSA)	754-91-6	ND	1
C₉-C₁₄ PFCA and its salts^e			
Perfluorononane Acid (PFNA)	375-95-1	ND	0.025
Perfluorodecane Acid (PFDA)	335-76-2	ND	0.025
Perfluoroundecanoic Acid (PFUnA)	2058-94-8	ND	0.025
Perfluorododecanoic Acid (PFDoA)	307-55-1	ND	0.025
Perfluorotridecanoic Acid (PFTrA)	72629-94-8	ND	0.025
Perfluorotetradecanoic Acid (PFTeA)	376-06-7	ND	0.025
Perfluoro-3,7-dimethyloctanoic Acid (PF-3,7-DMOA)	172155-07-6	ND	0.025
C₉-C₁₄ PFCA related substances^f			
Perfluorodecane Sulfonate (PFDS) ^g	335-77-3	ND	0.1

Sample Description:

1. Nickel Sulfamate Solution

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- Note:
1. mg/kg = milligram per kilogram
 2. mg/kg = ppm
 3. 1% = 10000 mg/kg (ppm)
 4. ND = Not Detected, reported when the reading is less than the reporting limit value.

b) PFOA refer to its salts including PFOA-Na (CAS No.: 335-95-5), PFOA-K (CAS No.: 2395-00-8), PFOA-Ag (CAS No.: 335-93-3), PFOA-F (CAS No.: 335-66-0) and APFO (CAS No.: 3825-26-1).

c) PFOS refer to its salts / derivative including PFOS-K (CAS No.: 2795-39-3) , PFOS-Li (CAS No.: 29457-72-5), PFOS-NH₄ (CAS No.: 29081-56-9), PFOS-NH(OH)₂ (CAS No.: 70225-14-8), PFOS-N(C₂H₅)₄ (CAS No.: 56773-42-3), PFOS-N(C₁₀H₂₁)₂(CH₃)₂ (CAS No. 251099-16-8) and POSF (CAS No.: 307-35-7)

e) PFNA refer to its salts including PFNA-Na (CAS No.: 21049-39-8), and APFN (CAS No.: 4149-60-4); PFDA refer to its salts including PFDA-Na (CAS No.: 3830-45-3) and APFDA (CAS No.: 3108-42-7); PFDoA refer to its salts including PFDoA-NH₄ (CAS NO.: 67906-42-7).

g) PFDS including PFDS-Na (CAS No.: 2806-15-7), PFDS-K (CAS No.: 2806-16-8), PFDS-NH₄ (CAS No.: 67906-42-7)

Reporting limits

- a) PFAS below C₈ = 1 mg/kg (each)
- b) PFOA and its salts = 0.025 mg/kg
- c) PFOS and d) its related substance = 1 mg/kg or 1 µg/m² (each)
- e) C9-C14 PFCA and its salts = 0.025 mg/kg (each)
- f) C9-C14 PFCA related substances = 0.1 mg/kg (each)

Requirements:

- | | |
|---|----------------------------|
| a) PFAS below C ₈ | Not Applicable |
| b) PFOA and its salts | 0.025 mg/kg |
| Recommended requirement with reference to Regulation (EU) 2020/784 amending Annex I to Regulation (EC) 2019/1021. | |
| c) PFOS and d) its related substances | |
| Textile / Coated Material | 1 µg/m ² (each) |
| Others (eg. Plastic) | 1000 mg/kg (each) |
| Substance / Mixture | 10 mg/kg (each) |
| Recommended requirement with reference to commission regulation (EU) 2019/1021 | |
| e) C9-C14 PFCA and its salts | 0.025 mg/kg (sum) |
| f) C9-C14 PFCA related substances | 0.26 mg/kg (sum) |
| Recommended requirement with reference to commission regulation (EU) 2021/1297 amending Annex XVII to Regulation (EC) 1907/2006. (Effective date: 25th February 2023) | |

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4. Hexabromocyclododecane (HBCDD) Content

Test Method: In-House test method. Analysis performed by GC-MS.

Test Item	Result (mg/kg)	Detection Limit (mg/kg)
	1	
Hexabromocyclododecane (HBCDD)	ND	5

Sample Description:

- Nickel Sulfamate Solution

- Note:
1. mg/kg = milligram per kilogram
 2. mg/kg = ppm
 3. 1% = 10000 mg/kg (ppm)
 4. ND = Not Detected, reported when the reading is less than the reporting limit value.

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5. Phthalate Content (As requested by Client)

Test Method : With reference to CPSC-CH-C1001-09.4 and/or SGS In-House Method. Analysis was performed by GC-MS.

Phthalates	CAS No.	Results (ppm)	Reporting Limit (ppm)	Permissible Limit (ppm)
		1		
Dibutyl Phthalate (DBP)	84-74-2	ND	150	1000
Benzylbutyl Phthalate (BBP)	85-68-7	ND	150	1000
Bis-(2-ethylhexyl) Phthalate (DEHP)	117-81-7	ND	150	1000
Diisononyl Phthalate (DINP)	28553-12-0 / 68515-49-1	ND	150	1000
Diisobutyl Phthalate (DIBP)	84-69-5	ND	150	1000
Di-n-hexyl Phthalate (DnHP)	84-75-3	ND	150	1000
Diisodecyl Phthalate (DIDP)	26761-40-0 / 68515-49-1	ND	150	1000
Di-n-octyl Phthalate (DNOP)	117-84-0	ND	150	1000
Conclusion		PASS	--	--

Sample Description:

1. Nickel Sulfamate Solution

- Note:
1. ppm = parts per million
 2. mg/kg = ppm
 3. 1% = 10000 ppm (mg/kg)
 4. ND = Not Detected

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6. US California Proposition 65 – Bisphenol A (BPA) Content

Test Method: Solvent extraction followed by analysis with High Performance Liquid Chromatography – Mass Selective Detector (HPLC-MSD).

Test Item	CAS No.	Result (ppm)	Reporting Limit (ppm)
		1	
Bisphenol A (BPA)	80-05-07	ND	0.1 / 1.0
Conclusion		--	--

Sample Description:

1. Nickel Sulfamate Solution

- Note:
1. ppm = parts per million
 2. mg/kg = ppm
 3. 1% = 10000 ppm (mg/kg)
 4. ND = Not Detected, reported when the reading is less than the reporting limit value.

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7. Halogen Content

Test Item(s):	Unit	Test Method	Results	MDL
			1	
Fluorine (F)	mg/kg	BS EN 14582:2016, analysis was performed by Ion Chromatography.	ND	50
Chlorine (Cl)	mg/kg		ND	50
Bromine (Br)	mg/kg		ND	50
Iodine (I)	mg/kg		ND	50

Sample Description:

- Nickel Sulfamate Solution

- Note:
- 1 ppm = parts per million
 - 2 mg/kg = ppm
 3. 1% = 10000 ppm (mg/kg)
 4. ND = Not Detected, reported when the reading is less than the reporting limit value.

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8. Element Analysis (As requested by Client)

Method: Analysis performed by ICP-MS.

Test Item	Result (mg/kg)		Detection Limit (mg/kg)
	1		
Beryllium (Be)	ND		2
Iron (Fe)	ND		10
Arsenic (As)	ND		2
Antimony (Sb)	ND		2

Sample Description:

- Nickel Sulfamate Solution

- Note:
1. mg/kg = milligram per kilogram
 2. mg/kg = ppm
 3. 1% = 10000 mg/kg (ppm)
 4. ND = Not Detected
 5. TBD = To Be Determined

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9. Flame Retardant Content (As requested by Client)

Test Method: In-house Method. Analysis was performed by GC-MS or LC-MS.

Flame Retardants	Results (ppm)	Reporting Limit (ppm)	Client Limit (ppm)
	1		
Tetrabromobisphenol A (TBBPA)	ND	5	25
Comment	PASS	--	--

Sample Description:

- Nickel Sulfamate Solution

- Note:
1. mg/kg = milligram per kilogram
 2. mg/kg = ppm
 3. 1% = 10000 mg/kg (ppm)
 4. ND = Not Detected, reported when the reading is less than the reporting limit value.

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10. PVC Identification
a) Beilstein Test:

Test Method: PVC: With reference to Health Canada – Product Safety Bureau Reference Manual Book5 – Laboratory Policies and Procedures, Method C-28 “Beilstein Test”.

Test Results:

Test Items	PVC Result
Nickel Sulfamate Solution	Negative (No Green Flame)

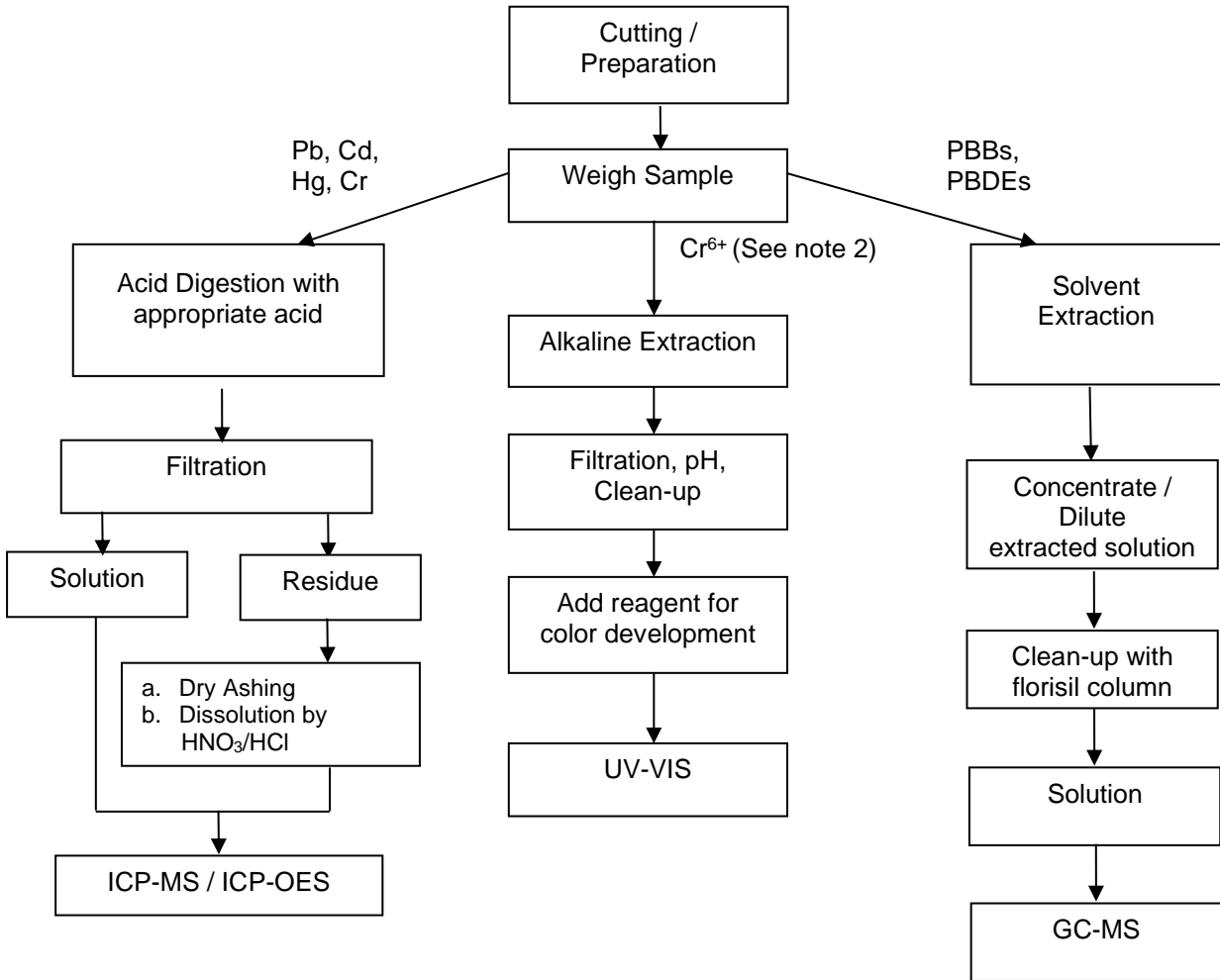
b) FTIR Test Results:

Test Method: Testing was performed using Fourier Transform Infrared Spectroscopy (FTIR) analytical instrumentation.

Sample	Identification
Nickel Sulfamate Solution	PVC Not Present

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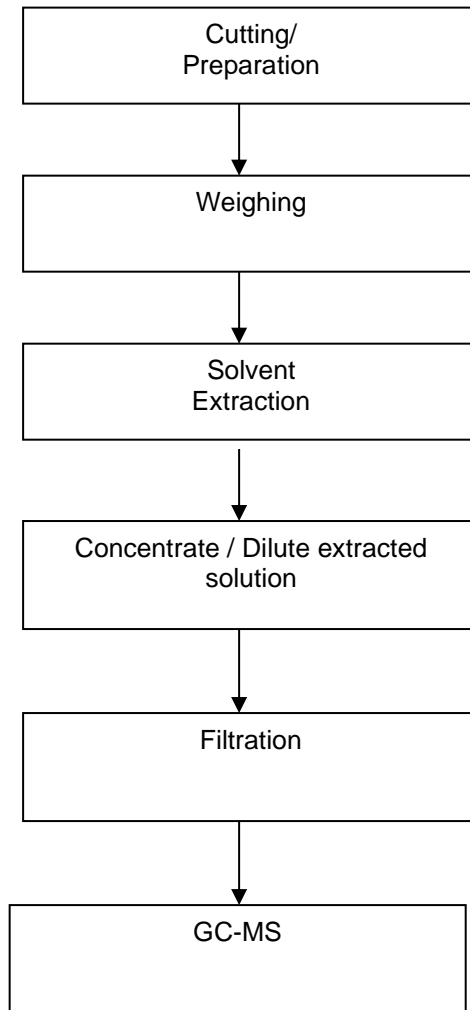
Flowchart for RoHS:



- Note : 1. The Cr, Cd, Pb and Hg contents test on polymeric samples were dissolved totally by pre-conditioning method according to above flow chart.
 2. Cr⁶⁺ is performed only when total Cr is detected

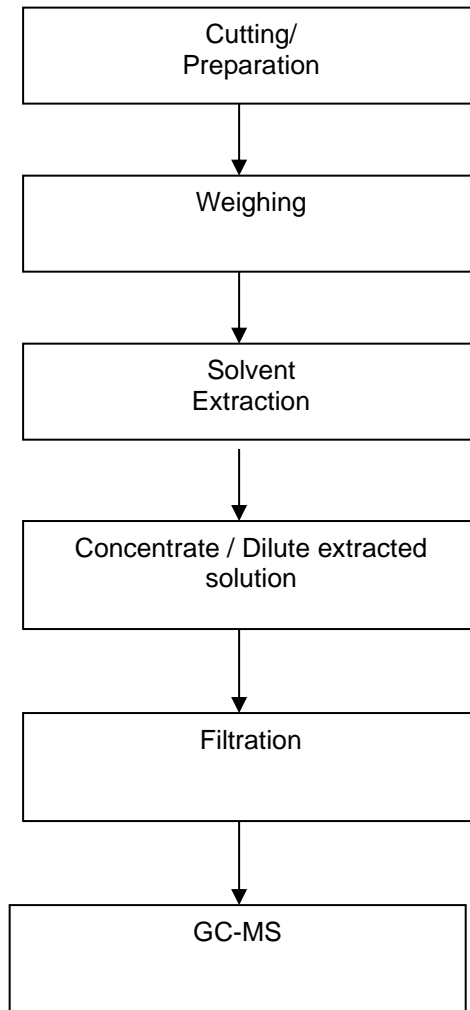
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Flowchart for Phthalates



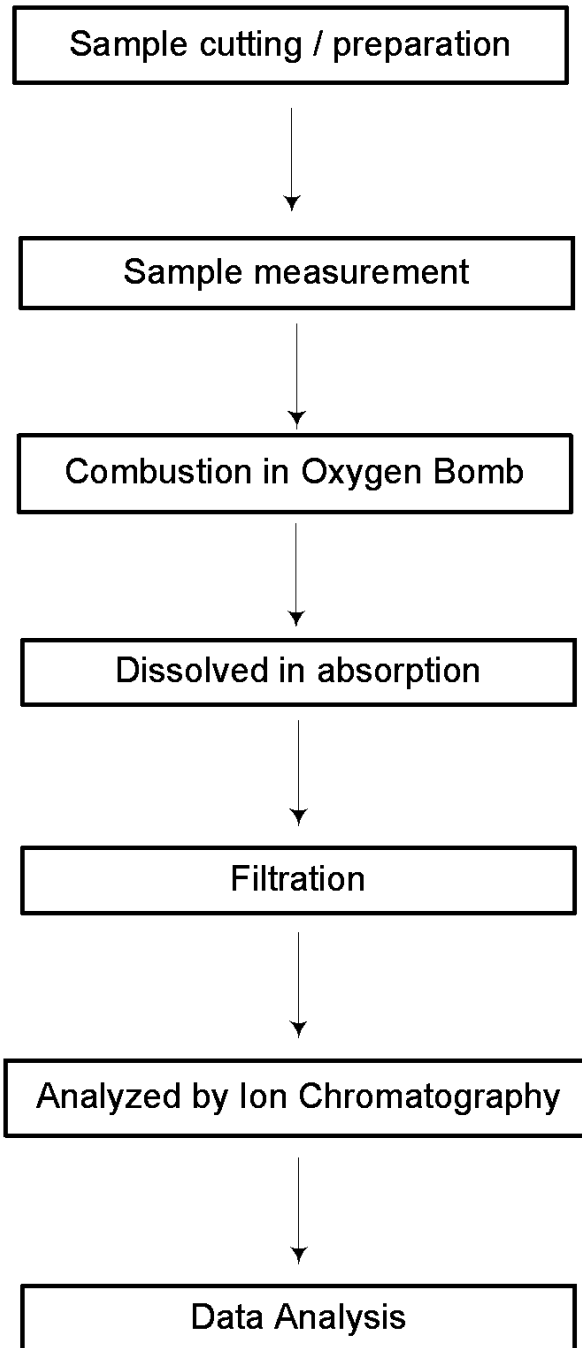
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Flowchart for Phthalates/HBCDD



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Halogen Testing Flow Chart



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Sample Photo(s):



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