ICP Test Report Certification Packet

Company name: Littelfuse, Inc.

Product Series: Ultra-low Capacitance Protection Array, with zener

Product #: SP3003-02JTG

Issue Date: February 7, 2012

It is hereby certified by Littelfuse, Inc. that there is neither RoHS (EU Directive 2002/95/EC)-restricted substance nor such use, for materials to be used for unit parts, for packing/packaging materials, and for additives and the like in the manufacturing processes.
In addition, it is hereby reported to you that the parts and sub-materials, the materials to be used for unit parts, the packing/packaging materials, and the additives and the like in the manufacturing processes, are all composed of the following components.

Issued by: KRISTEEN BACILA

<Global EHS Engineer>

(1) Parts, sub-materials and unit parts

This document covers the SP3003-02JTG RoHS-Compliant series products manufactured by Littelfuse, Inc.

＜ Raw Materials Used

Please see Table 1

(2) The ICP data on all measurable substances

Please see appropriate pages as identifed in Table 1

Remarks：.

Table 1: List of Raw Materials covered by this report

Total Parts	Raw Material Part Number	Raw Material Description	Page(s)
1	2200D	Adhesive (RoHS)	3-8
2	2200D	Adhesive (Halogen)	9-12
3	EME-G600	Epoxy Molding Compound (RoHS, Halogen, RoHS 2)	13-20
4	A194 Alloy	Leadframe	21-25
5	N/A	Au Bonding Wire	26-37
6	N/A	Wafer	38-41
7	N/A	Tin Plating	42-49

Test Report

No. : CE/2011/A3053 Date : 2011/10/24

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

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

Sample Description	:	ADHESIVE
Style/Item No.	:	2200D
Sample Receiving Date	:	2011/10/18
Testing Period	:	2011/10/18 TO 2011/10/24

==========

Test Requested : In accordance with the RoHS Directive 2011/65/EU Annex II.

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

SGS TAIWAN LTD SGS TAIWAN

Chenyu Kung / Operation Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory – Taipei

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

Test Result(s)

PART NAME No.1 : SILVER COLORED PASTE

Test Item (s):	Unit	Method	MDL	Result No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.
Sum of PBBs	mg/kg	With reference to IEC 62321: 2008 and performed by GC/MS.	-	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	mg/kg		5	n.d.
Sum of PBDEs	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.

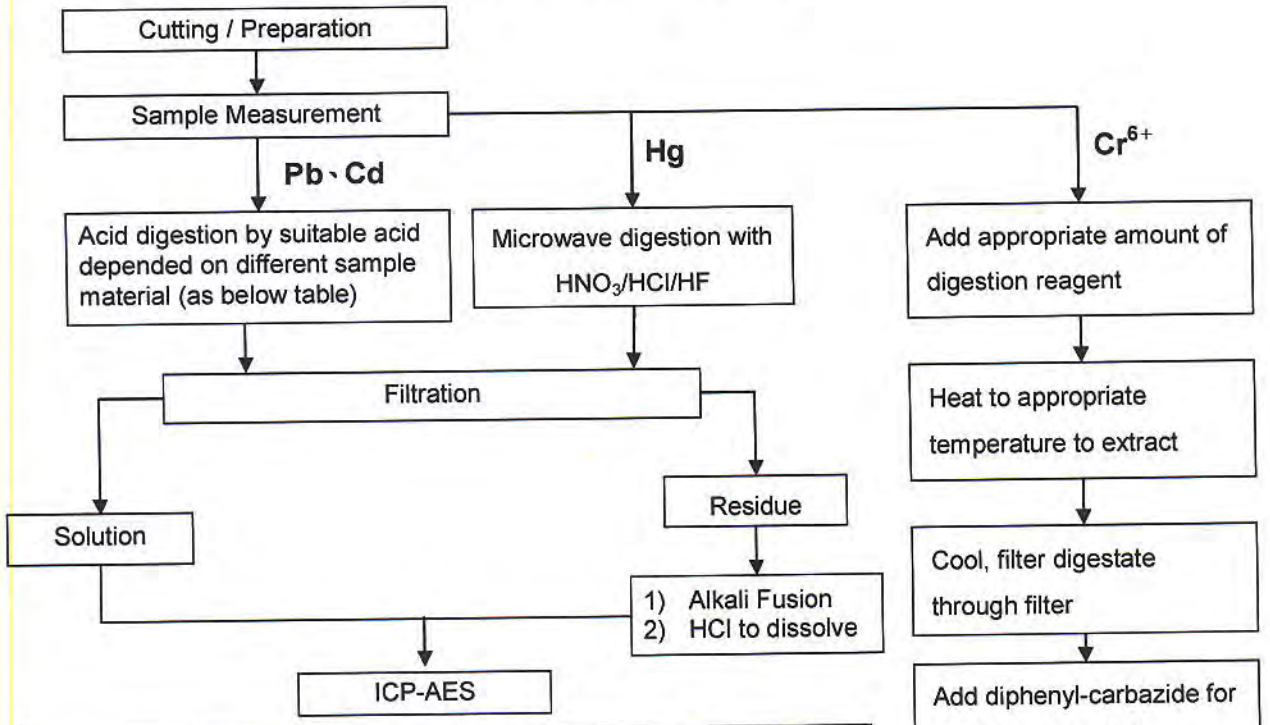
HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)
2) Name of the person who made measurement: Climbgreat Yang
3) Name of the person in charge of measurement: Troy Chang

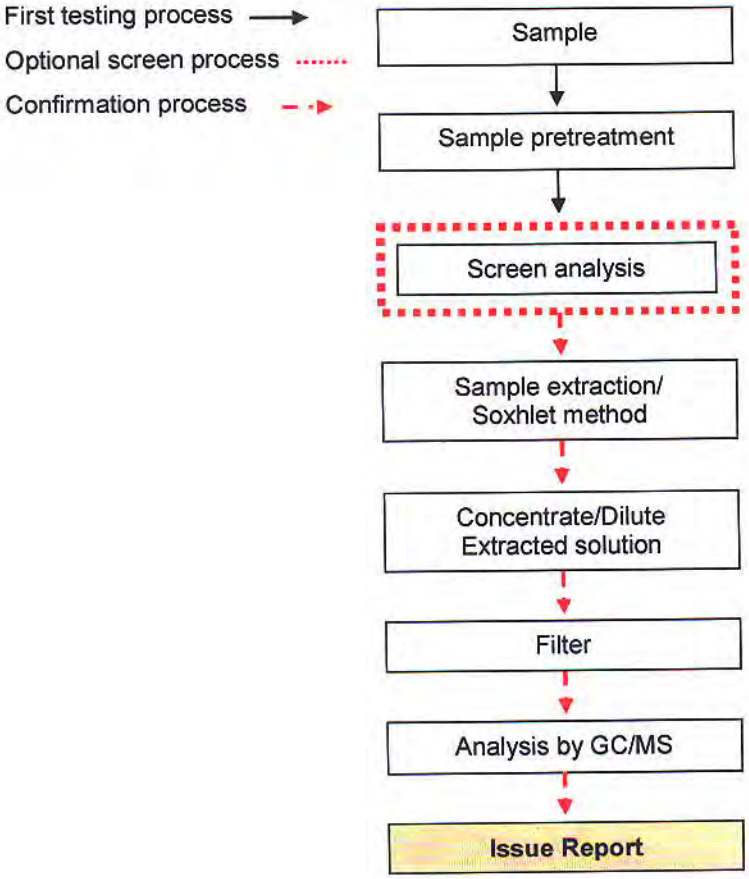


Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO_3, HCl, HF, H_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Any acid to total digestion

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

PBB/PBDE analytical FLOW CHART

- Name of the person who made measurement: Roman Wong
- Name of the person in charge of measurement: Troy Chang

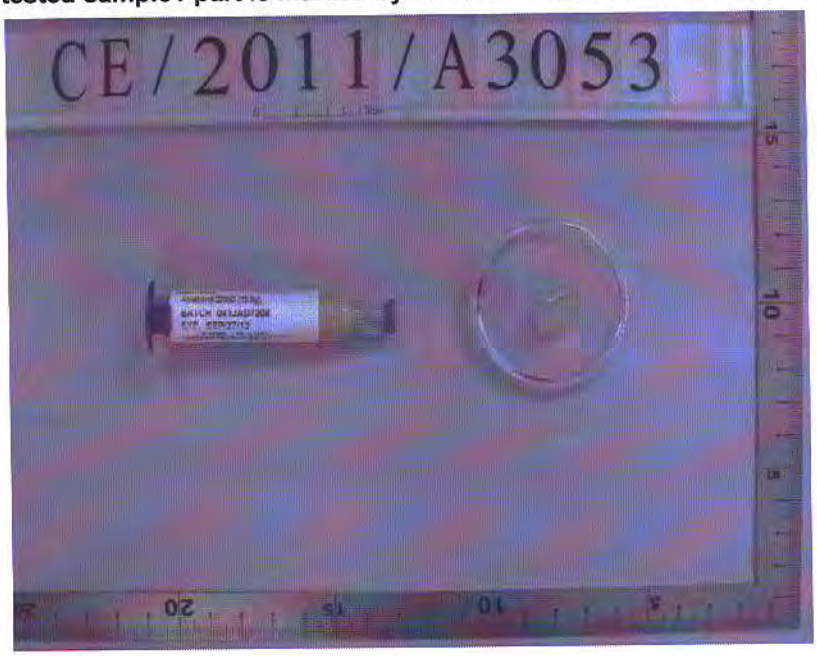


Test Report

No. : CE/2011/A3053 Date : 2011/10/24

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

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



** End of Report **

Test Report

No. : CE/2011/A3050 Date : 2011/10/24

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

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

Sample Description	:	ADHESIVE
Style/Item No.	:	2200D
Sample Receiving Date	:	2011/10/18
Testing Period	:	2011/10/18 TO 2011/10/24

==========

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

SGS TAIWAN LTD SGS TAIWAN

Shinjyh Chen / Asst. Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

Test Report

No. : CE/2011/A3050 Date : 2011/10/24

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

Test Result(s)

PART NAME No.1 : SILVER COLORED PASTE

Test Item (s):	Unit	Method	MDL	Result No.1
Halogen				
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582:2007. Analysis was performed by IC.	50	n.d.
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)			50	n.d.
Halogen-Bromine (Br) (CAS No.: 10097-32-2)			50	n.d.
Halogen-Iodine (I) (CAS No.: 14362-44-8)			50	n.d.

Note :

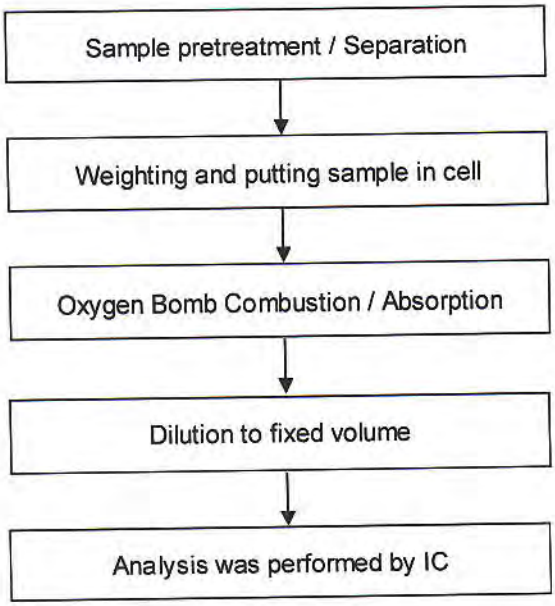
1. mg/kg = ppm; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit

* CE/ 2011/ A3050*

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

Analytical flow chart of halogen content

1) Name of the person who made measurement: Rita Chen
2) Name of the person in charge of measurement: Troy Chang



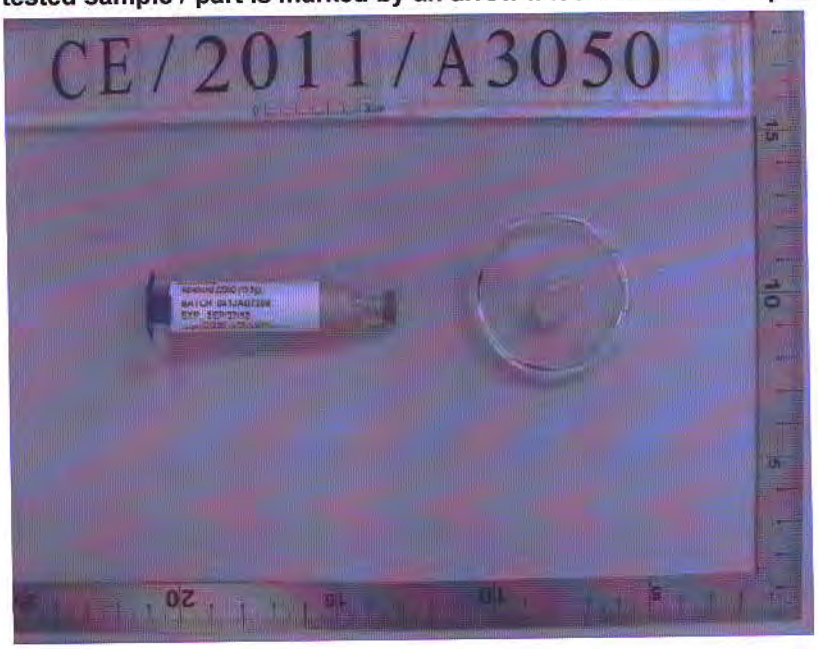
Test Report

No. : CE/2011/A3050 Date : 2011/10/24

HENKEL CORPORATION
HENKEL ADHESIVES-ELECTRONICS MAIN OFFICE: 14000 JAMBOREE ROAD, IRVINE, CALIFORNIA, 92606 U.S.A.

CE/ 2011/ A3050

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



** End of Report **

Test Report

No. SHAEC1110406121 Date: 05 Jul 2011

SUMITOMO BAKELITE (SUZHOU) CO., LTD.

140JINJIHU ROAD, START-UP AREA, CHINA-SINGAPORE SUZHOU INDUSTRIAL PARK

The following sample(s) was/were submitted and identified on behalf of the clients as : EME-G600F SERIES

SGS Job No. :	SP11-020560 - SH
Date of Sample Received :	01 Jul 2011
Testing Period :	01 Jul 2011 - 05 Jul 2011
Test Requested :	Selected test(s) as requested by client.
Test Method :	Please refer to next page(s).
Test Results :	Please refer to next page(s).

Signed for and on behalf of
SGS-CSTC Ltd.

Fan Jingjie, JJ
Approved Signatory

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
Testing Service Division
3rd Building,No.889 Yishan Road Xuhui District,Shanghai China 200233
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t E&E (86-21) 61402553 f E&E (86-21)64953679 www.cn.sgs.com
HL: (86-21) 61402594 HL: (86-21)54500353 e sgs.china@sgs.com

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
1	SHA11-104061.012	Dark grey solid grain

Remarks :

(1) 1 mg/kg = 1 ppm = 0.0001%

(2) MDL = Method Detection Limit

(3) ND = Not Detected (< MDL)

(4) "-" = Not Regulated

RoHS Directive 2002/95/EC

Test Method : (1) With reference to IEC 62321:2008 (Section 8) for Cadmium content. Analysis was performed by ICP-OES and AAS.
(2) With reference to IEC 62321:2008 (Section 8) for Lead content. Analysis was performed by ICP-OES and AAS.
(3) With reference to IEC 62321:2008 (Section 7) for Mercury content. Analysis was performed by ICP-OES.
(4) With reference to IEC 62321:2008 (ANNEX C) for Hexavalent Chromium by Spot test / Colorimetric Method.
Analysis was performed by UV/Vis Spectrophotometer.
(5) With reference to IEC 62321:2008 (ANNEX A) for PBBs / PBDEs content. Analysis was performed by GC/MS.

Test Item(s)	Limit	Unit	MDL	*012*
Cadmium (Cd)	100	mg/kg	2	ND
Lead (Pb)	1,000	mg/kg	2	ND
Mercury (Hg)	1,000	mg/kg	2	ND
Hexavalent Chromium (CrVI)	1,000	mg/kg	2	ND
Sum of PBBs	1,000	mg/kg	-	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	-	mg/kg	5	ND
Tribromobiphenyl	-	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	-	mg/kg	5	ND
Hexabromobiphenyl	-	mg/kg	5	ND
Heptabromobiphenyl	-	mg/kg	5	ND

Test Item(s)	Limit	Unit	MDL	*012*
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1,000	mg/kg	-	ND
Monobromodiphenyl ether	-	mg/kg	5	ND
Dibromodiphenyl ether	-	mg/kg	5	ND
Tribromodiphenyl ether	-	mg/kg	5	ND
Tetrabromodiphenyl ether	-	mg/kg	5	ND
Pentabromodiphenyl ether	-	mg/kg	5	ND
Hexabromodiphenyl ether	-	mg/kg	5	ND
Heptabromodiphenyl ether	-	mg/kg	5	ND
Octabromodiphenyl ether	-	mg/kg	5	ND
Nonabromodiphenyl ether	-	mg/kg	5	ND
Decabromodiphenyl ether	-	mg/kg	5	ND

Notes :

(1) The maximum permissible limit is quoted from the document 2005/618/EC amending RoHS directive 2002/95/EC

Halogen

Test Method : With reference to EN 14582: 2007, analysis was performed by Ion Chromatograph (IC).

Test Item(s)	Unit	MDL	*012*
Bromine (Br)	mg/kg	50	ND
Fluorine (F)	mg/kg	50	ND
Chlorine (Cl)	mg/kg	50	ND
Iodine (I)	mg/kg	50	ND

Phthalates

Test Method : With reference to EN14372: 2004, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*012*
Dibutyl Phthalate (DBP)	%	0.003	ND
Benzylbutyl Phthalate (BBP)	%	0.003	ND
Bis-(2-ethylhexyl) Phthalate (DEHP)	%	0.003	ND
Diisononyl Phthalate (DINP)	%	0.010	ND

Test Item(s)	Unit	MDL	*012*
Di-n-octyl Phthalate (DNOP)	%	0.003	ND
Diisodecyl Phthalate (DIDP)	%	0.010	ND

Notes :

(1) DBP,BBP,DEHP Reference information: Entry 51 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC):

i) Shall not be used as substances or in mixtures, in concentrations greater than 0,1 % by weight of the plasticised material, in toys and childcare articles.

ii) Toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information

DINP, DNOP, DIDP Reference information: Entry 52 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2005/84/EC).

i) Shall not be used as substances or in mixtures, in concentrations greater than 0.1 % by weight of the plasticised material, in toys and childcare articles which can be placed in the mouth by children.

ii) Such toys and childcare articles containing these phthalates in a concentration greater than 0.1 % by weight of the plasticised material shall not be placed on the market.

Please refer to Regulation (EC) No 552/2009 to get more detail information

Polynuclear Aromatic Hydrocarbons (PAH)

Test Method : With reference to ZEK 01.2-08 of German ZLS and its amendments, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*012*
Sum of 16 PAH	mg/kg	-	2.1
Naphthalene(NAP)	mg/kg	0.2	ND
Acenaphthylene(ANY)	mg/kg	0.2	ND
Acenaphthene(ANA)	mg/kg	0.2	ND
Fluorene(FLU)	mg/kg	0.2	ND
Phenanthrene(PHE)	mg/kg	0.2	ND
Anthracene(ANT)	mg/kg	0.2	ND
Fluoranthene(FLT)	mg/kg	0.2	ND
Pyrene(PYR)	mg/kg	0.2	2.1
Benzo(a)anthracene(BaA)	mg/kg	0.2	ND
Chrysene(CHR)	mg/kg	0.2	ND
Benzo(b)fluoranthene(BbF)	mg/kg	0.2	ND
Benzo(k)fluoranthene(BkF)	mg/kg	0.2	ND
Benzo(a)pyrene(BaP)	mg/kg	0.2	ND

Test Item(s)	Unit	MDL	*012*
Indeno(1,2,3-c,d)pyrene(IPY)	mg/kg	0.2	ND
Dibenzo(a,h)anthracene(DBA)	mg/kg	0.2	ND
Benzo(g,h,i)perylene(BPE)	mg/kg	0.2	ND

ZEK 01.2-08: Restraining maximum values for products

Parameter	Category 1	Category 2	Category 3
	Material indented to be put in the mouth or material for toys with normal skin contact for children aged < 36 months	Materials which are not included in Category 1, with predictable contact with the skin longer than 30 s. (long-term skin contact)	Materials which are not included in Category 1 or 2, with predictable skin contact up to 30 s (short-term skin contact).
Benzo[a]pyrene (mg/kg)	<MDL (<0.2)***	1	20
Sum of 16 PAH(US EPA) (mg/kg)**	<MDL (<0.2)***	10	200

Remark : ** = Only PAH substances >0.2 mg/kg are taken into account while calculating the sum of PAH
*** = In case that the maximum values exceed the limits of category 1, but are within the limits of category 2, one may confirm the suitability of the tested material which is indented to be put in the mouth by additional specific migration tests of PAH components based on DIN EN 1186ff and §64 LFGB 80.30-1. The conclusion of the migration test results must be made based on food law criteria.

Tetrabromobisphenol A (TBBP-A)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by GC-MS.

Test Item(s)	Unit	MDL	*012*
Tetrabromobisphenol A (TBBP-A)	mg/kg	10	ND

PFOS (Perfluorooctane Sulfonates) and PFOA (Perfluorooctanoic Acid)

Test Method : With reference to US EPA 3550C: 2007, analysis was performed by HPLC-MS.

Test Item(s)	Unit	MDL	012
Perfluorooctane Sulfonates (PFOS) and related Acid,Metal Salt and Amide	mg/kg	10	ND
Perfluorooctyl Acid (PFOA)	mg/kg	10	ND

Notes :

(1) PFOS Reference Information: Entry 53 of Regulation (EC) No 552/2009 amending Annex XVII of REACH Regulation (EC) No 1907/2006 (previously restricted under Directive 2006/122/EC)

(i) May not be placed on the market or used as a substance or constituent of preparations in a concentration equal to or higher than 0.005 % by mass.

(ii) May not be placed on the market in semi-finished products or articles, or parts thereof, if the concentration of PFOS is equal to or higher than 0.1 % by mass calculated with reference to the mass of structurally or microstructurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is equal to or higher than 1μg /m² of the coated material.

Please refer to Regulation (EC) No 552/2009 to get more detail information

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
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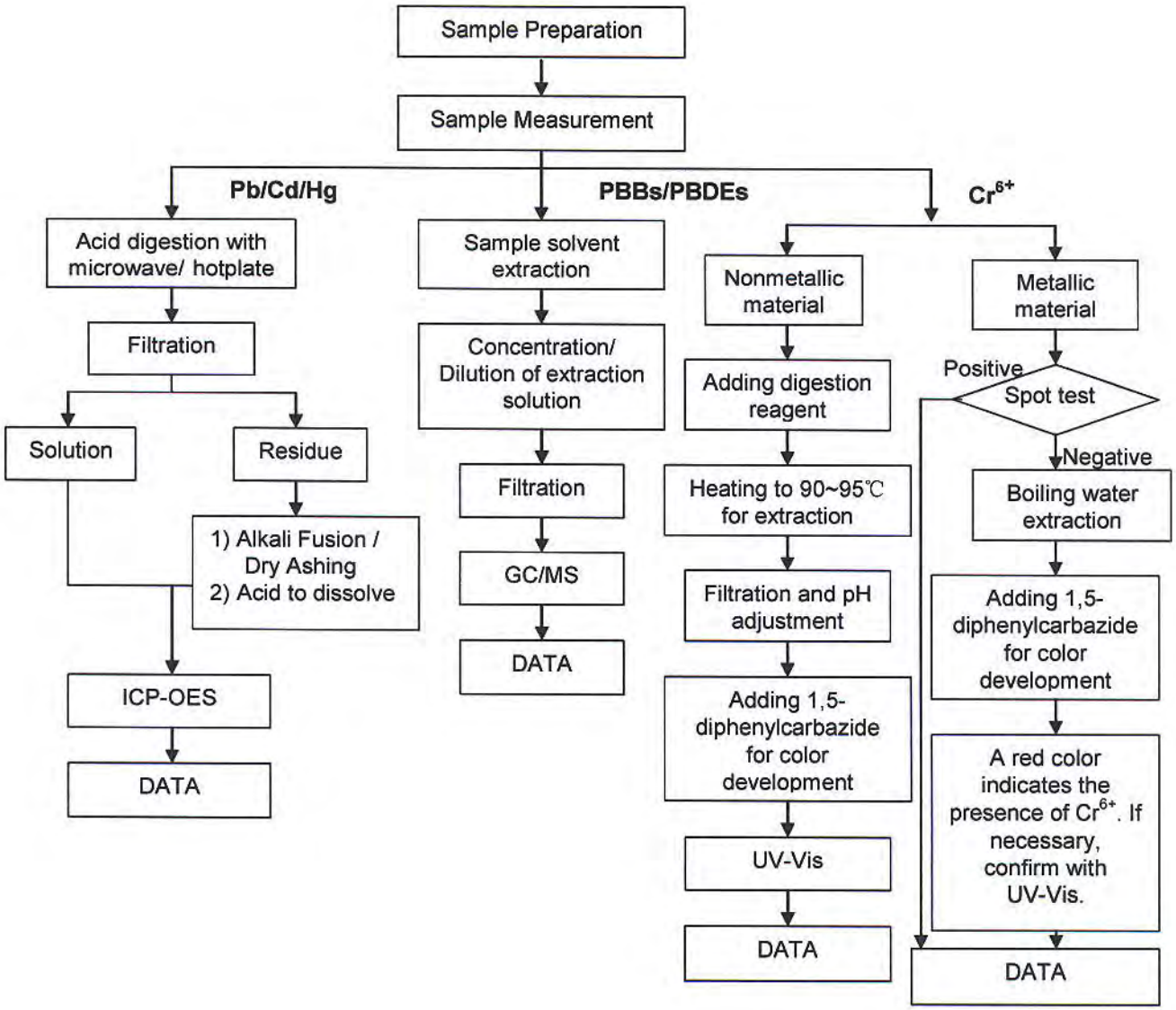
HL: (86-21) 61402594 HL: (86-21)54500353 e sgs.china@sgs.com

ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Jan Shi/Yoyo Wang/Allen Xiao/Gary Xu
2) Name of the person in charge of testing: Jeff Zhang/George Xu/ Elim Lin
3) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ and PBBs/PBDEs test method excluded)



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Testing Service Division
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HL: (86-21) 61402594 HL: (86-21)54500353 e sgs.china@sgs.com

Sample photo:

SHA11-104061.012

SGS authenticate the photo on original report only

*** End of Report ***

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd.
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SGS

LABORATORY ACCREDITATION
TESTING
No.0013

Test Report No. 1997551 Date : 18-Apr-2011

Client : Sumiko Leadframe (Thailand) Co., Ltd.
1/49 moo 5 Rojana Industrial Park
Tambol Kanham,Amphur Uthai Phra Nakhon Si Ayutthaya 13210 Thailand

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

Sample Description	:	A 194 with Ni, Pd, Au (PPF Plating)
Sample No.	:	2046120
Sample Condition	:	As per attached photograph
Sample Receiving Date	:	8-Apr-2011
Testing Period	:	08-Apr-2011 to 18-Apr-2011
Test Requested	:	In accordance with the RoHS Directive 2002/95/EC and its amendment directives
Test Method	:	(1) With reference to IEC 62321:2008 for Lead content, Analysis was performed by ICP-OES. (2) With reference to IEC 62321:2008 for Cadmium content, Analysis was performed by ICP-OES. (3) With reference to IEC 62321:2008 for Mercury content, Analysis was performed by ICP-OES. (4) With reference to IEC 62321:2008 for Hexavalent Chromium by Colorless and Colored Chromate Coating on Metals/ Colorimetric Method, Analysis was performed by UV-Vis spectrometry. (5) With reference to IEC 62321:2008 for PBB/PBDE content, Analysis was performed by GC/MS.
Test Results	:	Please refer to next page.

CONCLUSION

Based on the performed tests on submitted samples, the result comply with the RoHS Directive 2002/95/EC and its subsequent amendments.

Signed for and on behalf of
SGS (Thailand) Limited

Pornpana Lirathpong
Hardlines Testing Manager

1699264

TEST RESULTS

Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Lead (Pb)	(1)	n.d.	2	1000
Cadmium (Cd)	(2)	n.d.	2	100
Mercury (Hg)	(3)	n.d.	2	1000
Hexavalent Chromium (CrVI) by Spot test / boiling water extraction (optional)	(4)	Negative	-	#
sum of PBBs	(5)*	n.d.	-	1000
Monobromobiphenyl		n.d.	5	-
Dibromobiphenyl		n.d.	5	-
Tribromobiphenyl		n.d.	5	-
Tetrabromobiphenyl		n.d.	5	-
Pentabromobiphenyl		n.d.	5	-
Hexabromobiphenyl		n.d.	5	-
Heptabromobiphenyl		n.d.	5	-
Octabromobiphenyl		n.d.	5	-
Nonabromobiphenyl		n.d.	5	-
Decabromobiphenyl		n.d.	5	-

TEST RESULTS

Test results by chemical method (Unit: mg/kg)

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
Sum of PBDEs	(5)*	n.d.	-	1000
Monobromodiphenyl ether		n.d.	5	-
Dibromodiphenyl ether		n.d.	5	-
Tribromodiphenyl ether		n.d.	5	-
Tetrabromodiphenyl ether		n.d.	5	-
Pentabromodiphenyl ether		n.d.	5	-
Hexabromodiphenyl ether		n.d.	5	-
Heptabromodiphenyl ether		n.d.	5	-
Octabromodiphenyl ether		n.d.	5	-
Nonabromodiphenyl ether		n.d.	5	-
Decabromodiphenyl ether		n.d.	5	-

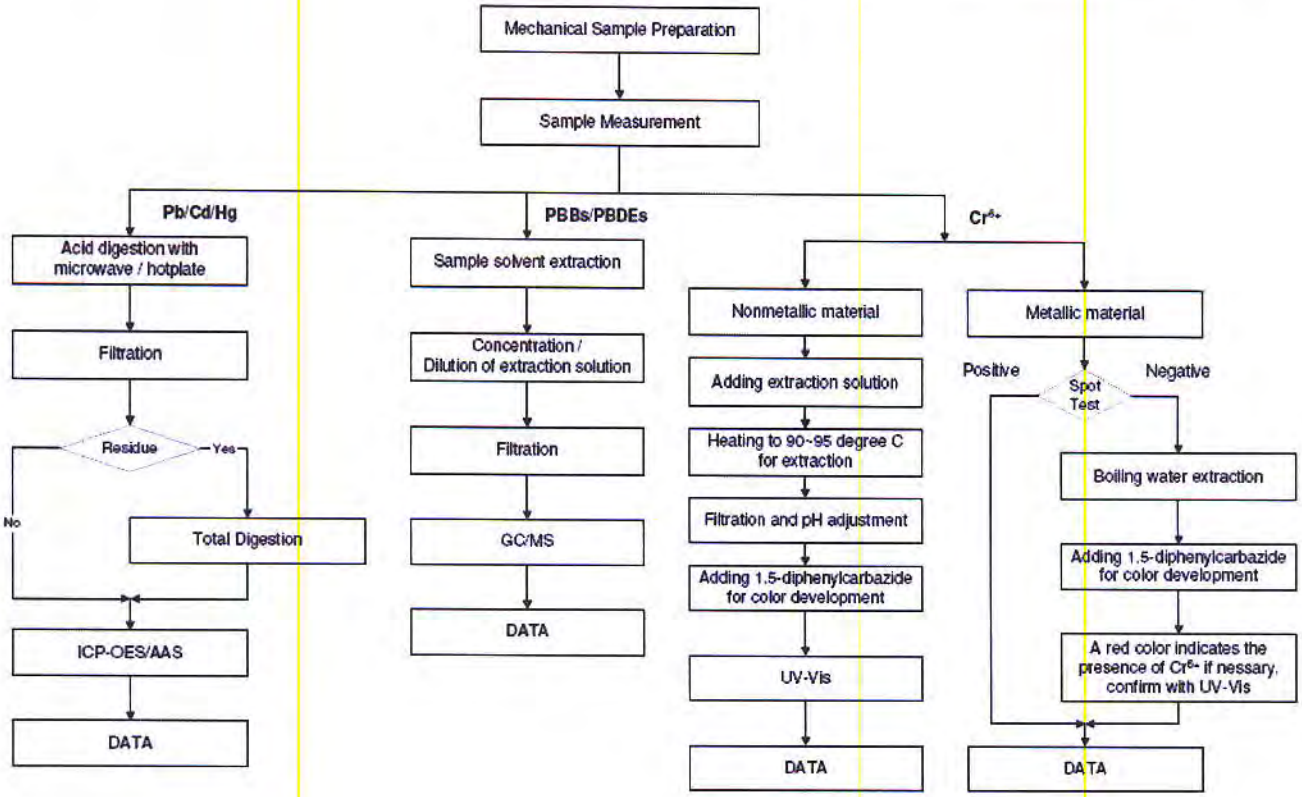
Test Part Description
Result (1) metal with plating

Note :
(a) mg/kg = ppm ; 0.1 wt% = 1000 ppm
(b) The results shown are based on the total weight of dry sample
(c) n.d. = Not Detected
(d) MDL = Method Detection Limit
(e) The exemption of DecaBDE in polymeric application according 2005/17/EC was overruled by the European Court of Justice by its decision of 01.04.2008. Subsequently DecaBDE will be included in the sum of PBDE after 01.07.2008
(f) "-" = Not regulated

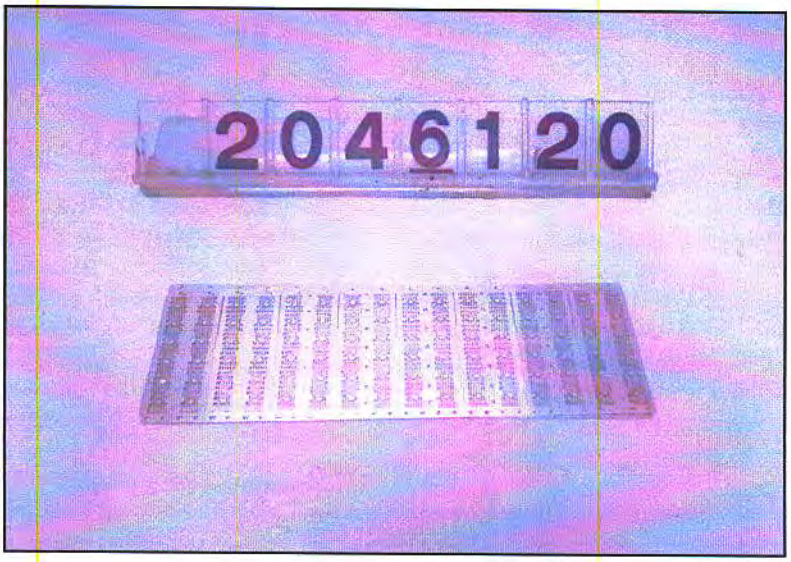
"Test(s) marked * on this Report are not included in the TISI Accreditation Schedule for our Laboratory"

Flow Chart for RoHS : Pb/Cd/Hg/Cr^{6+}/PBBs/PBDEs Testing

1. **Operator : Siam Polarwut**
2. **Section Chief : Laddawan Uranpitr**
3. **The sample was dissolved totally by pre-conditioning method according to below flowchart. (Cr6+ and PBBs/PBDEs test method excluded)**



SAMPLE/ATTACHMENT PICTURE



********** End of Report **********

Test Report No. F690501/LF-CTSAYAA11-15562 Issued Date: May 30, 2011

To: **HERAEUS ORIENTAL HITEC CO.,LTD.**
587-122
Hakik-dong
Nam-gu
Incheon
Korea

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

Product Name	:	Au wire
SGS File No.	:	AYAA11-15562
Item No./Part No.	:	4N
Client Reference Date	:	HD2 (Be), HD3, HD5 (Ce), HD6 (Ca), HA5, HA6, HA9, HA11, AW7, AW13, AW14, AW25, AW29, AW66X
Received Date	:	May 12, 2011
Test Performing Date	:	May 13. 2011 to May 30, 2011
Test Performed	:	SGS Korea tested the sample(s) selected by applicant with following results This test report contains result performed by subcontracted laboratory in agreement with the applicant.The result is marked with crosshatch(#) in this report.
Test Result(s)	:	For further details, please refer to following page (s)
Buyer(s)	:	AMKOR,HYNIX,ASAHI KASEI,ASE KR,SCK,FUJITSU,NIGATA SEIMITSU
Comments	:	The client has confirmed that the described client reference data are the same with the sample submitted.

SGS Korea Co., Ltd.

Jeff Jang

Jeff Jang / Technical Mgr

Timothy Jeon
Jinhee Kim
Cindy Park
Jerry Jung /Testing Person

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SGS

Test Report No. F690501/LF-CTSAYAA11-15562 Issued Date: May 30, 2011

Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium(Cd)	mg/kg	With reference to IEC 62321:2008,ICP	0.5	N.D
Lead (Pb)	mg/kg	With reference to IEC 62321:2008,ICP	5	N.D
Mercury (Hg)	mg/kg	With reference to IEC 62321:2008,ICP	2	N.D
Hexavalent Chromium(CrVI) By boiling water extraction*	**	With reference to IEC 62321:2008	-	Negative
Beryllium (Be)	mg/kg	US EPA 3050B (1996),US EPA 6010B(1996),ICP	0.5	N.D
Phosphorous (P)	mg/kg	US EPA 3050B (1996),US EPA 6010B(1996),ICP	10	N.D
Antimony (Sb)	mg/kg	US EPA 3050B (1996),US EPA 6010B(1996),ICP	10	N.D

Flame Retardants-PBBs/PBDEs

Test Items	Unit	Test Method	MDL	Results
Monobromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Dibromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Tribromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Tetrabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Hexabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Pentabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Heptabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Octabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Nonabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Decabromobiphenyl	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Tribromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Hexabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Octabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Nonabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D
Decabromodiphenyl ether	mg/kg	With reference to IEC 62321:2008,GC-MS	5	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Formaldehyde Contents

Test Items	Unit	Test Method	MDL	Results
Formaldehyde	mg/kg	ISO 14184-1, UV-vis	20	N.D

Phthalates

Test Items	Unit	Test Method	MDL	Results
Di-n-octyl phthalate (DNOP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-isononyl phthalate (DINP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-isodecyl phthalate (DIDP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-methyl phthalate (DMP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-ethyl phthalate(DEP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-cyclohexyl phthalate (DCHP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-n-hexyl phthalate (DNHP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-pentyl phthalate(DPP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-propyl phthalate(DPrP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-isooctyl phthalate (DIOP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-n-nonyl phthalate (DNP)	mg/kg	US EPA 8061A,GC/MS	50	N.D
Di-(2-ethylhexyl) adipate (DEHA)	mg/kg	US EPA 8061A,GC/MS	50	N.D

Halogen Contents

Test Items	Unit	Test Method	MDL	Results
Bromine(Br)	mg/kg	BS EN 14582:2007,IC	30	N.D
Chlorine(Cl)	mg/kg	BS EN 14582:2007,IC	30	N.D
Fluorine(F)	mg/kg	BS EN 14582:2007,IC	30	N.D
Iodine(I)	mg/kg	BS EN 14582:2007,IC	50	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Asbestos

Test Items	Unit	Test Method	MDL	Results
Anthrophylite	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative
Crocodolite	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative
Amosite	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative
Tremolite	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative
Chrysotile	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative
Actinolite	**	With reference to EPA/600/R-93/116 and USP, PLM and FT-IR	-	Negative

Chlorinated Organic Substances

Test Items	Unit	Test Method	MDL	Results
Polychlorinated Biphenyls (PCBs)	mg/kg	USEPA 8082 , GC/MS	3	N.D
Polychlorinated terphenyls (PCTs)	mg/kg	USEPA 8082 , GC/MS	3	N.D
Polychlorinated Naphthalene (PCN)	mg/kg	EPA 8081 A , GC/MS	5	N.D

Polymer Identification

Test Items	Unit	Test Method	MDL	Results
PVC free	**	FT-IR	-	Negative

Organotin Compounds

Test Items	Unit	Test Method	MDL	Results
Tributyltin (TBT)	mg/kg	DIN 38407-13 , GC/MS	0.1	N.D
Bis (tributyltin)oxide (TBTO)	mg/kg	DIN 38407-13 , GC/MS	0.1	N.D
Triphenyltin (TPhT)	mg/kg	DIN 38407-13 , GC/MS	0.1	N.D

Ozone Depleting Substances

Test Items	Unit	Test Method	MDL	Results
Trichlorofluoromethane (CFC-11)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Dichlorodifluoromethane (CFC-12)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1,2-Trichloro-1,2,2-trifluoroethane (CFC-113)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Dichlorotetrafluoroethane (CFC-114)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chloropentafluoroethane (CFC-115)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chlorotrifluoromethane (CFC-13)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Pentachlorofluoroethane (CFC-111)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Tetrachlorodifluoroethane (CFC-112)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Heptachlorofluoropropane (CFC-211)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Ozone Depleting Substances

Test Items	Unit	Test Method	MDL	Results
Hexachlorodifluoropropane (CFC-212)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Pentachlorotrifluoropropane (CFC-213)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Tetrachlorotetrafluoropropane (CFC-214)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Trichloropentafluoropropane (CFC-215)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Trichlorohexafluoropropane (CFC-216)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chloroheptafluoropropane (CFC-217)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1,1,2-Tetrachloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1,1-Trichloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1,2,2-Tetrachloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1,2-Trichloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1-Dichloroethene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1-Dichloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,1-Dichloropropene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,2,3-Trichloropropane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,2-Dichloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,2-Dichloropropane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,3-Dichloropropane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
2,2-Dichloropropane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Carbon tetrachloride	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chloroethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chloroform	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Chloromethane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
cis-1,2-Dichloroethene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
cis-1,3-Dichloropropene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hexachlorobutadiene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Methylene Chloride	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Tetrachloroethene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
trans-1,2-Dichloroethene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
trans-1,2-Dichloropropene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Trichloroethylene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Bromochlorodifluoromethane (Halon-1211)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Bromotrifluoromethane (Halon-1301)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Dibromotetrafluoroethane (Halon-2402)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Methyl bromide (Halon 1001)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Bromochloromethane (Halon 1011)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Ozone Depleting Substances

Test Items	Unit	Test Method	MDL	Results
Dibromodifloromethane (Halon-1202)	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-21b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-22b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-31b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-121b4	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-122b3	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-123b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-124b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-131b3	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-132b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-123b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-141b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-142b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-151b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-221b6	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-222b5	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-223b4	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-224b3	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-225b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-226b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-231b5	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-232b4	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-233b3	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-234b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-235b5	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-241b4	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-241b3	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-243b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-244b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-251b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-252b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-253b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-261b2	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-262b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
HBFC-271b1	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-21	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-22	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-31	mg/kg	US EPA 8260B , GC/MS	0.1	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Ozone Depleting Substances

Test Items	Unit	Test Method	MDL	Results
Hydrochlorofluorocarbon-121	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-122	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-123	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-124	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-131	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-132b	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-133a	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-141b	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-221	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-222	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-223	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-224	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-225ca	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-225cb	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-226	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-231	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-232	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-233	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-234	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-235	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-241	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-242	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-243	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-244	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-251	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-252	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-253	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-261	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-262	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrochlorofluorocarbon-271	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-23	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-41	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-43-10mee	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-125	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-134	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-134a	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-143	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-143a	mg/kg	US EPA 8260B , GC/MS	0.1	N.D

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Ozone Depleting Substances

Test Items	Unit	Test Method	MDL	Results
Hydrofluorocarbon-152a	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-227ea	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-236fa	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-236ea	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-245ca	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-245fa	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Hydrofluorocarbon-365mfc	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Freon 14	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Fluorocarbon 116	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Freon 218	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Decafluorobutane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Freon 318	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Perfluoro-1-butane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Perfluoroisobutene	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
1,4-Dihydrooctafluorobutane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Nonafluro-2-(trifluoromethyl)butane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Perfluoro-n-pentane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
2-Perfluoromethylpentane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D
Perfluorohexane	mg/kg	US EPA 8260B , GC/MS	0.1	N.D

Azo Dyes

Test Items	Unit	Test Method	MDL	Results
4-Aminodiphenyl	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
Benzidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
4-Chloro-o-Toluidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2-Naphtylamine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
o-Aminoazotoluene	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2-Amino-4-Nitrotoluene	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
p-Chloroaniline	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2,4-Diaminoanisole	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
4,4'-Diaminodiphenylmethane	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
3,3'-Dichlorobenzidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
3,3-Dimethoxybenzidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
3,3-Dimethylbenzidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
3,3-Dimethyl-4.4'-diaminodiphenyl Methane	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
p-Cresidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
4,4'-Methylen-bis-(2-chloroaniline)	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D

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t +82 (0)31 4608 000 f +82 (0)31 4608 059 http://www. ... www.kr.sgs.com/greenlab
Member of the SGS Group (Société Générale de Surveillance)

Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Azo Dyes

Test Items	Unit	Test Method	MDL	Results
4,4'-Oxydianiline	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
4-Aminodiphenyl	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
o-Toluidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2,4-Toluenediamine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2,4,5-Trimethylaniline	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
o-Anisidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
4-Aminoazobenzene	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2,4-Xylidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D
2,6-Xylidine	mg/kg	LFGB 64 BVL B 82.02.2 , GC/MS &HPLC	5	N.D

Other(s)

Test Items	Unit	Test Method	MDL	Results
PFOA(Perfluorooctanioc acid)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D
PFOS(Perfluorooctane Sulfonates-Acid/Metal Salt/Amide)	mg/kg	US EPA 3540C/3550C, LC/MS	1	N.D
Benzotriazole (UV-320)	mg/kg	US EPA 3540C, GC/MS	5	N.D

Note :

(1) n.d.= not detected
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) _ = No regulation
(5) ** = Qualitative analysis (No Unit)
(6) * = Boiling-water-extraction:
Negative = Absence of CrVI coating
Positive = Presence of CrVI coating; the detected concentration in boiling-water- extraction Solution is equal or greater than 0.02 mg/kg with 50 cm2 sample surface area.

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Sample No. : AYAA11-15562
Sample Description : Au wire
Item / Part No. : 4N

Test Item(s)	Unit	Method	Result
Radioactive Substances (#)	μSv/ hour	Geiger counter	Negative*

NOTE: (1) N.D.= Not detected
(2) mg/kg= ppm : 0.1wt% = 1000ppm
(3) MDL = Method Detection Limit
(4) -=No regulation
(5) **=Qualitative analysis (No Unite)
(6) Negative*/Positive* : The test result of Geiger counter is from comparison between test outcome and environment background . In general ,there is little radiation dose existing in environment.
(Radiation dose from environment background usually less than or equal to 0.10±0.05 μSv/ hour)
The test result less than environment background was shown as Negative *, the result greater than environment background was shown as Positive*.

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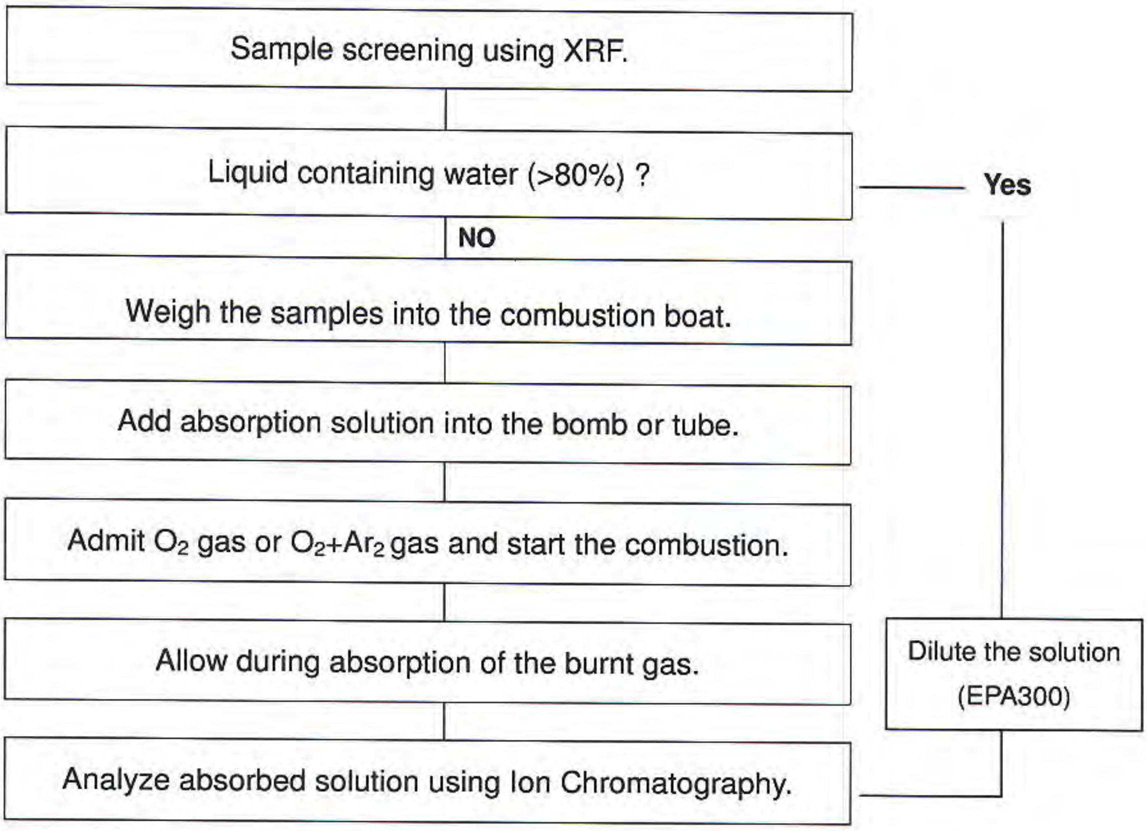
Picture of Sample as Received :

SGS Korea Co., Ltd.

Flow Chart for Halogen Test



*** End ***

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Test Report

No. : CE/2012/12342 Date : 2012/01/18

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION ROAD 1, SCIENCE BASED INDUSTRIAL PARK, HSINCHU, TAIWAN, R. O. C.

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

Sample Description	:	IC WAFER
Style/Item No.	:	ALUMINUM PROCESS
Sample Receiving Date	:	2012/01/11
Testing Period	:	2012/01/11 TO 2012/01/18

==========

Test Requested : As specified by client, with reference to RoHS Directive 2011/65/EU Annex II to determine Cadmium, Lead, Mercury, Cr(VI) contents in the submitted sample.

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

SGS TAIWAN LTD

Nicole Chien / Supervisor
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION ROAD 1, SCIENCE BASED INDUSTRIAL PARK, HSINCHU, TAIWAN, R. O. C.

Test Result(s)

PART NAME No.1 : MULTICOLOR WAFER

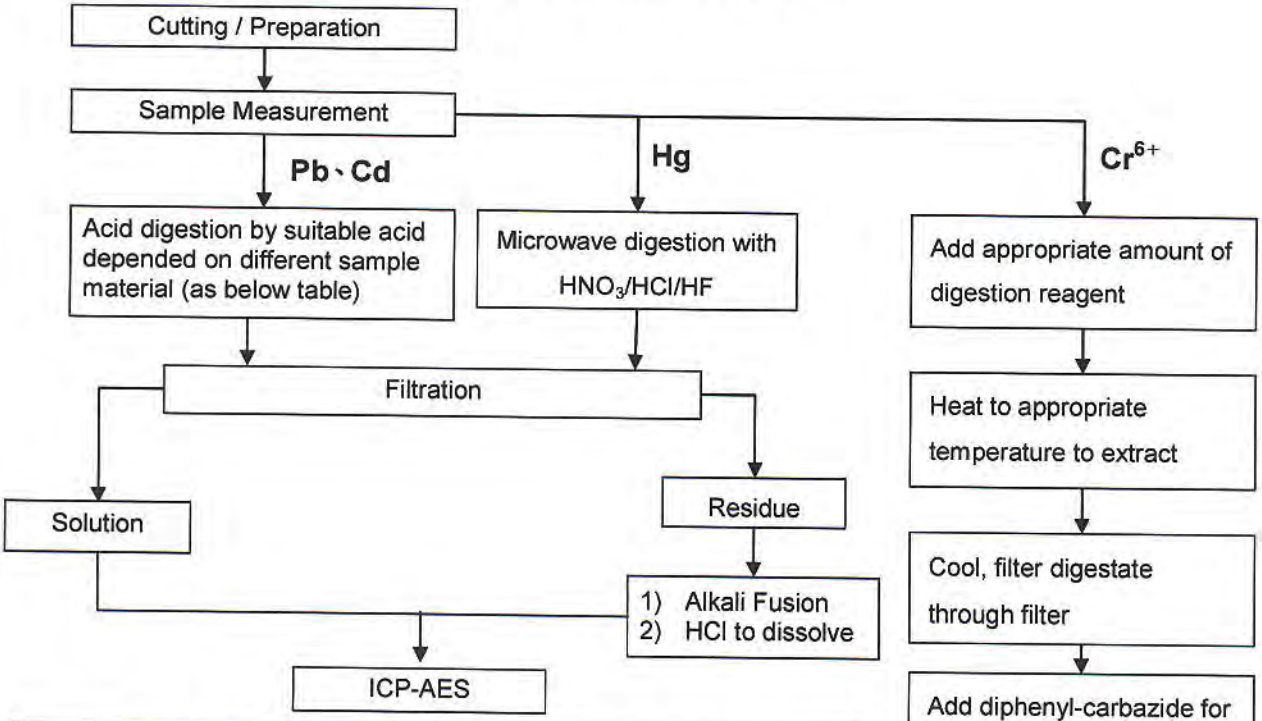
Test Item(s)	Unit	Method	MDL	Result
				No.1
Cadmium (Cd)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Lead (Pb)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Mercury (Hg)	mg/kg	With reference to IEC 62321: 2008 and performed by ICP-AES.	2	n.d.
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321: 2008 and performed by UV-VIS.	2	n.d.

Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION ROAD 1, SCIENCE BASED INDUSTRIAL PARK, HSINCHU, TAIWAN, R. O. C.

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)
2) Name of the person who made measurement: Climbgreat Yang
3) Name of the person in charge of measurement: Troy Chang

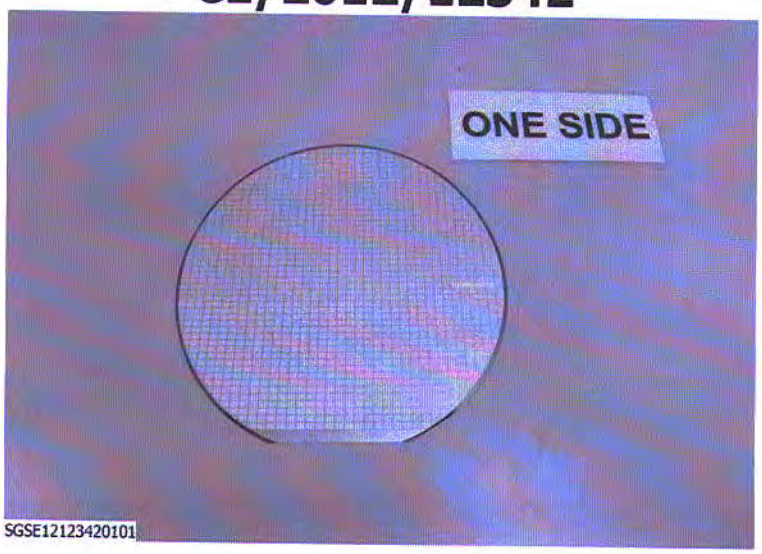


Sample Material	Digestion Acid
Steel, copper, aluminum, solder	Aqua regia, HNO_3, HCl, HF, H_2O_2
Glass	HNO_3/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO_3
Plastic	H_2SO_4, H_2O_2, HNO_3, HCl
Others	Any acid to total digestion

EPISIL TECHNOLOGIES INC.
NO. 3, INNOVATION ROAD 1, SCIENCE BASED INDUSTRIAL PARK, HSINCHU, TAIWAN, R. O. C.

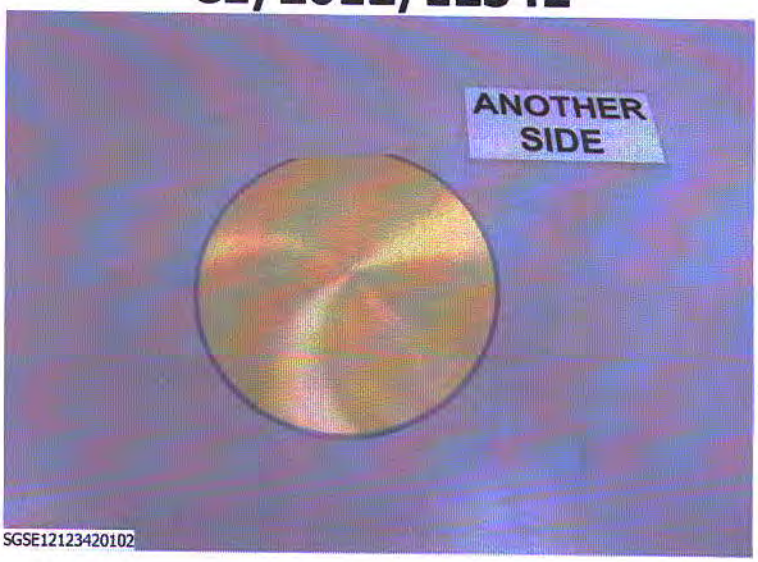
*** The tested sample / part is marked by an arrow if it's shown on the photo. ***

CE/2012/12342



SGSE12123420101

CE/2012/12342



SGSE12123420102

** End of Report **

Test Report

No. CANEC1103340401 Date: 01 Sep 2011 Page 1 of 8

GEJIU ZILI MINING&SMEL TING CO.,LTD
HUOGUDU,JIJIE TOWN,GEJIU CITY,HONGHE ZHOU,YUNNAN PROVINCE
CHINA

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

SGS Job No.	:	13332781 - GZ
Model No.	:	Sn 99.90
SGS Internal Reference No.	:	2.1
Date of Sample Received	:	26 Aug 2011
Testing Period	:	26 Aug 2011 - 01 Sep 2011
Test Requested	:	Selected test(s) as requested by client.
Test Method	:	Please refer to next page(s).
Test Results	:	Please refer to next page(s).
Conclusion	:	A:Based on the performed tests on submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE) comply with the limits as set by RoHS Directive 2011/65/EU Annex II; recasting 2002/95/EC.

Signed for and on behalf of
SGS-CSTC Ltd.

Merry

Merry Lv
Approved Signatory

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Test Results:

ID for specimen 1 : CAN11-033404.001

Description for specimen 1 : Silvery metal block

A:RoHS Directive 2011/65/EU

Test Item(s)	Unit	Test Method (Reference)	Result	MDL	Limit
Cadmium (Cd)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	100
Lead (Pb)	mg/kg	IEC 62321:2008, ICP-OES	46	2	1000
Mercury (Hg)	mg/kg	IEC 62321:2008, ICP-OES	N.D.	2	1000
Hexavalent Chromium (CrVI) by boiling water extraction	-	IEC 62321:2008, UV-Vis	Negative	◇	#
Sum of PBBs	mg/kg	-	N.D.	-	1000
Monobromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromobiphenyl	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Sum of PBDEs	mg/kg	-	N.D.	-	1000
Monobromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Dibromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tribromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Tetrabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Pentabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Hexabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Heptabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Octabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Nonabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	
Decabromodiphenyl ether	mg/kg	IEC 62321:2008, GC-MS	N.D.	5	

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Note:
1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit
4. ◇ = Spot-Test:
   Negative = Absence of CrVI coating, Positive = Presence of CrVI coating;
   (The tested sample should be further verified by boiling-water-extraction method if the spot test result is negative or cannot be confirmed.)
   Boiling-water-extraction:
   Negative = Absence of CrVI coating
   Positive = Presence of CrVI coating; the detected concentration in boiling-water-extraction solution is equal or greater than 0.02 mg/kg with 50 cm^2 sample surface area.
   Storage conditions and production date of the tested sample are unavailable and thus results of Cr(VI) represent status of the sample at the time of testing.
5. # = Positive indicates the presence of CrVI on the tested areas.
   Negative indicates the absence of CrVI on the tested areas.
6. "- " = Not regulated

B:Halogen

Test Item(s)	Unit	Test Method (Reference)	Result	MDL
Fluorine (F)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Chlorine (Cl)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Bromine (Br)	mg/kg	BS EN 14582:2007, IC	N.D.	50
Iodine (I)	mg/kg	BS EN 14582:2007, IC	N.D.	50

Note:
1. mg/kg = ppm
2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit

C:PFOA & PFOS (Perfluorooctanoic acid & Perfluorooctane sulfonates)

Test Item(s)	Unit	Test Method (Reference)	Result	MDL
Perfluorooctanoic acid (PFOA)	mg/kg	EPA 3550C: 2007, LC-MS	N.D.	10
Perfluorooctane sulfonates (PFOS) PFOS Acid PFOS Metal Salt PFOS Amide	mg/kg	EPA 3550C: 2007, LC-MS	N.D.	10

Note:
1. mg/kg = ppm

2. N.D. = Not Detected (< MDL)
3. MDL = Method Detection Limit

For reference: commission regulation (EU) No 757/2010 amending regulation (EC) No 850/2004:
(1) For the purposes of this entry, Article 4(1) (b) shall apply to concentrations of PFOS equal to or below 10 mg/kg (0,001 % by weight) when it occurs in substances or in preparations.
(2) For the purposes of this entry, Article 4(1) (b) shall apply to concentrations of PFOS in semi-finished products or articles, or parts thereof, if the concentration of PFOS is lower than 0,1 % by weight calculated with reference to the mass of structurally or micro-structurally distinct parts that contain PFOS or, for textiles or other coated materials, if the amount of PFOS is lower than 1µg /m² of the coated material.

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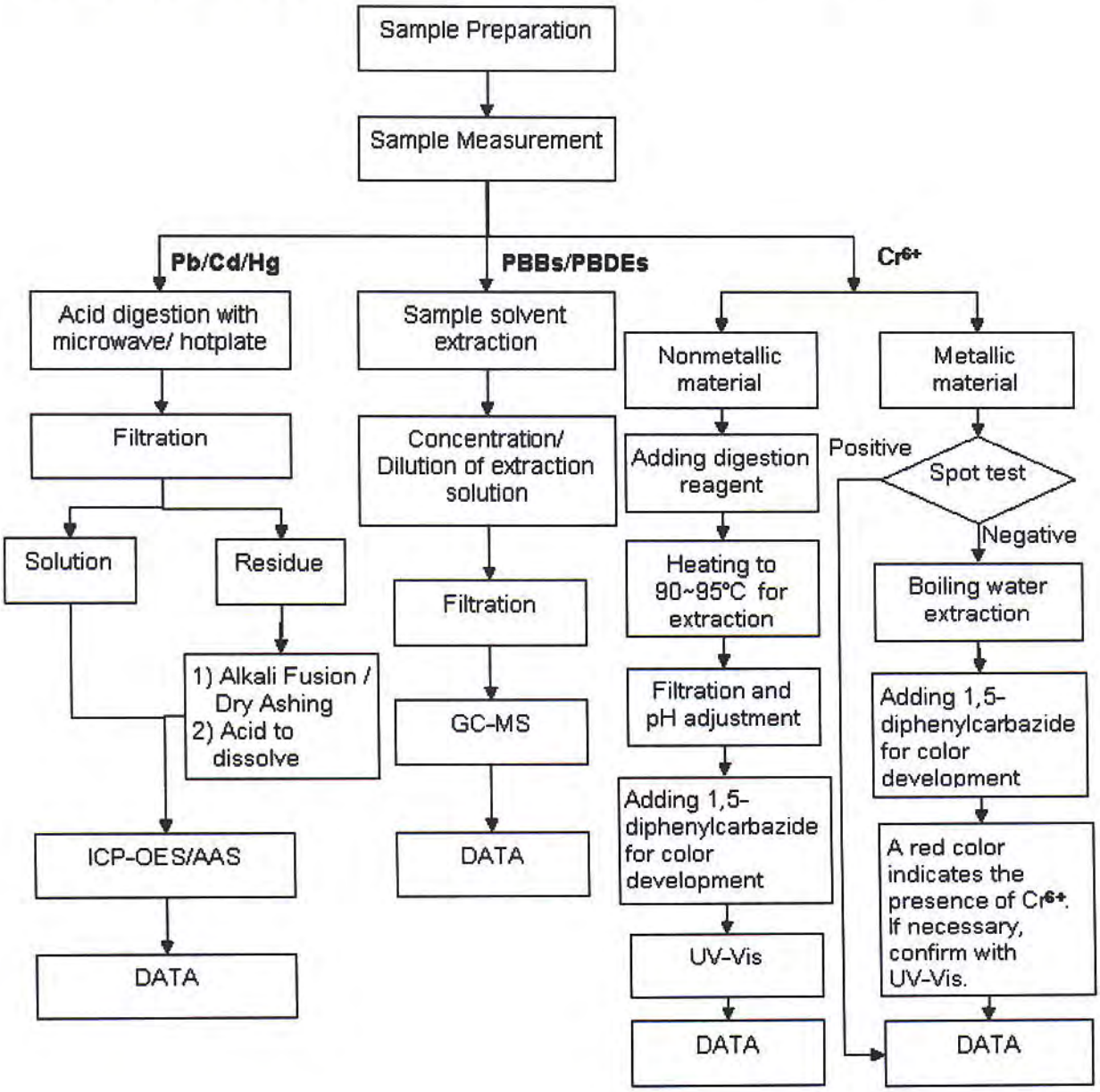
ATTACHMENTS

RoHS Testing Flow Chart

1) Name of the person who made testing: Bella Wang / Cutey Yu / Ross Zhan
2) Name of the person in charge of testing: Adams Yu / Ryan Yang
3) These samples were dissolved totally by pre-conditioning method according to below flow chart (Cr6+ and PBBs/PBDEs test method excluded).



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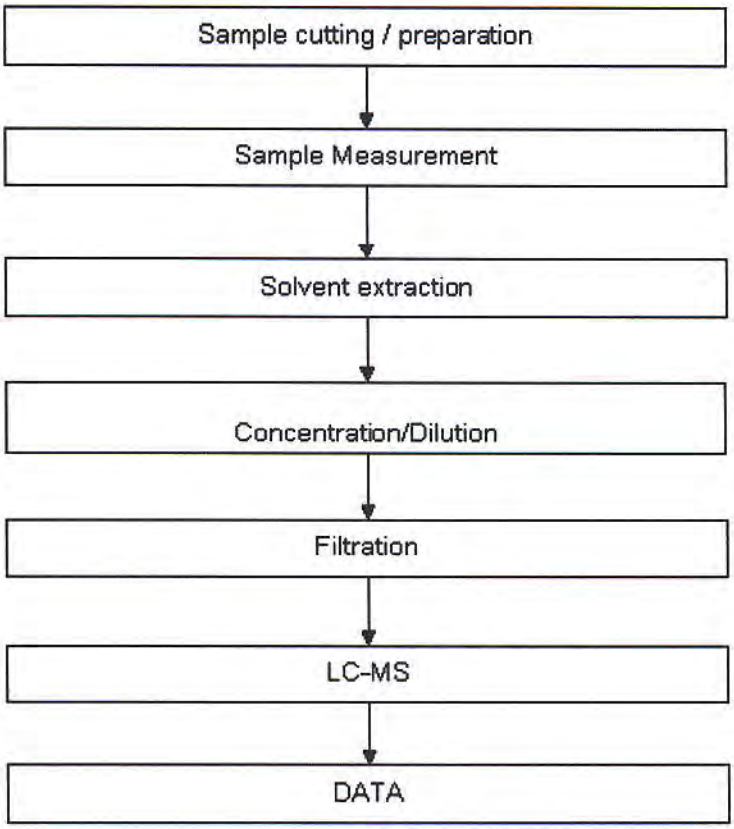
ATTACHMENTS

PFOA / PFOS Testing Flow Chart

1) Name of the person who made testing: Cindy Huang
2) Name of the person in charge of testing: Ryan Yang



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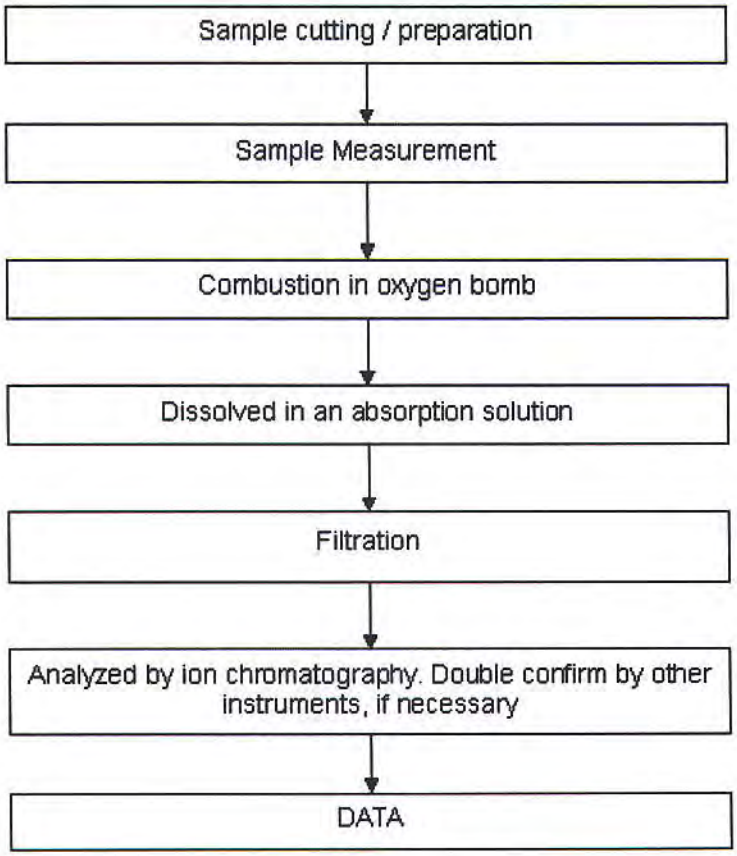
ATTACHMENTS

Halogen Testing Flow Chart

1) Name of the person who made testing: Liang Wang
2) Name of the person in charge of testing: Michelle Song



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Sample photo:

CAN11-033404.001

SGS authenticate the photo on original report only

*** End of Report ***

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