

# Test Report No.: SHAEC25002041225 Date: Feb 11, 2025 Page 1 of 20 Client Name: HERAEUS (ZHAOYUAN) PRECIOUS METAL MATERIALS CO.,LTD. Client Address: NO.9 ANKANG SOUTH ROAD,ZHAOYUAN CITY, SHANDONG PROVINCE, CHINA Sample Name: Gold wire

Model No.:	HD
Client Ref. Information:	HD2/HD-2/HD3/HD5/HD-5/HD5A/HD6
Lot No.:	9018568982
The above sample(s) and ir	formation were provided by the client.

SGS Job No.:	TIC10202501261006133MUL
Sample Receiving Date:	Feb 05, 2025
Testing Period:	Feb 05, 2025 ~ Feb 10, 2025
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 (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)	Pass
Element(s)	See Results
Halogen	See Results
Hexabromocyclododecane (HBCDD)	See Results
Medium Chain Chlorinated Paraffin(C14-C17)(MCCP)	See Results
Phthalates	See Results
Polychlorinated Biphenyls (PCBs)	See Results

# Signed for and on behalf of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.

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Sue Sheng Approved Signatory





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Test Report	No.:	SHAEC25002041225	Date:	Feb 11, 2025	Page 2 of	i 20
Test Requirement	nt				Conclusion	
TBBP-A					See Results	

Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid

Red Phosphorus as Phosphorus

(PFOS) and its derivatives

#### Test Result(s):

**Test Part Description:** 

	SN ID	Sample No.	SGS Sample ID	Description
	SN1	A5	SHA25-0020412-0001.C005	Golden metal wire
-				

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 (PBB), Polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP)

#### With reference to IEC 62321-4:2013+AMD1:2017, IEC 62321-5:2013, IEC 62321-7-1:2015, **Test Method:** IEC 62321-6:2015 and IEC62321-8:2017, analysis was performed by ICP-OES/AAS, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit(s)	MDL	A5
Lead (Pb)	1000	mg/kg	2	ND
Mercury (Hg)	1000	mg/kg	2	ND
Cadmium (Cd)	100	mg/kg	2	ND
Hexavalent Chromium (Cr(VI))▼	-	µg/cm²	0.10	ND
Polybromobiphenyl (PBB)	1000	mg/kg	-	ND
Monobrominated biphenyl (MonoBB)	-	mg/kg	5	ND
Dibrominated biphenyl (DiBB)	-	mg/kg	5	ND
Tribrominated biphenyl (TriBB)	-	mg/kg	5	ND
Tetrabrominated biphenyl (TetraBB)	-	mg/kg	5	ND
Pentabrominated biphenyl (PentaBB)	-	mg/kg	5	ND
Hexabrominated biphenyl (HexaBB)	-	mg/kg	5	ND
Heptabrominated biphenyl (HeptaBB)	-	mg/kg	5	ND
Octabrominated biphenyl (OctaBB)	-	mg/kg	5	ND
Nonabrominated biphenyl (NonaBB)	-	mg/kg	5	ND
Decabrominated biphenyl (DecaBB)	-	mg/kg	5	ND
Polybromodiphenyl ether(PBDE)	1000	mg/kg	-	ND
Monobrominated diphenyl ether (MonoBDE)	-	mg/kg	5	ND
Dibrominated diphenyl ether (DiBDE)	-	mg/kg	5	ND
Tribrominated diphenyl ether (TriBDE)	-	mg/kg	5	ND



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See Results

See Results



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Test Item(s)	Limit	Unit(s)	MDL	A5
Tetrabrominated diphenyl ether (TetraBDE)	-	mg/kg	5	ND
Pentabrominated diphenyl ether (PentaBDE)	-	mg/kg	5	ND
Hexabrominated diphenyl ether (HexaBDE)	-	mg/kg	5	ND
Heptabrominated diphenyl ether (HeptaBDE)	-	mg/kg	5	ND
Octabrominated diphenyl ether (OctaBDE)	-	mg/kg	5	ND
Nonabrominated diphenyl ether (NonaBDE)	-	mg/kg	5	ND
Decabrominated diphenyl ether (DecaBDE)	-	mg/kg	5	ND
Bis(2-ethylhexyl) phthalate (DEHP)	1000	mg/kg	50	ND
Butyl benzyl phthalate (BBP)	1000	mg/kg	50	ND
Dibutyl phthalate (DBP)	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) ▼ = a. The sample is positive for Cr(VI) if the Cr(VI)concentration is greater than 0.13 µg/cm<sup>2</sup>. The sample coating is considered to contain Cr(VI).
  - b. The sample is negative for Cr(VI) if Cr(VI) is ND (concentration less than 0.10 μg/cm<sup>2</sup>). The coating is considered a non-Cr(VI) based coating.
  - c. The result between 0.10  $\mu$ g/cm<sup>2</sup> and 0.13  $\mu$ g/cm<sup>2</sup> is considered to be inconclusive-unavoidable coating variations may influence the determination.

Information on storage conditions and production date of the tested sample is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.

#### Element(s)

Test Method: With reference to US EPA 3050B:1996, analysis was performed by ICP-OES/AAS.

Test Item(s)	Unit(s)	MDL	A5
Antimony(Sb)	mg/kg	10	ND
Antimony Trioxide(Sb <sub>2</sub> O <sub>3</sub> ) ◆	mg/kg	12	ND
Phosphorus(P)	mg/kg	20	ND
Beryllium(Be)	mg/kg	5	ND
Arsenic(As)	mg/kg	10	ND

#### Notes:

(1)  $\blacklozenge$  Sb<sub>2</sub>O<sub>3</sub> : Calculate from Antimony content.



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#### **Test Report No.:** SHAEC25002041225

**Date:** Feb 11, 2025

## <u>Halogen</u>

**Test Method:** With reference to EN 14582:2016, analysis was performed by IC.

Test Item(s)	Unit(s)	MDL	A5
Fluorine(F)	mg/kg	20	ND
Chlorine(Cl)	mg/kg	50	ND
Bromine(Br)	mg/kg	50	ND
lodine(l)	mg/kg	50	ND

#### Hexabromocyclododecane (HBCDD)

**Test Method:** With reference to IEC 62321-9:2021, analysis was performed by GC-MS.

Test Item(s)	CAS No.	Unit(s)	MDL	A5
Hexabromocyclododecane (HBCDD)	134237-50-6			
	/134237-51-7			
	/134237-52-8	mg/kg	20	ND
	/25637-99-4			
	/3194-55-6			

#### Medium Chain Chlorinated Paraffin(C14-C17)(MCCP)

**Test Method:** With reference to ISO 18219-2:2021, analysis was performed by GC-NCI-MS.

Test Item(s)	CAS No.	Unit(s)	MDL	A5
Medium Chain Chlorinated Paraffin(C <sub>14</sub> - C <sub>17</sub> )(MCCP)	85535-85-9	mg/kg	50	ND

#### **Phthalates**

**Test Method:** With reference to EN 14372:2004, analysis was performed by GC-MS.

Test Item(s)	CAS No.	Unit(s)	MDL	A5
Diisononyl Phthalate (DINP)	28553-12-0 /68515-48-0	%	0.010	ND
Di-n-octyl Phthalate (DNOP)	117-84-0	%	0.003	ND
Diisodecyl Phthalate (DIDP)	26761-40-0 /68515-49-1	%	0.010	ND
Di-n-pentyl Phthalates (DnPP)	131-18-0	%	0.003	ND
Di-n-hexyl Phthalates (DnHP)	84-75-3	%	0.003	ND
Bis(2-methoxyethyl) Phthalate (DMEP)	117-82-8	%	0.003	ND
Diisopentylphthalate (DiPP)	605-50-5	%	0.003	ND
N-Pentyl-isopentylphthalate (nPiPP)	776297-69-9	%	0.003	ND

#### **Polychlorinated Biphenyls (PCBs)**

**Test Method:** With reference to US EPA 8082A:2007, analysis was performed by GC-MS.



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Test Item(s)	CAS No.	Unit(s)	MDL	A5
2,2',5-Trichlorobiphenyl (PCB18)	37680-65-2	mg/kg	0.5	ND
2,4,4'-Trichlorobiphenyl (PCB28)	7012-37-5	mg/kg	0.5	ND
2,4',5-Trichlorobiphenyl (PCB31)	16606-02-3	mg/kg	0.5	ND
2,2',3,5'-Tetrachlorobiphenyl (PCB44)	41464-39-5	mg/kg	0.5	ND
2,2',5,5'-Tetrachlorobiphenyl (PCB52)	35693-99-3	mg/kg	0.5	ND
2,2',4,5,5'-Pentachlorobiphenyl (PCB101)	37680-73-2	mg/kg	0.5	ND
2,3',4,4',5-Pentachlorobiphenyl (PCB118)	31508-00-6	mg/kg	0.5	ND
2,2',3,4,4',5'-Hexachlorobiphenyl (PCB138)	35065-28-2	mg/kg	0.5	ND
2,2',4,4',5,5'-Hexachlorobiphenyl (PCB153)	35065-27-1	mg/kg	0.5	ND
2,2',3,4,4',5,5'-Heptachlorobiphenyl (PCB180)	35065-29-3	mg/kg	0.5	ND
2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl (PCB206)	40186-72-9	mg/kg	0.5	ND
4-Chlorobiphenyl (PCB3)	2051-62-9	mg/kg	0.5	ND
2,4'- Dichlorobiphenyl (PCB8)	34883-43-7	mg/kg	0.5	ND
2,4,5-Trichlorobiphenyl (PCB29)	15862-07-4	mg/kg	0.5	ND
2,2',4,6-Tetrachlorobiphenyl (PCB50)	62796-65-0	mg/kg	0.5	ND
2,2',3,4',5',6-Hexachlorobiphenyl (PCB149)	38380-04-0	mg/kg	0.5	ND
2,2',3,3',4,4',5,5'- Octachlorobiphenyl (PCB194)	35694-08-7	mg/kg	0.5	ND
2,2',3,3',4,4',5,5',6,6'- Decachlorobiphenyl (PCB209)	2051-24-3	mg/kg	0.5	ND

#### TBBP-A

**Test Method:** With reference to US EPA 3540C:1996, analysis was performed by GC-MS/LC-MS.

Test Item(s)	CAS No.	Unit(s)	MDL	A5
TBBP-A	79-94-7	mg/kg	10	ND

#### Perfluorooctanoic acid (PFOA) and its salts, Perfluorooctane sulfonic acid (PFOS) and its derivatives

**Test Method:** Modified EN 17681-1:2022, analysis was performed by LC-MS or LC-MS/MS.

Test Item(s)	CAS No.	Unit(s)	MDL	A5			
PFOS, its salts and related compounds							
Perfluorooctane sulfonic acid (PFOS), its salts^	1763-23-1	mg/kg	0.010	ND			
N-ethylperfluoro-1-octanesulfonamide (N-EtFOSA)	4151-50-2	mg/kg	0.010	ND			
N-methylperfluoro-1-octanesulfonamide (N-MeFOSA)	31506-32-8	mg/kg	0.010	ND			
2-(N-ethylperfluoro-1- octanesulfonamido)-ethanol (N-EtFOSE)	1691-99-2	mg/kg	0.010	ND			



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Test Item(s)	CAS No.	Unit(s)	MDL	A5
2-(N-methylperfluoro-1- octanesulfonamido)-ethanol (N- MeFOSE)	24448-09-7	mg/kg	0.010	ND
Perfluorooctane Sulfonamide (PFOSA), its salts^	754-91-6	mg/kg	0.010	ND
Perfluorooctane sulfonamidoacetic Acid (FOSAA), its salts^	2806-24-8	mg/kg	0.010	ND
N-Methylperfluoro-1- octanesulfonamidoacetic Acid (N- MeFOSAA), its salts^	2355-31-9	mg/kg	0.010	ND
N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA), its salts <sup>^</sup>	2991-50-6	mg/kg	0.010	ND
Sum of Perfluorooctane sulfonic acid (PFOS) and its derivatives	-	mg/kg	-	ND
PFOA, its salts				
Perfluorooctanoic acid (PFOA), its salts^	335-67-1	mg/kg	0.010	ND

#### Notes:

1. ^=Substances refer to its salts/derivative listed in below table.

Substance Name	CAS No.
PFOS, its salts & derivatives	
Perfluorooctane sulfonic acid (PFOS)	1763-23-1
Potassium Perfluorooctanesulfonate (PFOS-K)	2795-39-3
Perfluorooctanesulfonic acid, lithium salt (PFOS-Li)	29457-72-5
Sodium perfluorooctanesulfonate (PFOS-Na)	4021-47-0
Ammonium perfluorooctanesulfonate (PFOS-NH4)	29081-56-9
Perfluorooctane sulfonate diethanolamine salt (PFOS-NH <sub>2</sub> (C <sub>2</sub> H <sub>4</sub> OH) <sub>2</sub> )	70225-14-8
Perfluorooctanesulfonic acid,tetraethylammonium salt (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>4</sub> )	56773-42-3
N-decyl-N,N-dimethyldecan-1-aminium 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctane-1-sulfonate (PFOS-N( $C_{10}H_{21}$ ) <sub>2</sub> (CH <sub>3</sub> ) <sub>2</sub> )	251099-16-8
TetrabutylAmmonium perfluorooctanesulfonate (PFOS-N(C4H9)4)	111873-33-7
Perfluorooctane Sulfonyl fluoride (PFOS-F)	307-35-7
Magnesium bis(heptadecafluorooctanesulphonate) (PFOS-Mg)	91036-71-4
Piperidine 1,1,2,2,3,3,4,4,5,5,6,6,7,7,8,8,8-heptadecafluorooctanesulfonate	71463-74-6
Perfluorooctanesulfonate	45298-90-6
Triethylammonium perfluorooctane sulfonate (PFOS-N(C <sub>2</sub> H <sub>5</sub> ) <sub>3</sub> )	54439-46-2
Tetramethylammonium perfluorooctane sulfonate (PFOS-N(CH <sub>3</sub> ) <sub>4</sub> )	56773-44-5
N,N,N-Tripropylpentan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N( $C_3H_7$ ) <sub>3</sub> ( $C_5H_{11}$ ))	56773-56-9
N,N-Dibutyl-N-methylbutan-1-aminium heptadecafluorooctane-1-sulfonate (PFOS-N(C <sub>4</sub> H <sub>9</sub> ) <sub>3</sub> (CH <sub>3</sub> ))	124472-68-0



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lodonium, bis[4-(1,1-dimethylethyl)phenyl]-, salt with perfluoro-1-	213740-80-8
octanesulfonic acid (1:1)	
Diphenyl(2,4,6-trimethylphenyl)sulfonium perfluoro-1-octanesulfonate	258341-99-0
1-Hexadecylpyridinium perfluoro-1-octanesulfonate	334529-63-4
N,N,N-Triethyldecan-1-aminium heptadecafluorooctane-1-sulfonate	773895-92-4
Tetrabutylphosphonium perfluorooctane sulfonate (PFOS-P (C <sub>4</sub> H <sub>9</sub> ) <sub>4</sub> ))	2185049-59-4
Perfluorooctanesulfonic acid diethylamine salt (PFOS-C <sub>4</sub> H <sub>11</sub> N)	2205029-08-7
heptyldimethyl{2-[(2-methylprop-2-enoyl)oxy]ethyl}azanium heptadecafluorooctane-1-sulfonate (PFOS-C <sub>15</sub> H <sub>30</sub> NO <sub>2</sub> )	1203998-97-3
Perfluorooctane sulfonic anhydride (PFOSAN)	423-92-7
FOSAA, its salts	
Perfluorooctane sulfonamidoacetic Acid (FOSAA)	2806-24-8
N-[(Perfluorooctyl)sulfonyl]glycinate (FOSAA(anion))	909405-47-6
N-[(Perfluorooctyl)sulfonyl]glycine potassium salt (1:1) (FOSAA-K)	75260-69-4
N-[(Perfluorooctyl)sulfonyl]glycine sodium salt (1:1) (FOSAA-Na)	115716-87-5
N-MeFOSAA, its salts	
N-Methylperfluoro-1-octanesulfonamidoacetic Acid (N-MeFOSAA)	2355-31-9
2-(N-Methylperfluorooctanesulfonamido)acetate (N-Me-FOSAA(anion))	909405-48-7
Potassium N-((heptadecafluorooctyl)sulphonyl)-N-methylglycinate (N-Me-FOSAA-K)	70281-93-5
N-EtFOSAA, its salts	
N-Ethylperfluorooctane sulfonamidoacetic Acid (N-EtFOSAA)	2991-50-6
Glycine, N-ethyl-N-[(heptadecafluorooctyl)sulfonyl]-, potassium salt (N-Et-FOSAA-K)	2991-51-7
2-(N-Ethyl-perfluorooctanesulfonamido)acetate (N-Et-FOSAA(anion))	909405-49-8
Ammonium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA- NH4)	2991-52-8
Sodium 2-(N-ethylperfluorooctanesulfonamido)acetate (N-Et-FOSAA-Na)	3871-50-9
PFOSA, its salts	
Perfluorooctane Sulfonamide (PFOSA)	754-91-6
Perfluorooctanesulfonamide lithium salt (1:1) (PFOSA-Li)	76752-79-9
Perfluorooctanesulfonamide Sodium salt (1:1) (PFOSA-Na)	76752-78-8
Perfluorooctanesulfonamide Potassium salt (1:1) (PFOSA-K)	76752-70-0
Perfluorooctanesulfonamide Ammonium salt (1:1) (PFOSA-NH <sub>4</sub> )	76752-72-2
Heptadecafluorooctane-1-sulphonamide, compound with triethylamine (1:1) (PFOSA-C <sub>6</sub> H <sub>15</sub> N)	76752-82-4
PFOA, its salts & derivatives	
Perfluorooctanoic acid (PFOA)	335-67-1
Sodium perfluorooctanoate (PFOA-Na)	335-95-5
Potassium perfluorooctanoate (PFOA-K)	2395-00-8
Silver perfluorooctanote (PFOA-Ag)	335-93-3



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Perfluorooctano	/I fluoride (PF	OA-F)		335-66-0
Ammonium pent	adecafluoroo	ctanoate (APFO)		3825-26-1
Lithium perfluoro	octanoate (P	FOA-Li)		17125-58-5
Cobalt perfluoro	octanoate (PF	FOA-Co)		35965-01-6
Cesium perfluor	poctanoate (P	PFOA-Cs)		17125-60-9
Octanoic acid, 2 (PFOA-Cr(3+))	,2,3,3,4,4,5,5	,6,6,7,7,8,8,8-pentadecaflu	oro-, chromium(3+)	68141-02-6
Pentadecafluoro	octanoic acid	piperazine (2/1) (PFOA-N	IH(C₄H10N))	423-52-9
Pentadecafluoro	octanoate (ar	nion)		45285-51-6
Perfluorooctanoi	c Anhydride			33496-48-9
N,N,N-Triethylet	hanaminium p	perfluorooctanoate		98241-25-9
Perfluorooctanoa	ate N,N,N-Trii	methylmethanaminium		32609-65-7
Tetrapropylamm	onium perfluc	prooctanoate		277749-00-5
Potassium penta	decafluorooc	tanoatewater (1/1/2) (PFC	DA-K(H2O)2)	98065-31-7
Perfluorooctanoi	c acid compd	. with ethanamine (1:1) (PF	OA-C₂HァN)	1376936-03-6
Pentadecafluoro	octanoic acid	pyridine (1/1) (PFOA-C₅H	5N)	95658-47-2
pentadecafluoro	octanoic acid-	- 1-phenylpiperazine(1:1) (F	PFOA-C <sub>10</sub> H <sub>14</sub> N <sub>2</sub> )	1514-68-7
N,N,N-Trimethyl C <sub>11</sub> H <sub>26</sub> N)	octan-1-amini	um pentadecafluorooctano	ate (PFOA-	927835-01-6

#### **Red Phosphorus as Phosphorus**

**Test Method:** With reference to US EPA 3052:1996, analysis was performed by ICP-OES/AAS.

Test Item(s)	Unit(s)	MDL	A5
Red Phosphorus as Phosphorus	mg/kg	20	ND

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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#### **Elements Testing Flow Chart**

Name of the person who made testing: Meria Jin/Sielina Song

Name of the person in charge of testing: John Cheng

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





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# Test Report

No.: SHAEC25002041225

Date: Feb 11, 2025

## ATTACHMENTS

#### Hexavalent Chromium (Cr(VI)) Testing Flow Chart

Name of the person who made testing: Alex Wang Name of the person in charge of testing: Xiaolong Yang





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No.: SHAEC25002041225

#### **PBB/PBDE Testing Flow Chart**

Name of the person who made testing: Gary Xu Name of the person in charge of testing: Carol Cui





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Phthalates Testing Flow Chart

Name of the person who made testing: Sherry Shi Name of the person in charge of testing: Carol Cui





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No.: SHAEC25002041225

Date: Feb 11, 2025

# **Elements Testing Flow Chart**

Name of the person who made testing: Meria Jin/Sielina Song Name of the person in charge of testing: Carey Shan





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No.: SHAEC25002041225

#### **Halogen Testing Flow Chart**

Name of the person who made testing: Andy Zhang Name of the person in charge of testing: Gordon Mu





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# Test Report

No.: SHAEC25002041225

Date: Feb 11, 2025

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#### **HBCDD Testing Flow Chart**

Name of the person who made testing: Gary Xu Name of the person in charge of testing: Carol Cui





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No.: SHAEC25002041225

Date: Feb 11, 2025

# **Chlorinated Paraffin Testing Flow Chart**

Name of the person who made testing: Stella Jiang Name of the person in charge of testing: Mia Wang





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No.: SHAEC25002041225

## **PCB Testing Flow Chart**

Name of the person who made testing: Stella Jiang Name of the person in charge of testing: Mia Wang





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# **Test Report**

No.: SHAEC25002041225

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#### **TBBP-A Testing Flow Chart**

Name of the person who made testing: Gary Xu Name of the person in charge of testing: Carol Cui





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**No.:** SHAEC25002041225

# **PFASs/ PFOS/PFOA Testing Flow Chart**

Name of the person who made testing: Ance Chen Name of the person in charge of testing: Liyas Wang





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