

Test Report

No.: NGBEC23002262647

Date: Jun 06, 2023

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Client Name: FORMOSA CHEMICALS INDUSTRIES (NINGBO) LIMITED COMPANY

Client Address: FPG INDUSTRIAL ZONE, XIAPU, BEILUN, NINGBO, CHINA

Sample Name: Polystyrene

Model No.: HP825T

The above sample(s) and information were provided by the client.

SGS Job No.: NBP23-000724

Sample Receiving Date: May 31, 2023

Testing Period: May 31, 2023 ~ Jun 06, 2023

Test Requested: Select test(s) as requested by the client.

Test Method(s): Please refer to next page(s).

Test Result(s): Please refer to next page(s).

Test Requirement	Conclusion
EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	Pass
Polycyclic Aromatic Hydrocarbons (PAHs)	Pass

Signed for and on behalf of
SGS-CSTC Standards Technical Services Co., Ltd. Ningbo Branch

Hedy Hu

Hedy Hu
Approved Signatory

scan to see the report



99C65147



SGS-CSTC Standards Technical Services Co., Ltd.
Ningbo Branch Chemical Laboratory

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Test Result(s):

Test Part Description:

SN ID	Sample No.	SGS Sample ID	Description
SN1	A24	NGB23-0022626-0001.C024	White plastic grain

Remarks:

- (1) 1 mg/kg = 1 ppm = 0.0001%
- (2) MDL = Method Detection Limit
- (3) ND = Not Detected (< MDL)
- (4) "-" = Not Regulated

EU RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU- Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

Test Method: With reference to IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-2:2017, IEC 62321-6:2015 and IEC 62321-8:2017, analysis was performed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit(s)	MDL	A24
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))	1000	mg/kg	8	ND
Polybromobiphenyl (PBBs)	1000	mg/kg	-	ND
Monobromobiphenyl (MonoBB)	-	mg/kg	5	ND
Dibromobiphenyl (DiBB)	-	mg/kg	5	ND
Tribromobiphenyl (TriBB)	-	mg/kg	5	ND
Tetrabromobiphenyl (TetraBB)	-	mg/kg	5	ND
Pentabromobiphenyl (PentaBB)	-	mg/kg	5	ND
Hexabromobiphenyl (HexaBB)	-	mg/kg	5	ND
Heptabromobiphenyl (HeptaBB)	-	mg/kg	5	ND
Octabromobiphenyl (OctaBB)	-	mg/kg	5	ND
Nonabromobiphenyl (NonaBB)	-	mg/kg	5	ND
Decabromobiphenyl (DecaBB)	-	mg/kg	5	ND
Polybromodiphenyl ether (PBDEs)	1000	mg/kg	-	ND
Monobromodiphenylether (MonoBDE)	-	mg/kg	5	ND
Dibromodiphenylether (DiBDE)	-	mg/kg	5	ND
Tribromodiphenylether (TriBDE)	-	mg/kg	5	ND
Tetrabromodiphenylether (TetraBDE)	-	mg/kg	5	ND
Pentabromodiphenylether (PentaBDE)	-	mg/kg	5	ND
Hexabromodiphenylether (HexaBDE)	-	mg/kg	5	ND
Heptabromodiphenylether (HeptaBDE)	-	mg/kg	5	ND
Octabromodiphenylether (OctaBDE)	-	mg/kg	5	ND
Nonabromodiphenylether (NonaBDE)	-	mg/kg	5	ND
Decabromodiphenylether (DecaBDE)	-	mg/kg	5	ND
Dibutyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND



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Test Item(s)	Limit	Unit(s)	MDL	A24
Bis-(2-ethylhexyl) Phthalate(DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalate(DIBP)	1000	mg/kg	50	ND

Notes:

- (1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
- (2) IEC 62321 series is equivalent to EN 62321 series.
- (3) 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.

Polycyclic Aromatic Hydrocarbons (PAHs)

Test Method: With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

Test Item(s)	CAS No.	Limit	Unit(s)	MDL	A24
Benzo(a)pyrene (BaP)	50-32-8	0.2	mg/kg	0.1	ND
Benzo(e)pyrene (BeP)	192-97-2	0.2	mg/kg	0.1	ND
Benzo(a)anthracene (BaA)	56-55-3	0.2	mg/kg	0.1	ND
Benzo(b)fluoranthene (BbF)	205-99-2	0.2	mg/kg	0.1	ND
Benzo(j)fluoranthene (BjF)	205-82-3	0.2	mg/kg	0.1	ND
Benzo(k)fluoranthene (BkF)	207-08-9	0.2	mg/kg	0.1	ND
Chrysene (CHR)	218-01-9	0.2	mg/kg	0.1	ND
Dibenzo(a,h)anthracene (DBA)	53-70-3	0.2	mg/kg	0.1	ND
Benzo(g,h,i)perylene (BPE)	191-24-2	0.2	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene (IPY)	193-39-5	0.2	mg/kg	0.1	ND
Phenanthrene (PHE)	85-01-8	-	mg/kg	0.1	ND
Pyrene (PYR)	129-00-0	-	mg/kg	0.1	ND
Anthracene (ANT)	120-12-7	-	mg/kg	0.1	ND
Fluoranthene (FLT)	206-44-0	-	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	-	1	mg/kg	-	ND
Naphthalene (NAP)	91-20-3	1	mg/kg	0.1	ND
Sum of 15 PAHs	-	1	mg/kg	-	ND
Material Category	-	-	-	-	1
Conclusion					Pass

Notes:

As per client information, the tested sample is toy's product which is under the directive of 2009/48/EC and materials in articles for use by children up to three years of age.

AfPS (German commission for Product Safety) : PAHs requirements

Parameter	Category 1	Category 2	Category 3
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	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age.	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact ^c with skin during the intended or foreseeable use ^d .		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use.	
		a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (BeP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (CHR) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (DBA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT), mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum



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Naphthalene (NAP) mg/kg	< 1	< 2	< 10
Sum of 15 PAHs	<1	< 5	< 10
	< 20	< 50	

Notes:

^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No.1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28)

"foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.

Remark:

The German committee on Product Safety (AfPS) published a new PAHs document (AfPS GS 2019:01 PAK) on April 10, 2020, which will be binding for the issue of GS mark certificate from July 1, 2020.

Test Method: With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

Test Item(s)	CAS No.	Limit	Unit(s)	MDL	A24
Benzo(a)pyrene (BaP)	50-32-8	0.5	mg/kg	0.1	ND
Benzo(e)pyrene (BeP)	192-97-2	0.5	mg/kg	0.1	ND
Benzo(a)anthracene (BaA)	56-55-3	0.5	mg/kg	0.1	ND
Benzo(b)fluoranthene (BbF)	205-99-2	0.5	mg/kg	0.1	ND
Benzo(j)fluoranthene (BjF)	205-82-3	0.5	mg/kg	0.1	ND
Benzo(k)fluoranthene (BkF)	207-08-9	0.5	mg/kg	0.1	ND
Chrysene (CHR)	218-01-9	0.5	mg/kg	0.1	ND
Dibenzo(a,h)anthracene (DBA)	53-70-3	0.5	mg/kg	0.1	ND
Benzo(g,h,i)perylene (BPE)	191-24-2	0.5	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene (IPY)	193-39-5	0.5	mg/kg	0.1	ND
Phenanthrene (PHE)	85-01-8	-	mg/kg	0.1	ND
Pyrene (PYR)	129-00-0	-	mg/kg	0.1	ND
Anthracene (ANT)	120-12-7	-	mg/kg	0.1	ND
Fluoranthene (FLT)	206-44-0	-	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	-	10	mg/kg	-	ND
Naphthalene (NAP)	91-20-3	2	mg/kg	0.1	ND
Sum of 15 PAHs	-	10	mg/kg	-	ND
Material Category	-	-	-	-	2
Conclusion					Pass

Notes:

As per client information, the tested sample is not children product which is under the directive of German ProdSG.

AfPS (German commission for Product Safety) : PAHs requirements



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Parameter	Category 1	Category 2		Category 3	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age.	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact ^c with skin during the intended or foreseeable use ^d .		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use.	
		a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (BeP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (CHR) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (DBA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT), mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum



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Naphthalene (NAP) mg/kg	< 1	< 2	< 10
Sum of 15 PAHs	<1	< 5	< 10
	< 20	< 50	

Notes:

^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No.1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28)

"foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.

Remark:

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Test Method: With reference to AfPS GS 2019:01 PAK, analysis was performed by GC-MS.

Test Item(s)	CAS No.	Limit	Unit(s)	MDL	A24
Benzo(a)pyrene (BaP)	50-32-8	1	mg/kg	0.1	ND
Benzo(e)pyrene (BeP)	192-97-2	1	mg/kg	0.1	ND
Benzo(a)anthracene (BaA)	56-55-3	1	mg/kg	0.1	ND
Benzo(b)fluoranthene (BbF)	205-99-2	1	mg/kg	0.1	ND
Benzo(j)fluoranthene (BjF)	205-82-3	1	mg/kg	0.1	ND
Benzo(k)fluoranthene (BkF)	207-08-9	1	mg/kg	0.1	ND
Chrysene (CHR)	218-01-9	1	mg/kg	0.1	ND
Dibenzo(a,h)anthracene (DBA)	53-70-3	1	mg/kg	0.1	ND
Benzo(g,h,i)perylene (BPE)	191-24-2	1	mg/kg	0.1	ND
Indeno(1,2,3-c,d)pyrene (IPY)	193-39-5	1	mg/kg	0.1	ND
Phenanthrene (PHE)	85-01-8	-	mg/kg	0.1	ND
Pyrene (PYR)	129-00-0	-	mg/kg	0.1	ND
Anthracene (ANT)	120-12-7	-	mg/kg	0.1	ND
Fluoranthene (FLT)	206-44-0	-	mg/kg	0.1	ND
Sum of Phenanthrene(PHE), Pyrene(PYR), Anthracene(ANT), Fluoranthene(FLT)	-	50	mg/kg	-	ND
Naphthalene (NAP)	91-20-3	10	mg/kg	0.1	ND
Sum of 15 PAHs	-	50	mg/kg	-	ND
Material Category	-	-	-	-	3
Conclusion					Pass

Notes:

As per client information, the tested sample is not children product which is under the directive of German ProdSG.

AfPS (German commission for Product Safety) : PAHs requirements



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Ningbo Branch Chemical Laboratory

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Parameter	Category 1	Category 2		Category 3	
	Materials intended to be placed in the mouth, or materials coming into long-term contact with skin (more than 30s) during the intended use -in toys according to Directive 2009/48/EC or -for the use by children ^{a,b} up to 3 years of age.	Materials not covered by category 1, coming into long-term contact (more than 30s) or short-term repetitive contact ^c with skin during the intended or foreseeable use ^d .		Materials covered neither by category 1 nor by category 2, coming into short-term contact (up to 30s) with skin during the intended or foreseeable use.	
		a. use by children	b. other consumer products	a. use by children	b. other consumer products
Benzo(a)pyrene (BaP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(e)pyrene (BeP) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(a)anthracene (BaA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(b)fluoranthene (BbF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(j)fluoranthene (BjF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(k)fluoranthene (BkF) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene (CHR) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo(a,h)anthracene (DBA) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo(g,h,i)perylene (BPE) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno(1,2,3-cd)pyrene (IPY) mg/kg	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Phenanthrene (PHE), pyrene (PYR), anthracene (ANT), fluoranthene (FLT), mg/kg	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum



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Naphthalene (NAP) mg/kg	< 1	< 2	< 10
Sum of 15 PAHs	<1	< 5	< 10
		< 20	< 50

Notes:

^a A "Child" is legally defined as a person before reaching the age of 14 years.

^b Use by children includes both active and passive contact by children.

^c Definition "short-term repetitive contact" taken from REACH Annex XVII entry 50 amendment (Regulation (EC) No.1272/2013)

^d According to the definition of the German Product Safety Act (ProdSG) (chapter 1 Article 2 No. 28)

"foreseeable use" shall mean the use of a product in a manner that the person placing it on the market, has not intended, but which could be reasonably foreseeable.

Remark:

The German committee on Product Safety (AfPS) published a new PAHs document (AfPS GS 2019:01 PAK) on April 10, 2020, which will be binding for the issue of GS mark certificate from July 1, 2020.

Unless otherwise stated, the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule ($w=0$) stated in ILAC-G8:09/2019.



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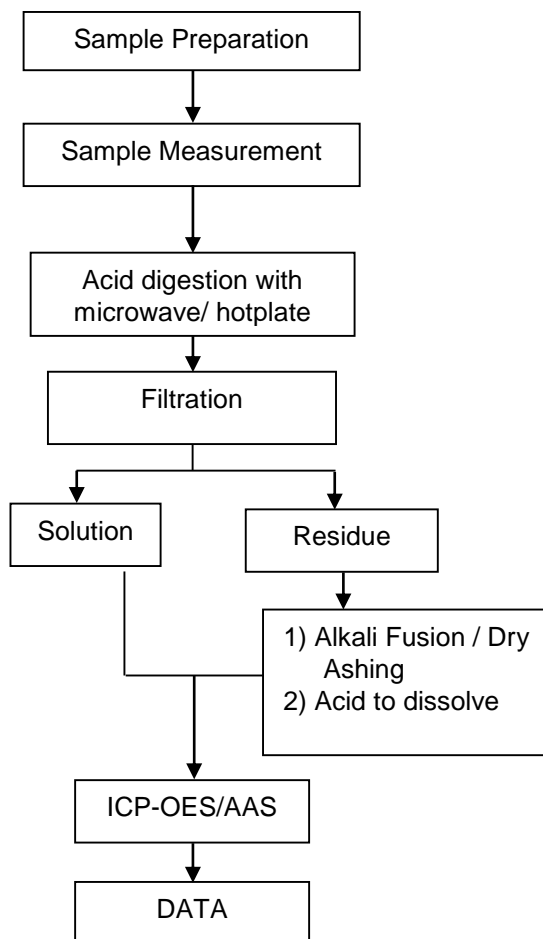
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Elements Testing Flow Chart

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

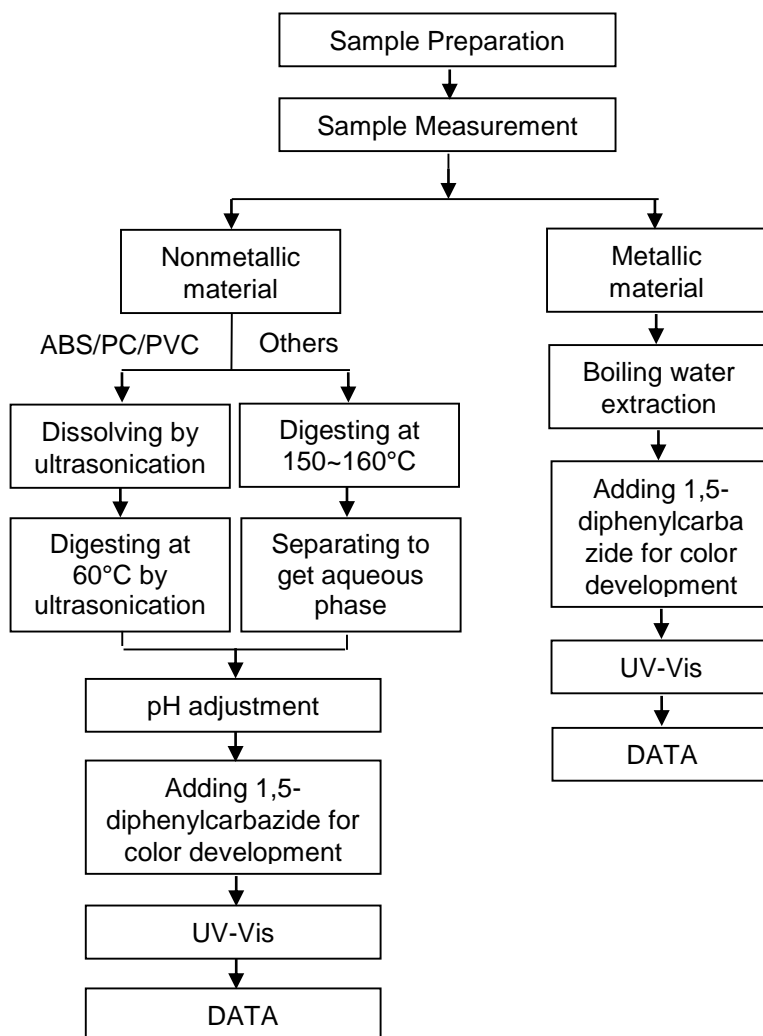


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Hexavalent Chromium (Cr(VI)) Testing Flow Chart



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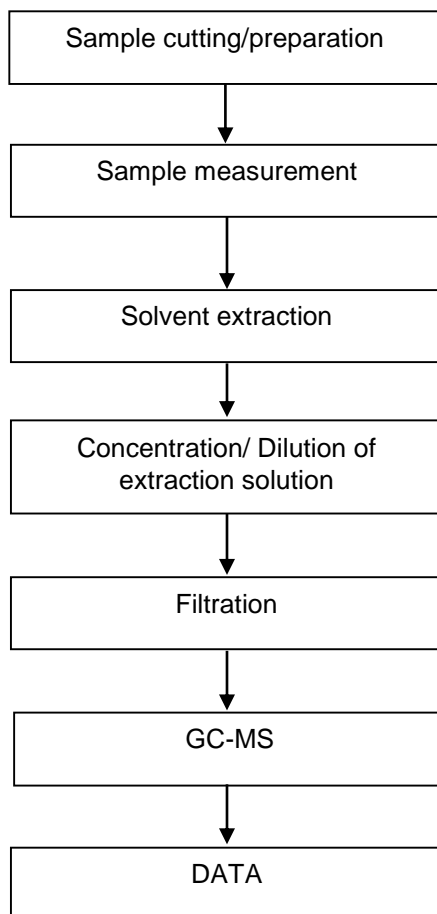
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PBBs/PBDEs Testing Flow Chart



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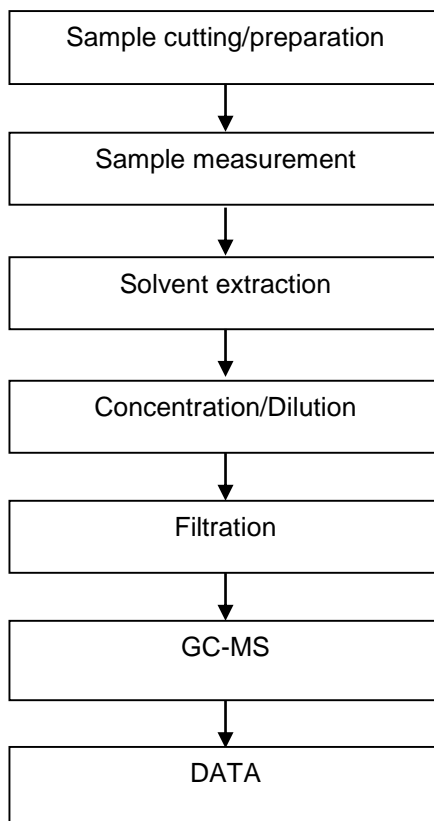
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Phthalates Testing Flow Chart



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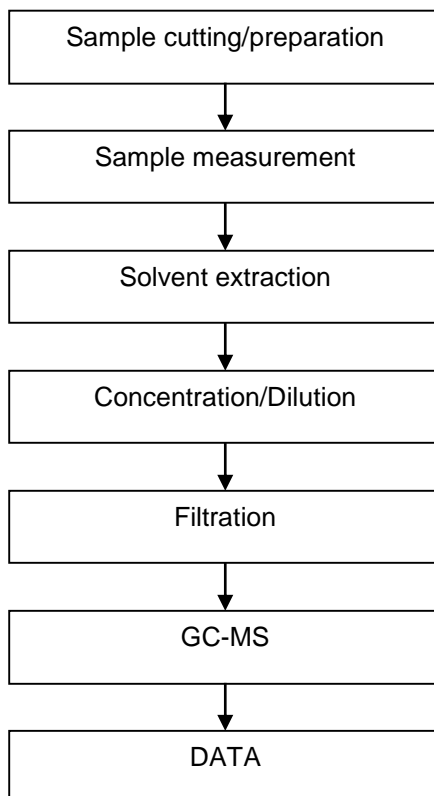
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PAHs Testing Flow Chart



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