Product	Laser diode
Package	Closed CAN-SS-PD

1.Stem(Basemetal)

SGS

ilac-MRA THAILAND

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 1 of 10**

Client : [redacted]

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

Sample Name : SPCC-8D (COLD ROKKED STEEL)
Manufacturer/Vendor : [redacted]
Country of Origin : Thailand
Country of Destination : Thailand
Buyer's Name : [redacted]

The following sample(s) was/were identified by SGS as:
SGS Sample No. : [redacted]
Sample Condition : Sample is contained in a plastic bag.
Quantity Submitted : 1 bag

Sample Receiving Date : 23-May-2019
Testing Period : 23-May-2019 to 28-May-2019

Test Requested : In accordance with the RoHS Directive 2011/65/EU (Annex II) [amended by Directive (EU) 2015/863] .Selected test (s) as requested by client.

Test Method :
(1) IEC 62321-5 edition 1.0 : 2013 for Lead content, Analyzed by ICP-OES.
(2) IEC 62321-5 edition 1.0 : 2013 for Cadmium content, Analyzed by ICP-OES.
(3) IEC 62321-4 ,edition 1.1 : 2017 for Mercury Content, Analyzed by ICP-OES.
(4) IEC 62321-7-1 edition 1.0 : 2015 for Hexavalent Chromium Content,Analyzed by UV/Vis Spectrometry.
(5) IEC 62321-6 edition 1.0 : 2015 for PBBs/PBDEs content, Analyzed by GC/MS.

Test Results : Please refer to next page.

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1.Stem(Basemetal)

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 2 of 10**

CONCLUSION

Based on the performed tests on submitted sample(s),the results of Cadmium,Lead,Mercury,Hexavalent chromium,Polybrominated biphenyls (PBBs),Polybrominated diphenyl ethers (PBDEs) do not exceed the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Remark:
On 4 June 2015,Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP,DBP,DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.

Signed for and on behalf of
SGS (Thailand) Limited

Patcharee T.

Patcharee Treeporncharoen
Laboratory manager - Chemical

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1.Stem(Basemetal)

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SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 3 of 10**

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 boiling water extraction # (Unit : (ug/cm2))	(4)	n.d.	0.10	-

Test Part Description
Result (1) metal

Note :
(a) mg/kg = ppm ; 0.1wt% = 1000 ppm
(b) ug/cm2 = microgram/centremeter square
(c) n.d. = Not Detected
(d) MDL = Method Detection Limit
(e) # = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating
c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination
(f) "-" = Not regulated
(g) For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of testing.

1.Stem(Basemetal)

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Testing 0013
SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 4 of 10**

TEST RESULTS

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

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
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	-

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1.Stem(Basemetal)

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Testing 0013
SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 5 of 10**

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

Note :
(a) mg/kg = ppm ; 0.1 wt% = 1000 ppm
(b) n.d. = Not Detected
(c) MDL = Method Detection Limit
(d) "-" = Not regulated
(e) Test done on client submitted sample

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1.Stem(Basemetal)

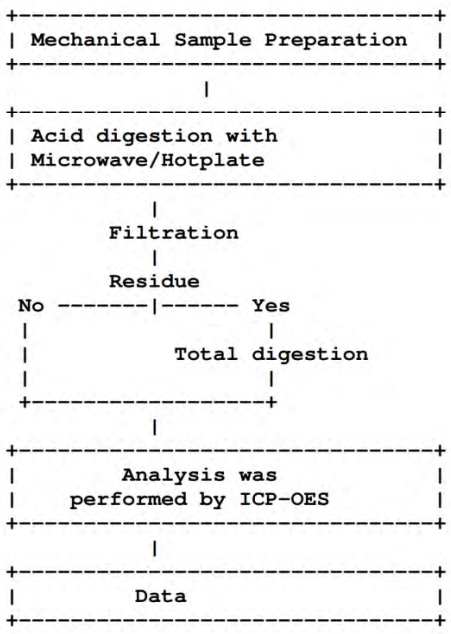
Test Report No. 4252261 Date : 28-May-2019 **Page 6 of 10**

"Test(s) marked * on this report are not included in the NSC-ONSC accreditation scope'

1.Stem(Basemetal)

Flow chart of Pb,Cd,Hg Testing

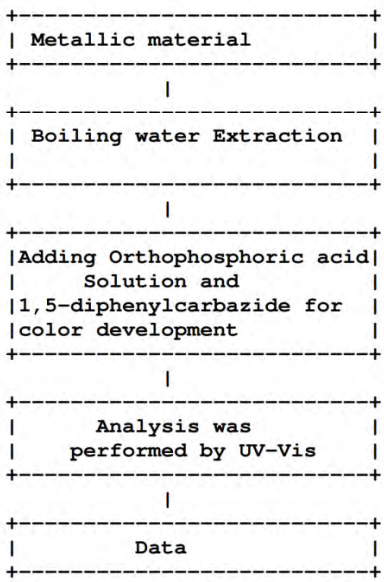
(Test method : IEC 62321)



1.Stem(Basemetal)

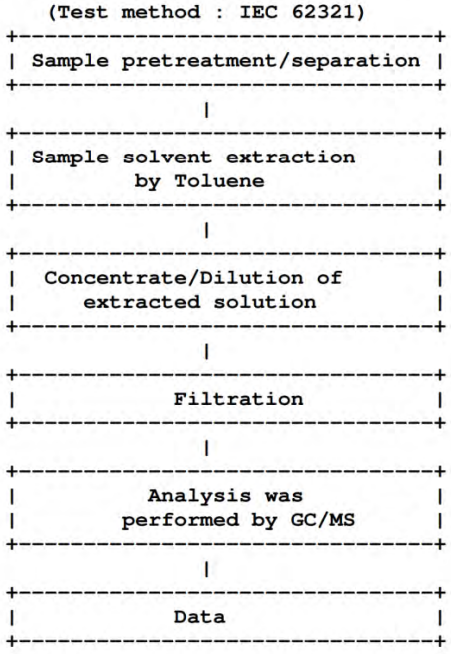
Flow chart of Hexavalent Chromium Testing

(Test method : IEC 62321)



1.Stem(Basemetal)

Flow chart of PBBs,PBDEs Testing



1.Stem(Basemetal)

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NSC-TISI-TIS 17025
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SGS (Thailand) Limited

Test Report No. 4252261 Date : 28-May-2019 **Page 10 of 10**

SAMPLE/ATTACHMENT PICTURE

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

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2.Stem S lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11807 Issued Date : 2019. 02. 22 Page 1 of 5

[redacted]

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

SGS File No.	: AYAA19-11807
Product Name	: [redacted]
Item No./Part No.	: N/A
Received Date	: 2019. 02. 15
Test Period	: 2019. 02. 15 to 2019. 02. 22
Test Results	: For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang / Chemical Lab Mgr

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2.Stem S lead

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Test Report No. F690101/LF-CTSAYAA19-11807 Issued Date : 2019. 02. 22 Page 2 of 5

Sample No. : AYAA19-11807.001
Sample Description : [redacted]
Item No./Part No. : N/A
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)*	µg/cm²	With reference to IEC 62321-7-1:2015 (Determination of CrVI by UV-Vis)	0.1	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

NOTE:
(1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) Negative = Undetectable / Positive = Detectable
(6) ** = Qualitative analysis (No Unit)
(7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI.
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating.
c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination.

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2.Stem S lead

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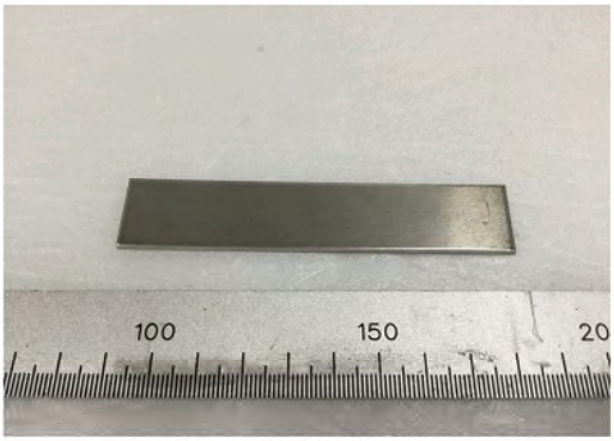
Test Report No. F690101/LF-CTSAYAA19-11807 Issued Date : 2019. 02. 22 Page 3 of 5

Picture of Sample as Received:



AYAA19-11807.001

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2.Stem S lead

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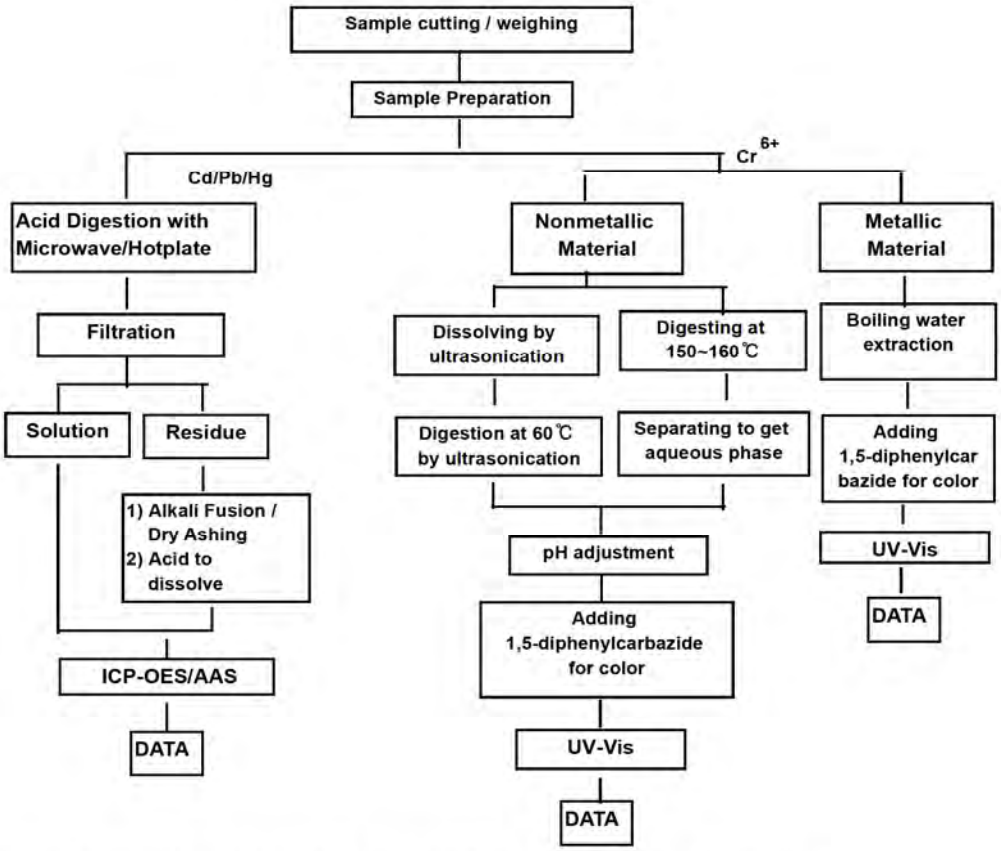
Test Report No. F690101/LF-CTSAYAA19-11807 Issued Date : 2019. 02. 22 Page 4 of 5

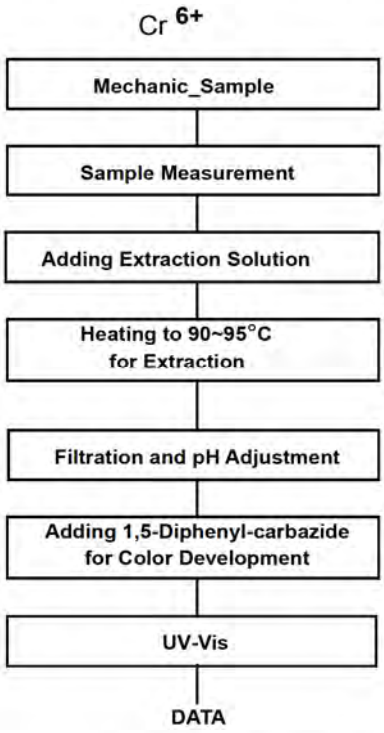
Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+} Testing



The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg
Section Chief : Minkyu Park

2.Stem S lead

Testing Flow Chart for RoHS:Cr^{6+} Testing



*** End of Report ***

3.Stem L lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 1 of 5

[redacted] [redacted]

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

SGS File No.	: AYAA19-11804
Product Name	: [redacted]
Item No./Part No.	: N/A
Received Date	: 2019. 02. 15
Test Period	: 2019. 02. 15 to 2019. 02. 22
Test Results	: For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang

Jeff Jang / Chemical Lab Mgr

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3.Stem L lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 2 of 5

Sample No. : AYAA19-11804.001
Sample Description : [redacted]
Item No./Part No. : N/A
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)*	µg/cm²	With reference to IEC 62321-7-1:2015 (Determination of CrVI by UV-Vis)	0.1	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) Negative = Undetectable / Positive = Detectable
(6) ** = Qualitative analysis (No Unit)
(7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI.
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating.
c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination.

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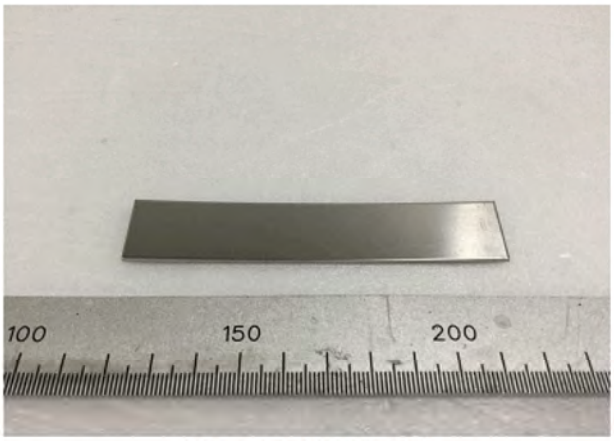
3.Stem L lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 3 of 5

Picture of Sample as Received:



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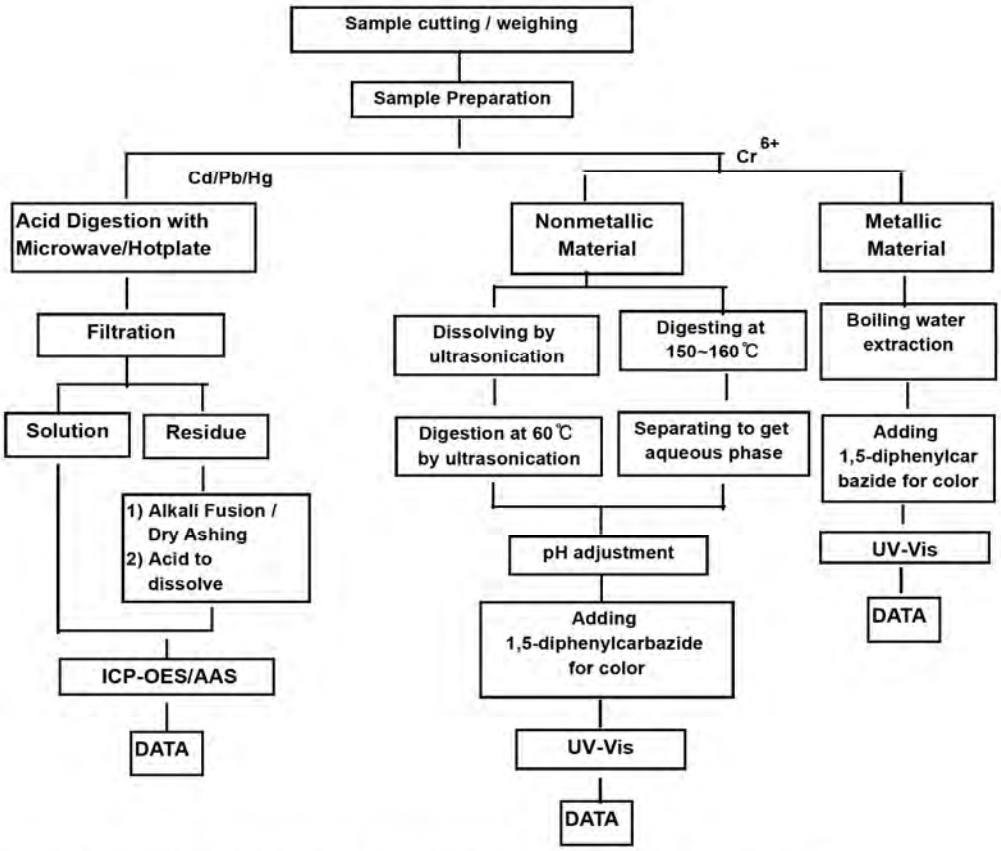
3.Stem L lead

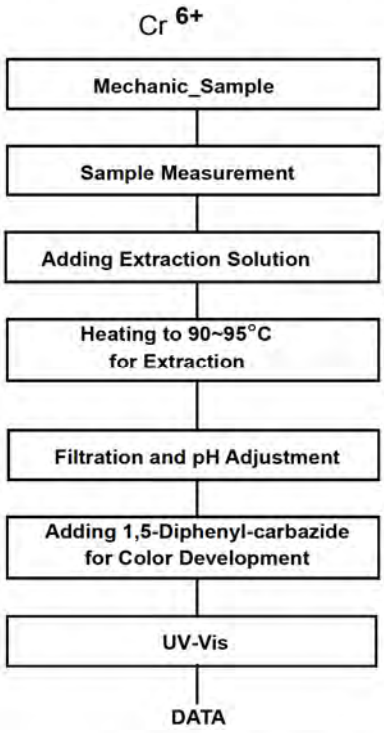
Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+} Testing



The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg
Section Chief : Minkyu Park

3.Stem L lead

Testing Flow Chart for RoHS:Cr^{6+} Testing



*** End of Report ***

4.Stem E lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 1 of 5

[redacted]

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

SGS File No.	: AYAA19-11804
Product Name	: [redacted]
Item No./Part No.	: N/A
Received Date	: 2019. 02. 15
Test Period	: 2019. 02. 15 to 2019. 02. 22
Test Results	: For further details, please refer to following page(s)

SGS Korea Co., Ltd.

Jeff Jang / Chemical Lab Mgr

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4.Stem E lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 2 of 5

Sample No. : AYAA19-11804.001
Sample Description : [redacted]
Item No./Part No. : N/A
Materials : N/A

Heavy Metals

Test Items	Unit	Test Method	MDL	Results
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Cadmium by ICP-OES)	0.5	N.D.
Lead (Pb)	mg/kg	With reference to IEC 62321-5:2013 (Determination of Lead by ICP-OES)	5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013 (Determination of Mercury by ICP-OES)	2	N.D.
Hexavalent Chromium (Cr VI)*	µg/cm²	With reference to IEC 62321-7-1:2015 (Determination of CrVI by UV-Vis)	0.1	N.D.
Hexavalent Chromium (Cr VI)	mg/kg	With reference to US EPA 3060A(1996), US EPA 7196A(1992), UV	1	N.D.

NOTE: (1) N.D. = Not detected.(<MDL)
(2) mg/kg = ppm
(3) MDL = Method Detection Limit
(4) - = No regulation
(5) Negative = Undetectable / Positive = Detectable
(6) ** = Qualitative analysis (No Unit)
(7) * = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI.
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating.
c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination.

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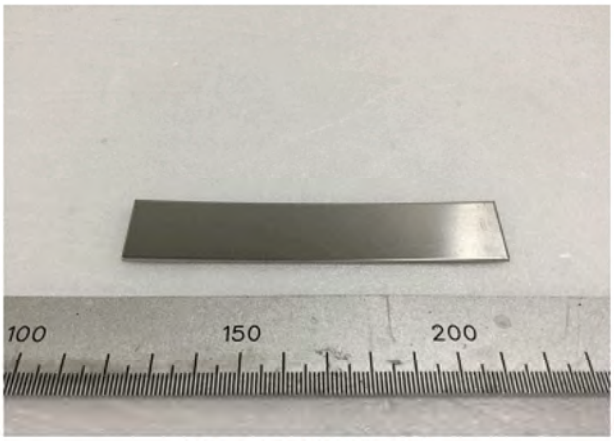
4.Stem E lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 3 of 5

Picture of Sample as Received:



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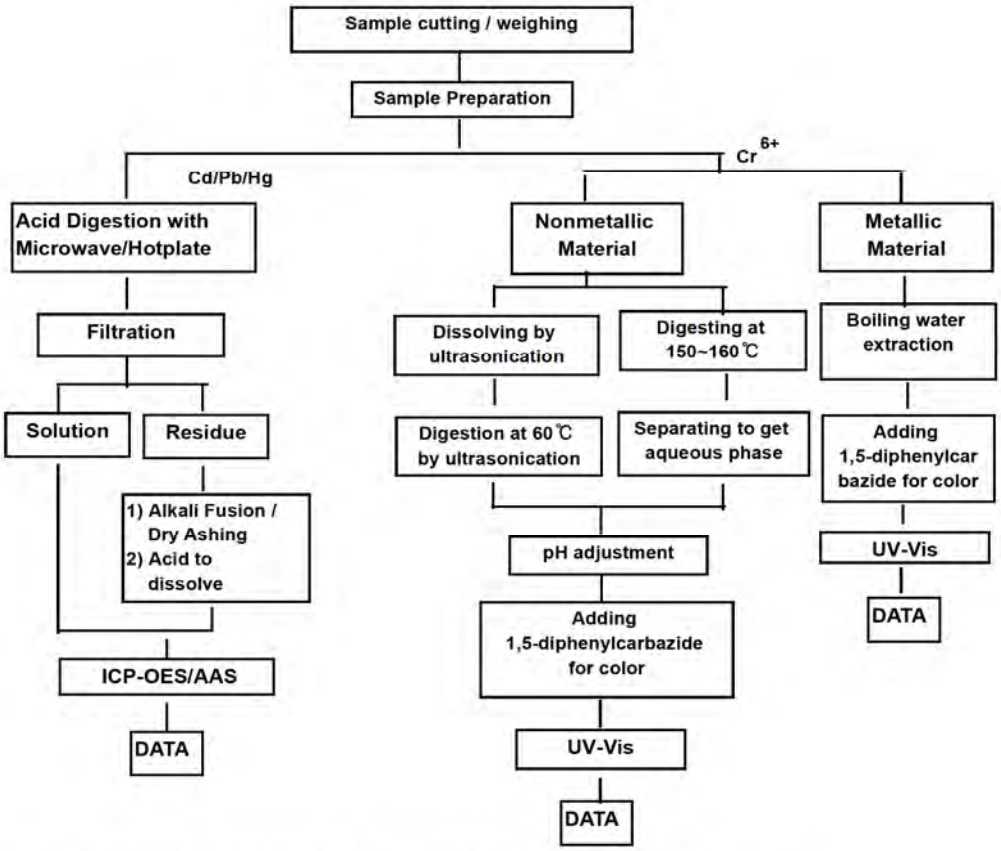
4.Stem E lead

SGS

Test Report No. F690101/LF-CTSAYAA19-11804 Issued Date : 2019. 02. 22 Page 4 of 5

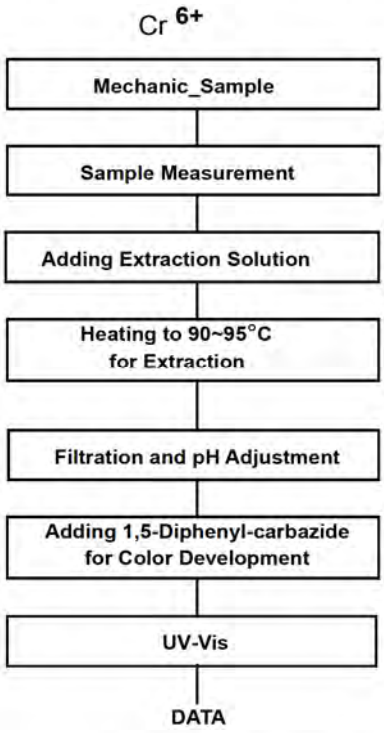
Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr^{6+} Testing



The samples were dissolved totally at the acid digestion step of the above flow chart for Cd,Pb,Hg
Section Chief : Minkyu Park

4.Stem E lead

Testing Flow Chart for RoHS:Cr^{6+} Testing



*** End of Report ***

5.Stem Ni_Au Plating

SGS

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 1 of 10**

[redacted]

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

Sample Name : CE Ni Au Plating
Sample Description : Metal
Part No. : [redacted]

The following sample(s) was/were identified by SGS as:

SGS Sample No. : 4349005
Sample Condition : Sample is contained in a plastic bag.
Quantity Submitted : 1 bag

Sample Receiving Date : 29-Mar-2019
Testing Period : 30-Mar-2019 to 05-Apr-2019

Test Requested : In accordance with the RoHS Directive 2011/65/EU (Annex II) [amended by Directive (EU) 2015/863] .Selected test (s) as requested by client.

Test Method :
(1) IEC 62321-5 edition 1.0 : 2013 for Lead content, Analyzed by ICP-OES.
(2) IEC 62321-5 edition 1.0 : 2013 for Cadmium content, Analyzed by ICP-OES.
(3) IEC 62321-4 ,edition 1.1 : 2017 for Mercury Content, Analyzed by ICP-OES.
(4) IEC 62321-7-1 edition 1.0 : 2015 for Hexavalent Chromium Content,Analyzed by UV/Vis Spectrometry.
(5) IEC 62321-6 edition 1.0 : 2015 for PBBs/PBDEs content, Analyzed by GC/MS.
(6) IEC 62321-8 edition 1.0 : 2017 for Phthalates content,Analyzed was performed by GC/MS.

Test Results : Please refer to next page.

CONCLUSION

Based on the performed tests on submitted sample(s),the results of Cadmium,Lead,Mercury,Hexavalent chromium,Polybrominated biphenyls (PBBs),Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP),Butyl benzyl phthalate (BBP),Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) to be in compliance with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of
SGS (Thailand) Limited

Patcharee T.

Patcharee Treeporncharoen
Laboratory manager - Chemical

"Any holder of this document is advised that should client or third party information be supplied with respect to the goods or sample, SGS may, at its discretion, attached or indicate such information to the report but SGS makes no warranties or accepts no liable for the veracity or lack thereof of such Information."

3907815

5.Stem Ni_Au Plating

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 2 of 10**

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 boiling water extraction # (Unit : (ug/cm2))	(4)	n.d.	0.10	-

Test Part Description
Result (1) metal with plating

Note :
(a) mg/kg = ppm ; 0.1wt% = 1000 ppm
(b) ug/cm2 = microgram/centremeter square
(c) n.d. = Not Detected
(d) MDL = Method Detection Limit
(e) # = a. The sample is positive for CrVI if the CrVI concentration is greater than 0.13 ug/cm2. The sample coating is considered to contain CrVI
b. The sample is negative for CrVI if CrVI is n.d. (concentration less than 0.10 ug/cm2). The coating is considered a non-CrVI based coating
c. The result between 0.10 ug/cm2 and 0.13 ug/cm2 is considered to be inconclusive - unavoidable coating variations may influence the determination
(f) "-" = Not regulated
(g) For corrosion protection coatings on metals: Information on storage conditions and production date of the tested sample is unavailable and thus results of Cr(VI) represent status of the sample at the time of testing represent status of the sample at the time of testing.

5.Stem Ni_Au Plating

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 3 of 10**

TEST RESULTS

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

Test Item (s):	Method (Refer to)	Result (1)	MDL	RoHS Limit
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	-

5.Stem Ni_Au Plating

SGS

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 4 of 10**

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) n.d. = Not Detected
(c) MDL = Method Detection Limit
(d) "-" = Not regulated
(e) Test done on client submitted sample

5.Stem Ni_Au Plating

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 5 of 10**

TEST RESULTS

Phthalates Content for RoHS Directive 2011/65/EU Annex II [amended by Directive (EU) 2015/863],Analysis was performed by GC/MS.

Analysis	Method (refer to 6)	Result (1) (mg/kg)	MDL	RoHS Limit (mg/kg)
DEHP (Di-2-ethylhexyl phthalate)* (CAS No.: 117-81-7)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
BBP (Benzyl butyl phthalate)* (CAS No.: 85-68-7)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
DBP (Di-butyl phthalate)* (CAS No.: 84-74-2)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000
DIBP (Di-isobutyl phthalate)* (CAS No.: 84-69-5)	IEC 62321-8 , Edition 1.0 , 2017	n.d.	50	1000

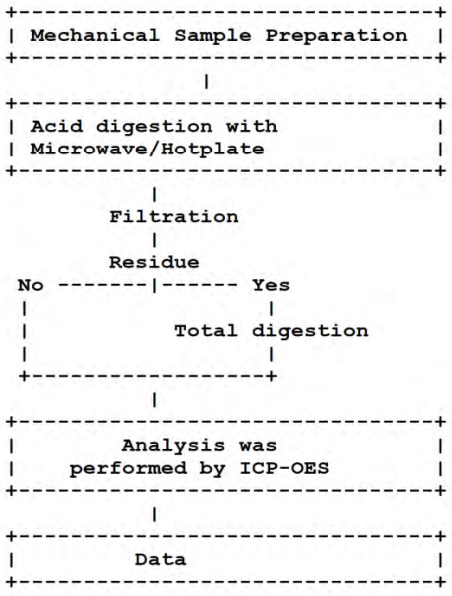
Note :
(a) mg/kg = ppm ; 0.1 wt% = 1000 ppm
(b) n.d. = Not Detected
(c) MDL = Method Detection Limit
(d) Result (1) metal with plating
(e) Test done on client submitted sample

"Test(s) marked * on this report are not included in the NSC-ONSC accreditation scope"

5.Stem Ni_Au Plating

Flow chart of Pb,Cd,Hg Testing

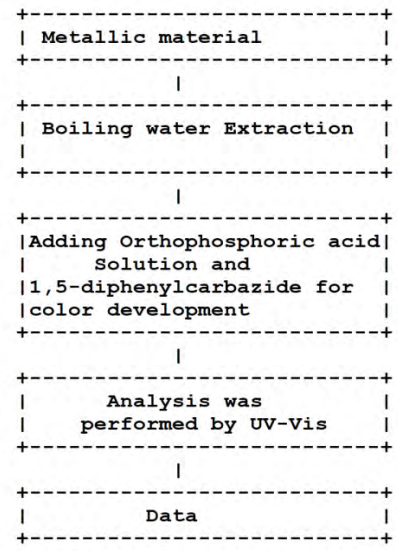
(Test method : IEC 62321)



5.Stem Ni_Au Plating

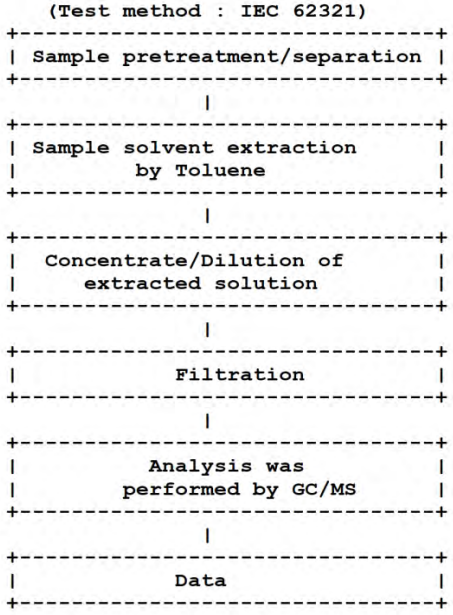
Flow chart of Hexavalent Chromium Testing

(Test method : IEC 62321)



5.Stem Ni_Au Plating

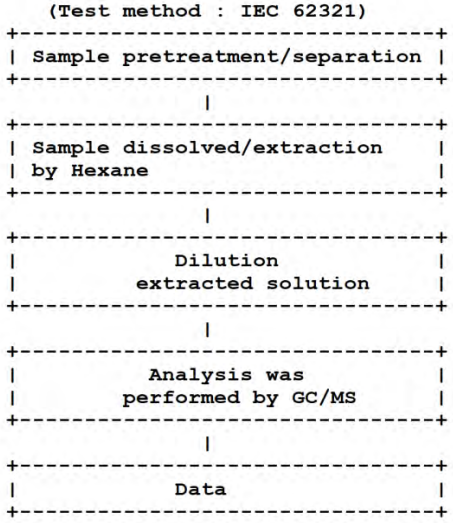
Flow chart of PBBs,PBDEs Testing



5.Stem Ni_Au Plating

Flow chart of Phthalates Testing

(Test method : IEC 62321)



5.Stem Ni_Au Plating

NSC-TISI-TIS 17025
Testing 0013
SGS (Thailand) Limited

Test Report No. 4206102 Date : 5-Apr-2019 **Page 10 of 10**

SAMPLE/ATTACHMENT PICTURE

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

6.Stem(glass)

SGS [redacted]

Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 1 of 7

[redacted]

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

Sample Submitted By	:	[redacted]
Sample Description	:	GLASS POWDER
Style/Item No.	:	[redacted]
Sample Receiving Date	:	2019/03/11
Testing Period	:	2019/03/11 to 2019/03/18

==========

Test Requested	:	As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).
Test Method	:	Please refer to following pages.
Test Result(s)	:	Please refer to following pages.
Conclusion	:	Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

SGS TAIWAN LTD

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

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6.Stem(glass)

SGS [redacted]

Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 2 of 7

[redacted]

Test Result(s)

PART NAME No.1 : GRAY POWDER

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4 (2013) and performed by ICP-AES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
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.	1000
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.	-

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6.Stem(glass)

SGS [redacted]

Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 3 of 7

[redacted]

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000

Note :

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

6.Stem(glass)

SGS [redacted]

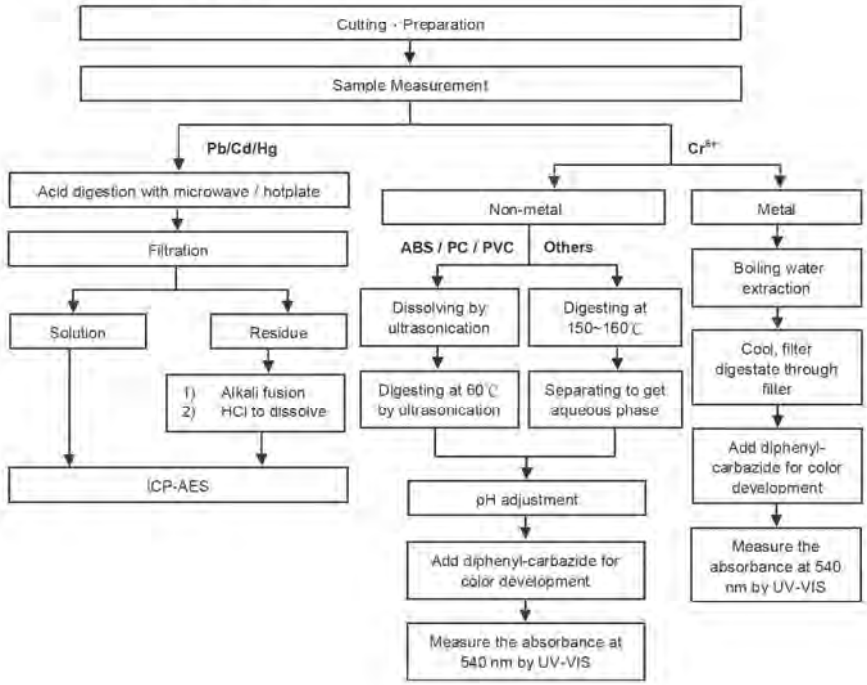
Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 4 of 7

[redacted]

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang



6.Stem(glass)

SGS [redacted]

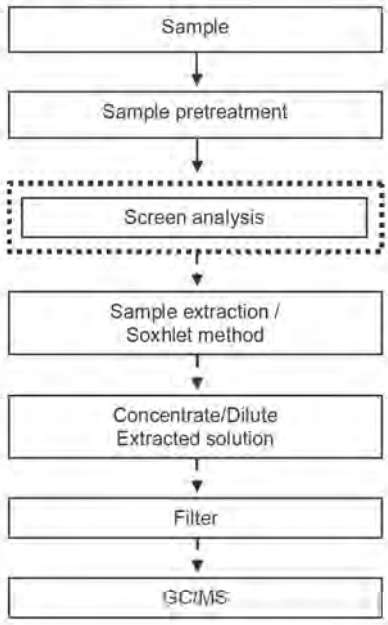
Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 5 of 7

[redacted]

Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang

First testing process →
Optional screen process ▪▪▪▪
Confirmation process – ·►



6.Stem(glass)

SGS [redacted]

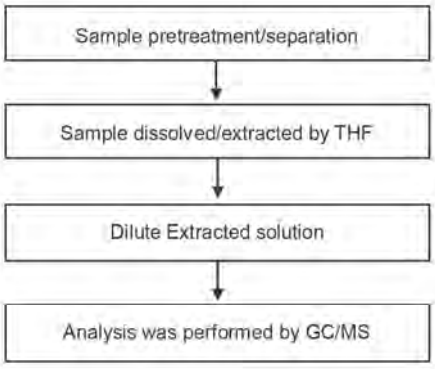
Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 6 of 7

[redacted]

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



6.Stem(glass)

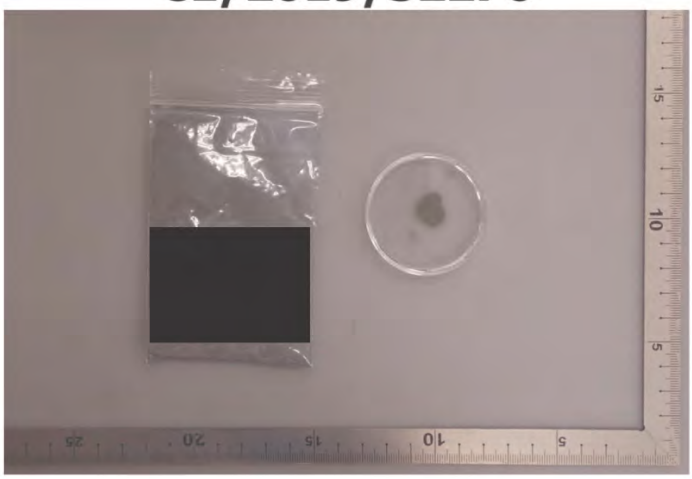
SGS [redacted]

Test Report No. : CE/2019/32276 Date : 2019/03/18 Page : 7 of 7

[redacted]

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

CE/2019/32276



** End of Report **

7.Stem (brazing)

2019年3月28日

[redacted]

石福金属興業株式会社 草加工場
〒340-0002 埼玉県草加市青柳 2-12-30
電話(048)931－4581(代表)

件名:環境負荷物質含有調査

品質保証部

承認	横田	島田	担当	赤堀

拝啓

毎々格別のご愛顧を賜り厚くお礼申し上げます。
さて、首題の件につきまして下記の通りご報告いたしますので、ご検討の程、よろしくお願い申し上げます。

敬 具

記

1. はじめに
ご依頼のありました[redacted]環境負荷物質含有調査結果を下記に報告いたします。

2. 前処理方法
硝酸にて自然溶解しました。

3. 測定方法
ICP発光分光分析

4. 測定結果、測定日

測定結果 / 分析サンプル	分析測定値(ppm)				Lot.No.
	Pb	Cd	Cr	Hg	
① [redacted]	<5	<1	<1	<5	LL80166
② [redacted]	<5	<1	<1	<5	GG80143

※Crについては全クロムです。
※当製品は金属材料であり、PBB、PBDE に関しては非含有です。

5. 分析方法フロー
硝酸にて自然溶解→メスアップ(定容)→ICP発光分光分析

以上

8.Cap(Base Material)

SGS

TEST REPORT REPORT NO. JP/2018/111297 DATE : December 3,2018 PAGE : 1 OF 4

[redacted]

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CLIENT AS:
以下のサンプルは顧客により提供され、顧客に代わって確認を行いました:

SAMPLE DESCRIPTION	:	[redacted]
CLIENT REF.NO	:	2018111900209000
SAMPLE RECEIVED	:	2018/11/20
TESTING DATE	:	2018/11/20 TO 2018/11/30

TEST REQUESTED 分析項目	:	SELECTED TEST(S) AS REQUESTED BY CLIENT. 分析項目は顧客の要求によります。
TEST METHOD(S) 分析方法	:	WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 6 SUBSTANCES. OTHER CHEMICALS WERE TESTED BY EACH APPROPRIATE METHOD. RoHS6物質の分析は最新版のIEC62321を参照しました。 それ以外の化学物質についてはそれぞれに最適な方法で分析を行いました。
TEST RESULT(S) 分析結果	:	PLEASE REFER TO THE NEXT PAGE(S). 以下のページをご参照願います。

大内 幸弘

Yukihiro Ouchi / Quality Manager
SGS Japan Inc., Chemical Laboratory

8.Cap(Base Material)

SGS

TEST REPORT REPORT NO. JP/2018/111297 DATE : December 3,2018 PAGE : 2 OF 4

[redacted]

TEST RESULT(S)

ITEM(S)	UNIT	RESULT	METHOD	INST./PLACE	MDL
CADMIUM(Cd)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
LEAD(Pb)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
MERCURY(Hg)	mg/kg	N.D.	IEC62321-4: 2013	ICP-OES	2
CHROMIUM VI(Cr(VI))	μg/cm²	N.D.	IEC62321-7-1: 2015	UV/VIS	0.01

NOTES: mg/kg = ppm, N.D. = Not Detected, INST. = INSTRUMENT, MDL = Method Detection Limit

REMARK: Cr(VI) has been tested with regard to the surface area of 10cm².

8.Cap(Base Material)

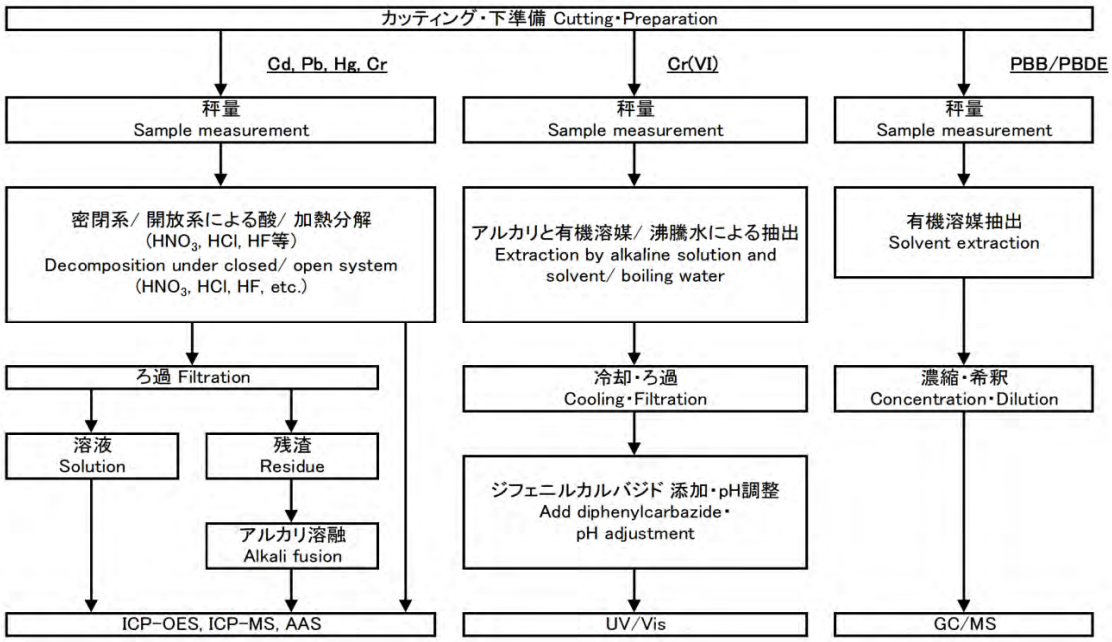
SGS

TEST REPORT REPORT NO. JP/2018/111297 DATE:December 3,2018 PAGE: 3 OF 4

[redacted]

分析フローチャート MEASUREMENT FLOW CHART

1)酸分解前処理において試料を完全分解しています。
The sample was dissolved/ decomposed totally by acid pre-conditioning method according to below flow chart.
2)Cd, Pb, Hg, Cr, Cr(VI), PBB/PBDE
分析担当者 Name of the person in charge of measurement: 及川 聡子 Satoko Oikawa
3)分析責任者 Name of the person responsible for measurement: 大谷 真由美 Mayumi Otani



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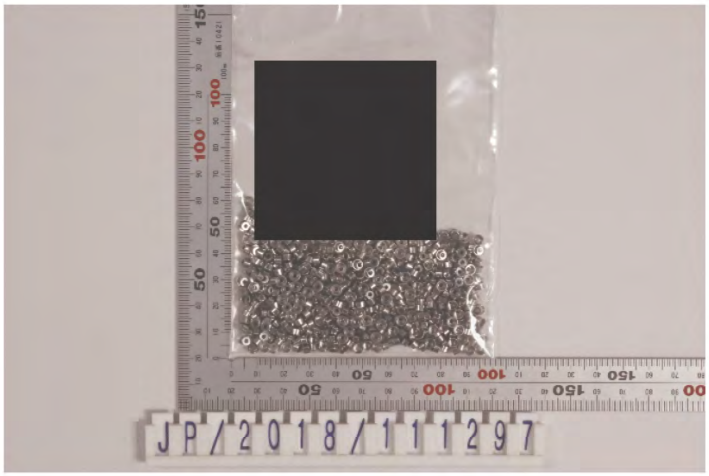
8.Cap(Base Material)

SGS

TEST REPORT REPORT NO. JP/2018/111297 DATE : December 3,2018 PAGE : 4 OF 4

[redacted]

SAMPLE IMAGE



<END>

9.Cap(Ni plating)

SGS

TEST REPORT REPORT NO. JP/2019/080387 DATE : August 20,2019 PAGE : 1 OF 4

[redacted]

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CLIENT AS:
以下のサンプルは顧客により提供され、顧客に代わって確認を行いました:

SAMPLE DESCRIPTION	:	Ni plating [redacted]
CLIENT REF.NO	:	
SAMPLE RECEIVED	:	2019/08/07
TESTING DATE	:	2019/08/07 TO 2019/08/20

TEST REQUESTED 分析項目	:	SELECTED TEST(S) AS REQUESTED BY CLIENT. 分析項目は顧客の要求によります。
TEST METHOD(S) 分析方法	:	WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 10 SUBSTANCES. OTHER CHEMICALS WERE TESTED BY EACH APPROPRIATE METHOD. RoHS10物質の分析は最新版のIEC62321を参照しました。 それ以外の化学物質についてはそれぞれに最適な方法で分析を行いました。
TEST RESULT(S) 分析結果	:	PLEASE REFER TO THE NEXT PAGE(S). 以下のページをご参照願います。

大内 幸弘

Yukihiro Ouchi / Quality Manager
SGS Japan Inc., Chemical Laboratory

9.Cap(Ni plating)

SGS

TEST REPORT REPORT NO. JP/2019/080387 DATE:August 20,2019 PAGE: 2 OF 4

[redacted]

TEST RESULT(S)

ITEM(S)	UNIT	RESULT	METHOD	INST./PLACE	MDL
CADMIUM(Cd)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
LEAD(Pb)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
MERCURY(Hg)	mg/kg	N.D.	IEC62321-4: 2013+AMD1: 2017	ICP-OES	2
CHROMIUM VI(Cr(VI))	μg/cm²	N.D.	IEC62321-7-1: 2015	UV/VIS	0.01

NOTES: mg/kg = ppm, N.D. = Not Detected, INST. = INSTRUMENT, MDL = Method Detection Limit

REMARK: Cr(VI) has been tested with regard to the surface area of 10cm².

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9.Cap(Ni plating)

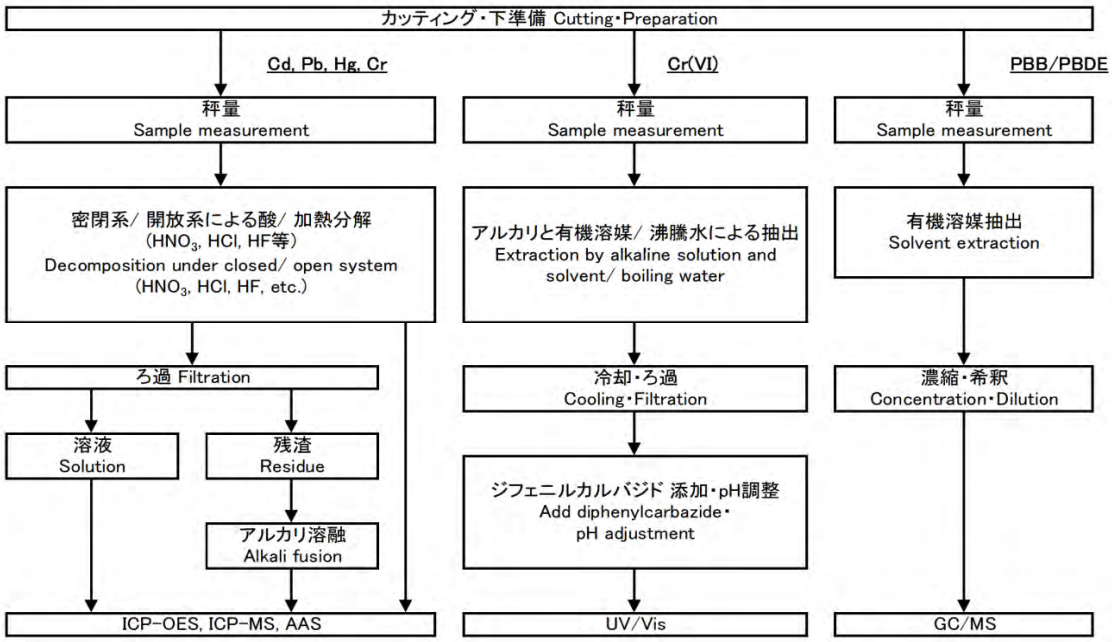
SGS

TEST REPORT REPORT NO. JP/2019/080387 DATE: August 20,2019 PAGE: 3 OF 4

[redacted]

分析フローチャート MEASUREMENT FLOW CHART

1)酸分解前処理において試料を完全分解しています。
The sample was dissolved/ decomposed totally by acid pre-conditioning method according to below flow chart.
2)Cd, Pb, Hg, Cr, Cr(VI), PBB/PBDE
分析担当者 Name of the person in charge of measurement: 府川 亮平 Ryohei Fukawa
3)分析責任者 Name of the person responsible for measurement: 大谷 真由美 Mayumi Otani



9.Cap(Ni plating)

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TEST REPORT REPORT NO. JP/2019/080387 DATE: August 20,2019 PAGE: 4 OF 4

[redacted]

SAMPLE IMAGE

<END>

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10.Cap(Window glass)

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TEST REPORT REPORT NO. JP/2018/111294 DATE:December 3,2018 PAGE: 1 OF 3

[redacted]

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CLIENT AS:
以下のサンプルは顧客により提供され、顧客に代わって確認を行いました:

SAMPLE DESCRIPTION	:	Window glass [redacted]
CLIENT REF.NO	:	2018111900209000
SAMPLE RECEIVED	:	2018/11/20
TESTING DATE	:	2018/11/20 TO 2018/11/30

TEST REQUESTED 分析項目	:	SELECTED TEST(S) AS REQUESTED BY CLIENT. 分析項目は顧客の要求によります。
TEST METHOD(S) 分析方法	:	WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 6 SUBSTANCES. OTHER CHEMICALS WERE TESTED BY EACH APPROPRIATE METHOD. RoHS6物質の分析は最新版のIEC62321を参照しました。 それ以外の化学物質についてはそれぞれに最適な方法で分析を行いました。
TEST RESULT(S) 分析結果	:	PLEASE REFER TO THE NEXT PAGE(S). 以下のページをご参照願います。

大内 幸弘

Yukihiro Ouchi / Quality Manager
SGS Japan Inc., Chemical Laboratory

10.Cap(Window glass)

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[redacted]

TEST RESULT(S)

ITEM(S)	UNIT	RESULT	METHOD	INST./PLACE	MDL
CADMIUM(Cd)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
LEAD(Pb)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
MERCURY(Hg)	mg/kg	N.D.	IEC62321-4: 2013	ICP-OES	2
CHROMIUM VI(Cr(VI))	mg/kg	N.D.	IEC62321-7-2: 2017	UV/VIS	8

NOTES: mg/kg = ppm, N.D. = Not Detected, INST. = INSTRUMENT, MDL = Method Detection Limit

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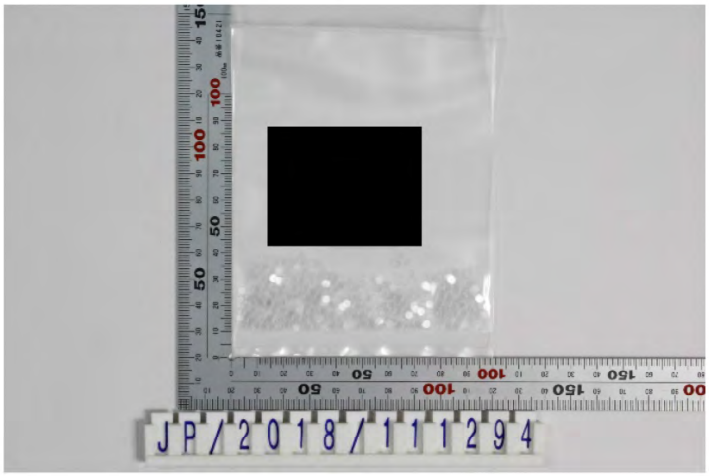
[redacted]

SAMPLE IMAGE



<END>

11.Cap(AR coating1)

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[redacted]

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

送樣廠商(Sample Submitted By)	:	[redacted]
樣品名稱(Sample Description)	:	
收件日期(Sample Receiving Date)	:	2019/09/10
測試期間(Testing Period)	:	2019/09/10 to 2019/09/20

==========

測試需求(Test Requested) :

(1) 依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP. (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

(2) 依據客戶指定，進行鹵素-氟、氯、溴、碘測試. (As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine contents in the submitted sample(s).)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages).

結論(Conclusion) :

(1) 根據客戶所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求. (Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.)

Troy Chang / Manager - Tec
Signed for and behalf of
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Chemical Laboratory - Taipei

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[redacted]

測試結果(Test Results)

測試部位(PART NAME)No. 1 : 透明顆粒 (TRANSPARENT PELLETS)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No. 1	限值 (Limit)
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4:2013+ AMD1:2017，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321-7-2 (2017)，以UV-VIS檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.	-
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.	-
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n.d.	-
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.	-
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.	-
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.	-
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n.d.	-
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No. 1	限值 (Limit)
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.	-
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.	-
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.	-
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.	-
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n.d.	-
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n.d.	-
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.	-
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.	-
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.	-
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		50	n.d.	1000
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
鹵素 / Halogen					
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	參考BS EN 14582 (2016), 以離子層析儀分析. / With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	721	-
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-

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[redacted]

備註(Note):
1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)

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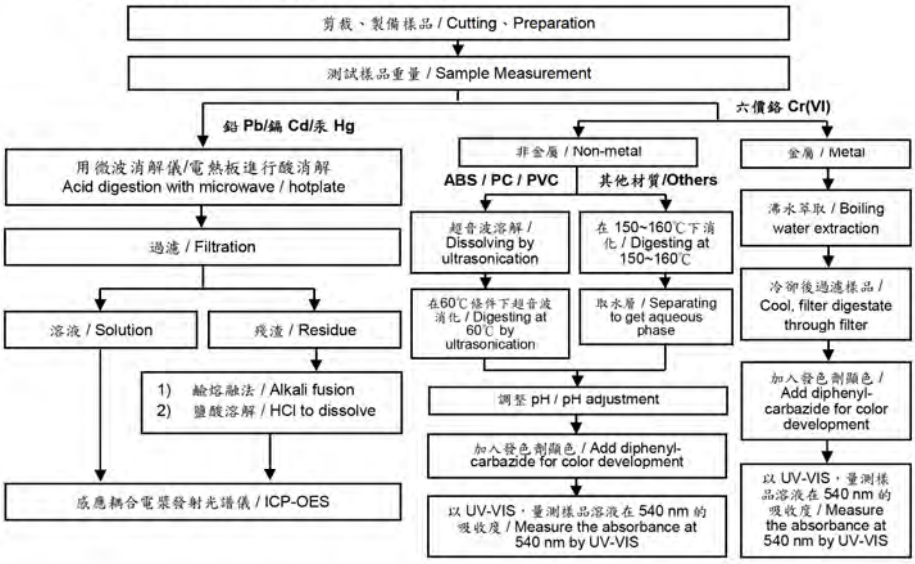
[redacted]

重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- 測試人員：陳思臻 / Technician : Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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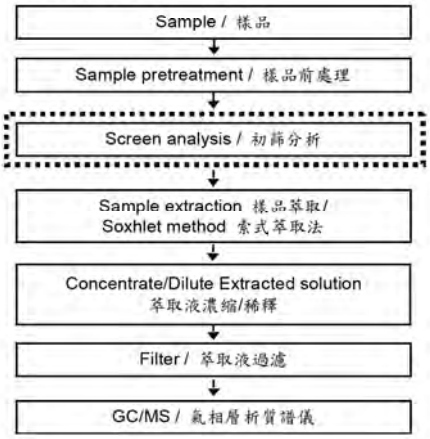
[redacted]

多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor: Troy Chang

初次測試程序 / First testing process ⟶
選擇性篩檢程序 / Optional screen process ⋯⋯
確認程序 / Confirmation process – · – ·⟶



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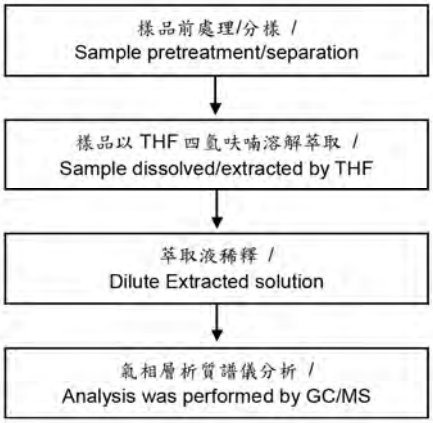
[redacted]

可塑劑分析流程圖 / Analytical flow chart - Phthalate

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor : Troy Chang

【測試方法/Test method: IEC 62321-8】



11.Cap(AR coating1)

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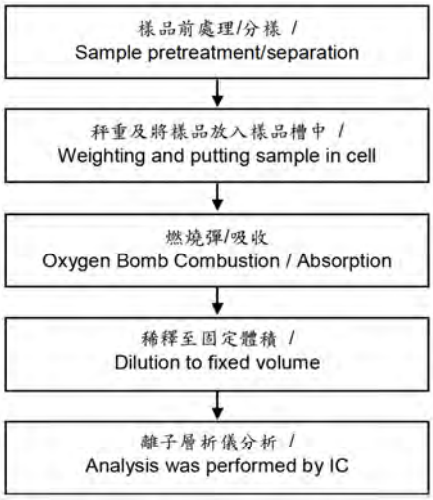
[redacted]

鹵素分析流程圖 / Analytical flow chart - Halogen

- 測試人員：陳思臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



11.Cap(AR coating1)

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[redacted]

* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. *
(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2019/91530

** 報告結尾 (End of Report) **

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[redacted]

以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

送樣廠商(Sample Submitted By)	:	[redacted]
樣品名稱(Sample Description)	:	
收件日期(Sample Receiving Date)	:	2019/09/10
測試期間(Testing Period)	:	2019/09/10 to 2019/09/20

==========

測試需求(Test Requested) :

(1) 依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP. (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

(2) 依據客戶指定，進行鹵素-氟、氯、溴、碘測試. (As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine contents in the submitted sample(s).)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages).

結論(Conclusion) :

(1) 根據客戶所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求. (Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.)

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

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[redacted]

測試結果(Test Results)

測試部位(PART NAME)No.1 : 深灰色塊狀 (DK. GRAY LUMP)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No.1	限值 (Limit)
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4:2013+ AMD1:2017，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321-7-2 (2017)，以UV-VIS檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.	-
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.	-
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n.d.	-
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.	-
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.	-
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.	-
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n.d.	-
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n.d.	-

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[redacted]

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No. 1	限值 (Limit)
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.	-
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.	-
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.	-
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.	-
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n.d.	-
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n.d.	-
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.	-
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.	-
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.	-
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		50	n.d.	1000
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
鹵素 / Halogen					
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	參考BS EN 14582 (2016), 以離子層析儀分析. / With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-

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[redacted]

備註(Note):
1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)

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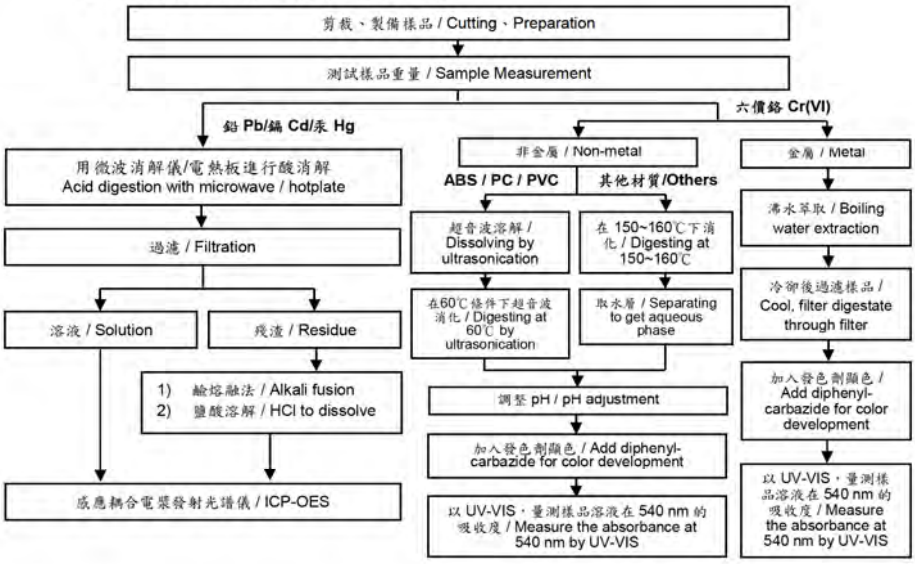
[redacted]

重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- 測試人員：陳思臻 / Technician : Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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13.Cap(AR coating2)
13.Cap(AR coating3)

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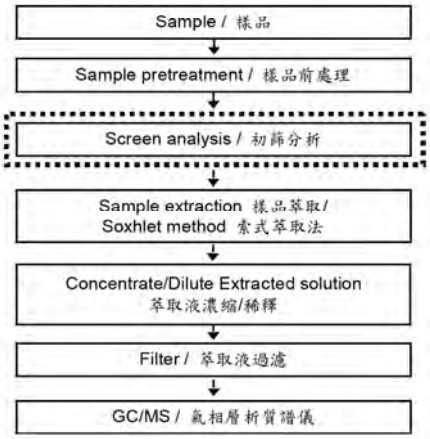
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor: Troy Chang

初次測試程序 / First testing process ⟶
選擇性篩檢程序 / Optional screen process ⋯⋯
確認程序 / Confirmation process – · – ·⟶



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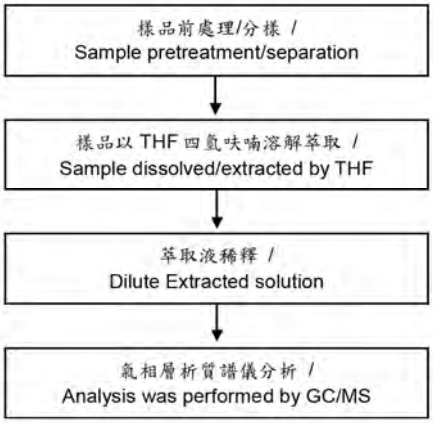
可塑劑分析流程圖 / Analytical flow chart - Phthalate

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor : Troy Chang

【測試方法/Test method: IEC 62321-8】



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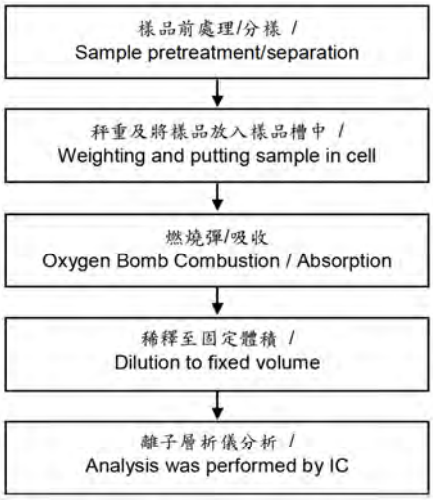
鹵素分析流程圖 / Analytical flow chart - Halogen

- 測試人員：陳思臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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[redacted]

* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. *
(The tested sample / part is marked by an arrow if it's shown on the photo.)

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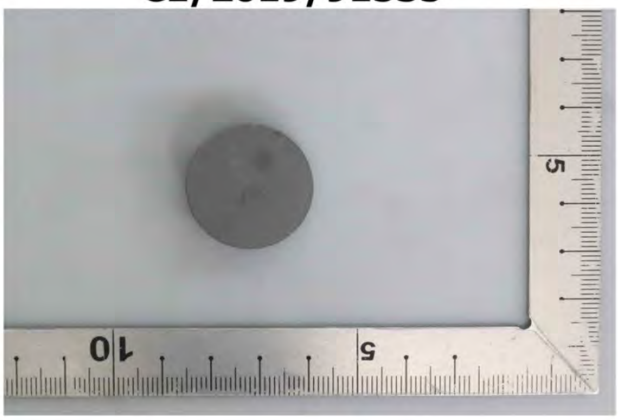

** 報告結尾 (End of Report) **

13.Cap(AR coating3)

Signature Not Verified
For Question Please
Contact with SGS
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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as):

送樣廠商(Sample Submitted By)	:	[redacted]
樣品名稱(Sample Description)	:	
收件日期(Sample Receiving Date)	:	2019/09/10
測試期間(Testing Period)	:	2019/09/10 to 2019/09/20

==========

測試需求(Test Requested) :

(1) 依據客戶指定，參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP. (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).)

(2) 依據客戶指定，進行鹵素-氟、氯、溴、碘測試. (As specified by client, to test Halogen-Fluorine, Chlorine, Bromine, Iodine contents in the submitted sample(s).)

測試結果(Test Results) : 請參閱下一頁 (Please refer to following pages).

結論(Conclusion) :

(1) 根據客戶所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS 2011/65/EU Annex II暨其修訂指令(EU) 2015/863之限值要求. (Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.)

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

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測試結果(Test Results)

測試部位(PART NAME)No.1 : 白色塊狀 (WHITE LUMP)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No.1	限值 (Limit)
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5 (2013)，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4:2013+ AMD1:2017，以感應耦合電漿發射光譜儀檢測. / With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321-7-2 (2017)，以UV-VIS檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.	-
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.	-
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n.d.	-
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.	-
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.	-
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.	-
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n.d.	-
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	MDL	結果 (Result) No. 1	限值 (Limit)
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.	-
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.	-
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.	-
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.	-
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n.d.	-
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n.d.	-
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.	-
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.	-
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.	-
鄰苯二甲酸二(2-乙基己基)酯 / DEHP (Di-(2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析/質譜儀檢測. / With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		50	n.d.	1000
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
鹵素 / Halogen					
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	參考BS EN 14582 (2016), 以離子層析儀分析. / With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-

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備註(Note):

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)

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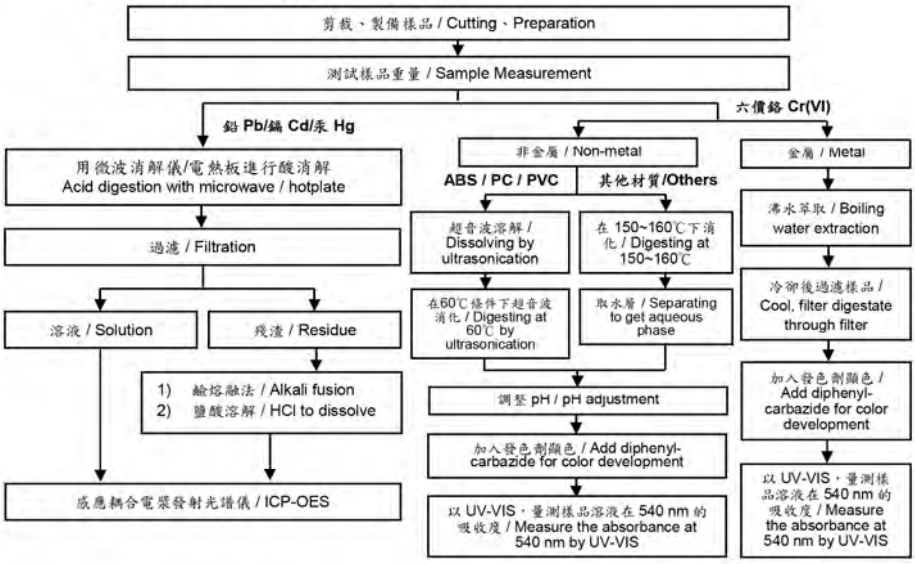
重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- 測試人員：陳思臻 / Technician : Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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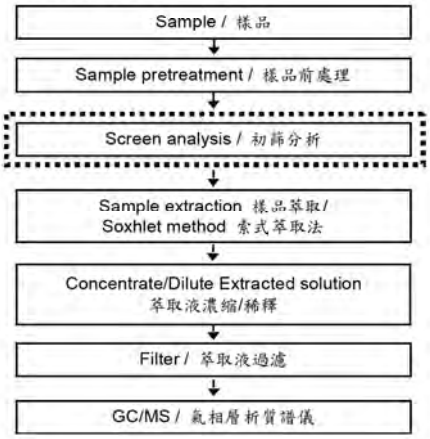
多溴聯苯/多溴聯苯醚分析流程圖 / Analytical flow chart - PBB/PBDE

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor: Troy Chang

初次測試程序 / First testing process ——→
選擇性篩檢程序 / Optional screen process ▪▪▪▪▪▪▪▪▪
確認程序 / Confirmation process — · — ·→



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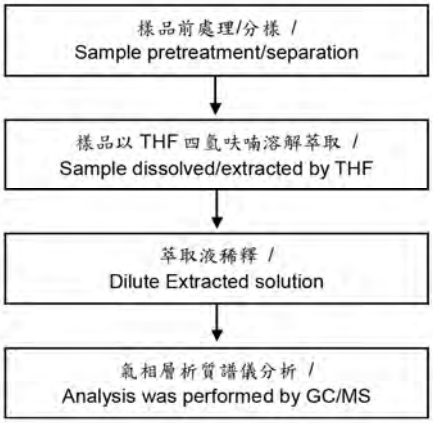
可塑劑分析流程圖 / Analytical flow chart - Phthalate

- 測試人員：涂雅苓 / Technician: Yaling Tu
- 測試負責人：張啟興 / Supervisor : Troy Chang

【測試方法/Test method: IEC 62321-8】



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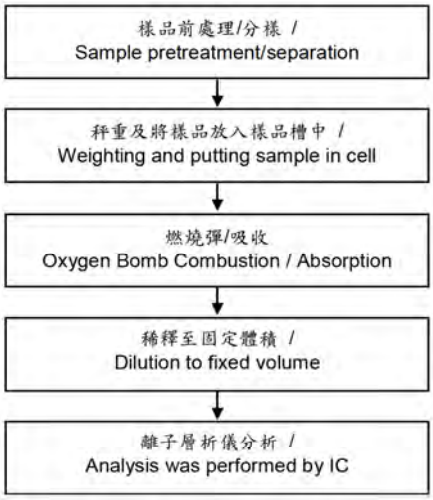
鹵素分析流程圖 / Analytical flow chart - Halogen

- 測試人員：陳思臻 / Technician: Rita Chen
- 測試負責人：張啟興 / Supervisor: Troy Chang



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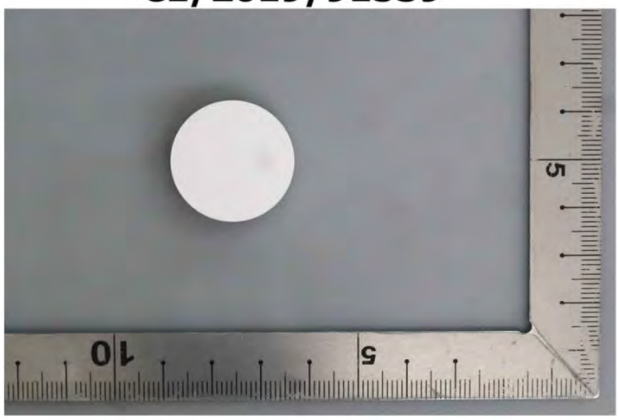
[redacted]

* 照片中如有箭頭標示，則表示為實際檢測之樣品/部位. *
(The tested sample / part is marked by an arrow if it's shown on the photo.)

CE/2019/91539



** 報告結尾 (End of Report) **

14.Cap(Low-melting glass)

SGS

TEST REPORT REPORT NO. JP/2018/111426 DATE:December 5,2018 PAGE: 1 OF 4

[redacted]

THE FOLLOWING SAMPLE(S) WAS/WERE SUBMITTED AND IDENTIFIED BY/ON BEHALF OF THE CLIENT AS:
以下のサンプルは顧客により提供され、顧客に代わって確認を行いました:

SAMPLE DESCRIPTION	:	Low-Melting Glass [redacted]
CLIENT REF.NO	:	2018112000721400
SAMPLE RECEIVED	:	2018/11/22
TESTING DATE	:	2018/11/22 TO 2018/12/04

TEST REQUESTED 分析項目	:	SELECTED TEST(S) AS REQUESTED BY CLIENT. 分析項目は顧客の要求によります。
TEST METHOD(S) 分析方法	:	WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 6 SUBSTANCES. OTHER CHEMICALS WERE TESTED BY EACH APPROPRIATE METHOD. RoHS6物質の分析は最新版のIEC62321を参照しました。 それ以外の化学物質についてはそれぞれに最適な方法で分析を行いました。
TEST RESULT(S) 分析結果	:	PLEASE REFER TO THE NEXT PAGE(S). 以下のページをご参照願います。

大内 幸弘

Yukihiro Ouchi / Quality Manager
SGS Japan Inc., Chemical Laboratory

14.Cap(Low-melting glass)

SGS

TEST REPORT REPORT NO. JP/2018/111426 DATE : December 5,2018 PAGE : 2 OF 4

[redacted]

TEST RESULT(S)

ITEM(S)	UNIT	RESULT	METHOD	INST./PLACE	MDL
CADMIUM(Cd)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
LEAD(Pb)	mg/kg	N.D.	IEC62321-5: 2013	ICP-OES	2
MERCURY(Hg)	mg/kg	N.D.	IEC62321-4: 2013	ICP-OES	2
CHROMIUM VI(Cr(VI))	mg/kg	N.D.	IEC62321-7-2: 2017	UV/VIS	8

NOTES: mg/kg = ppm, N.D. = Not Detected, INST. = INSTRUMENT, MDL = Method Detection Limit

14.Cap(Low-melting glass)

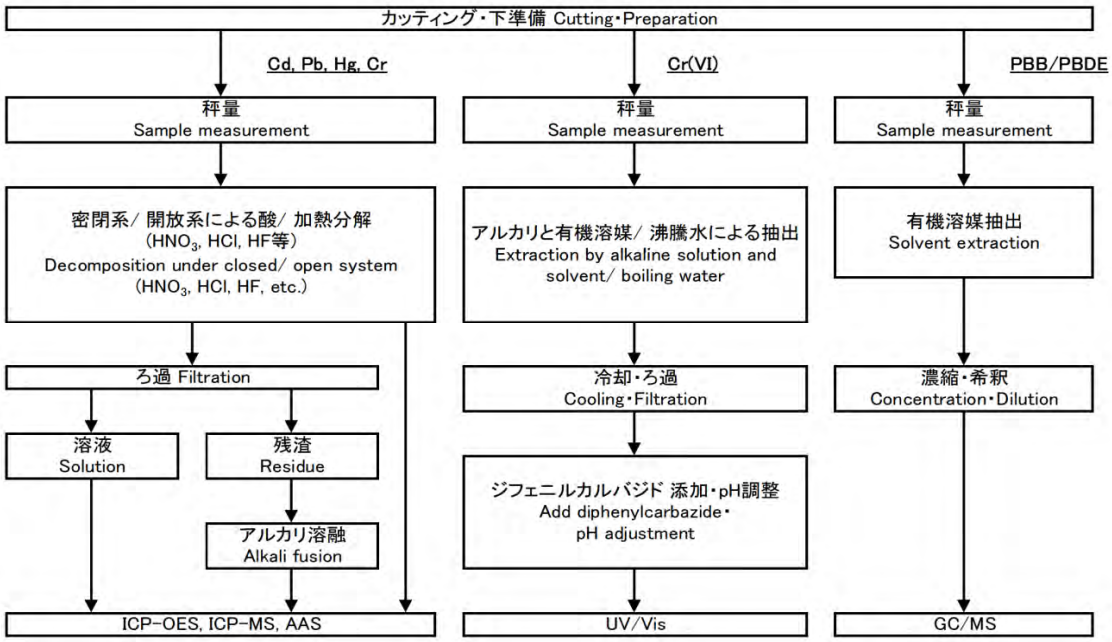
SGS

TEST REPORT REPORT NO. JP/2018/111426 DATE:December 5,2018 PAGE: 3 OF 4

[redacted]

分析フローチャート MEASUREMENT FLOW CHART

1)酸分解前処理において試料を完全分解しています。
The sample was dissolved/ decomposed totally by acid pre-conditioning method according to below flow chart.
2)Cd, Pb, Hg, Cr, Cr(VI), PBB/PBDE
分析担当者 Name of the person in charge of measurement: 及川 聡子 Satoko Oikawa
3)分析責任者 Name of the person responsible for measurement: 大谷 真由美 Mayumi Otani



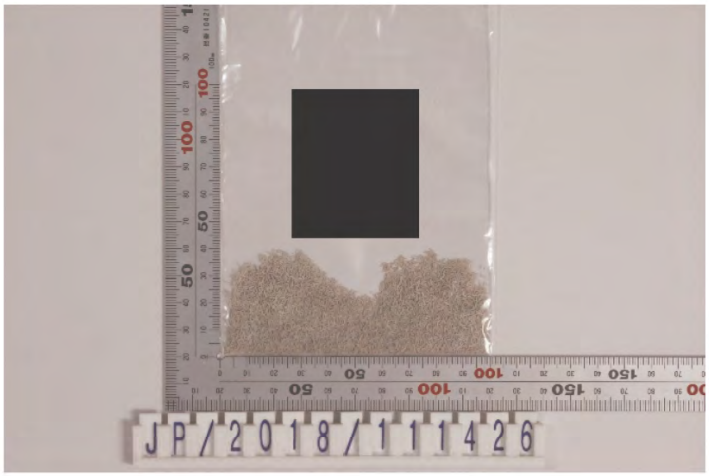
14.Cap(Low-melting glass)

SGS

TEST REPORT REPORT NO. JP/2018/111426 DATE : December 5,2018 PAGE : 4 OF 4

[redacted]

SAMPLE IMAGE



<END>

15.LD CHIP

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Test Report

No. : CE/2019/A5280 Date : 2019/11/06 Page : 1 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	ROHM CO., LTD.
Sample Description	:	LD CHIP
Sample Receiving Date	:	2019/10/30
Testing Period	:	2019/10/30 to 2019/11/06

==========

Test Requested :

(1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

(2) Please refer to next pages for the other item(s).

Test Result(s) : Please refer to following pages.

Conclusion : (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

SGS TAIWAN LTD. SGS TAIWAN

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15.LD CHIP

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Test Report

No. : CE/2019/A5280 Date : 2019/11/06 Page : 2 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Result(s)

PART NAME No.1 : WAFER

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
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.	1000
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.	-

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15.LD CHIP

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Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 3 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50	n.d.	1000
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg		50	n.d.	-
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n.d.	-
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 335-67-1)	mg/kg		10	n.d.	-
Antimony (Sb)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	-
Beryllium (Be)	mg/kg		2	n.d.	-
Phosphorus (P)	mg/kg		2	2700	-

Note :

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

15.LD CHIP

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Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 4 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

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15.LD CHIP

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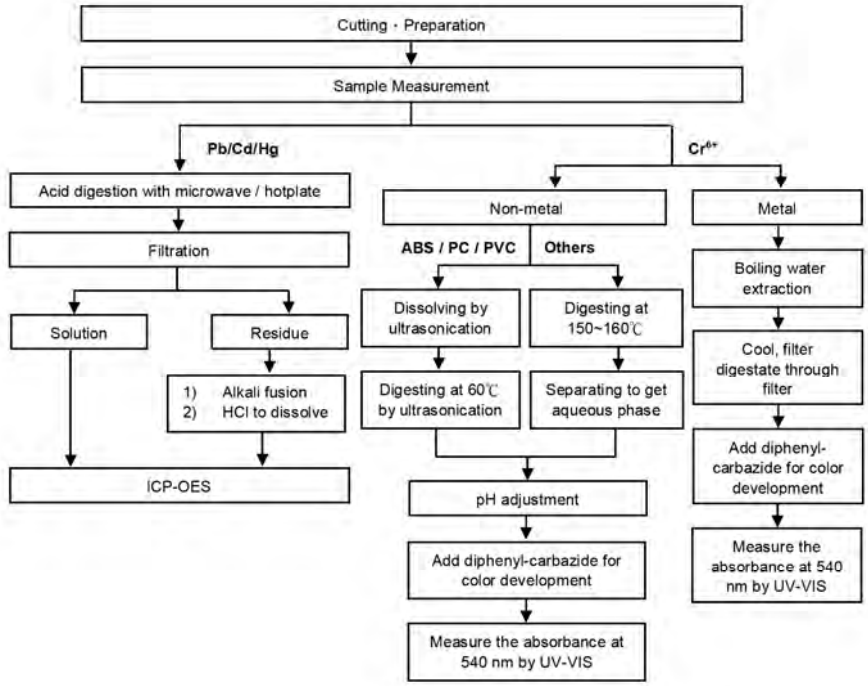
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 5 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang



15.LD CHIP

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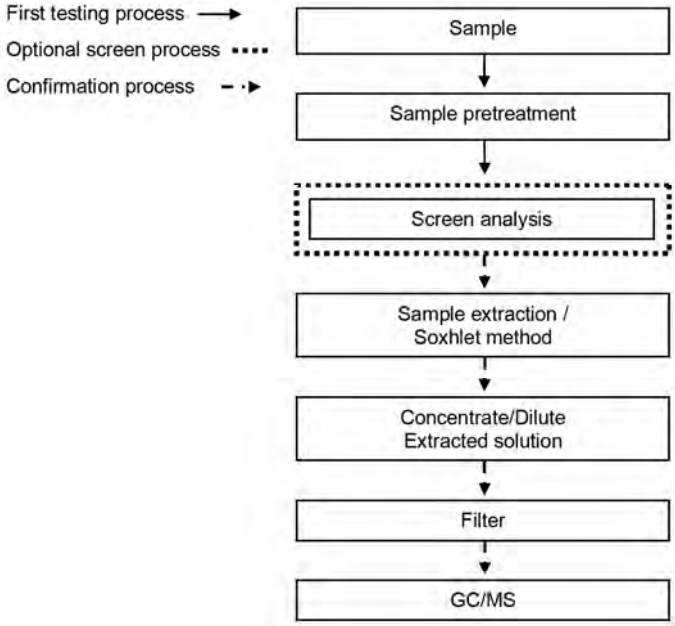
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 6 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang



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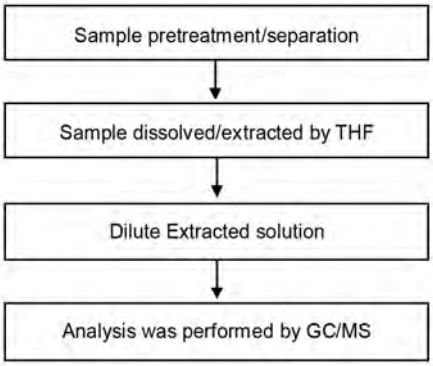
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 7 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



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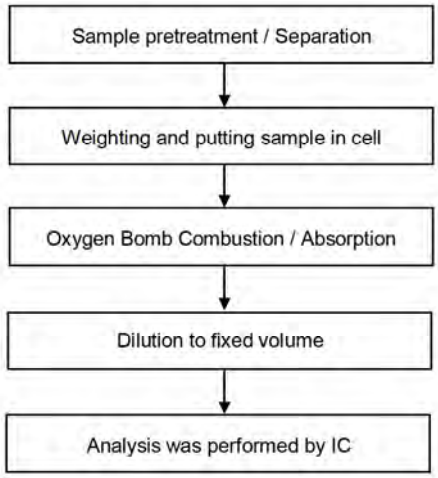
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 8 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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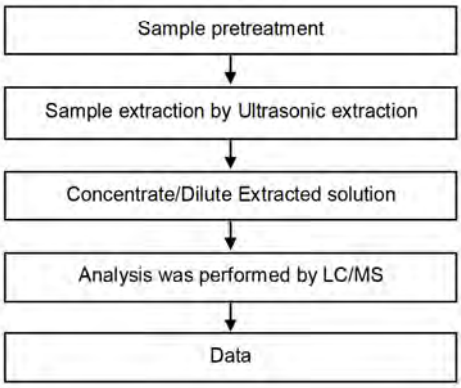
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 9 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



15.LD CHIP

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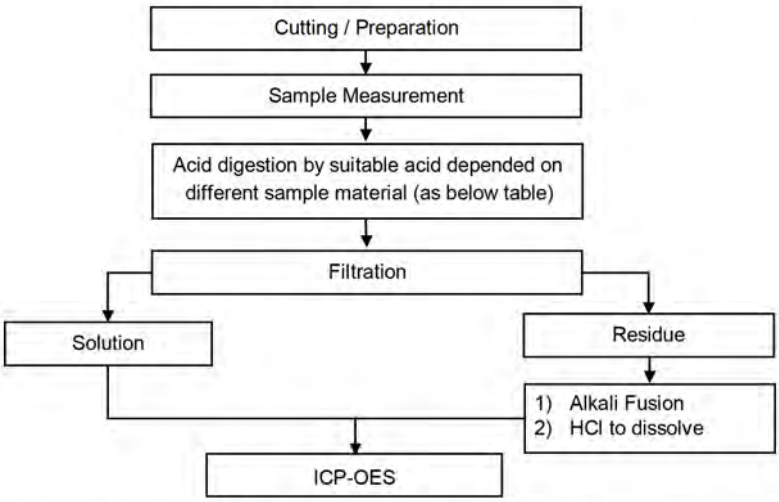
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 10 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

- Technician: Rita Chen
- Supervisor: Troy Chang

Flow Chart of digestion for the elements analysis performed by ICP-OES



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	Added appropriate reagent to total digestion

15.LD CHIP

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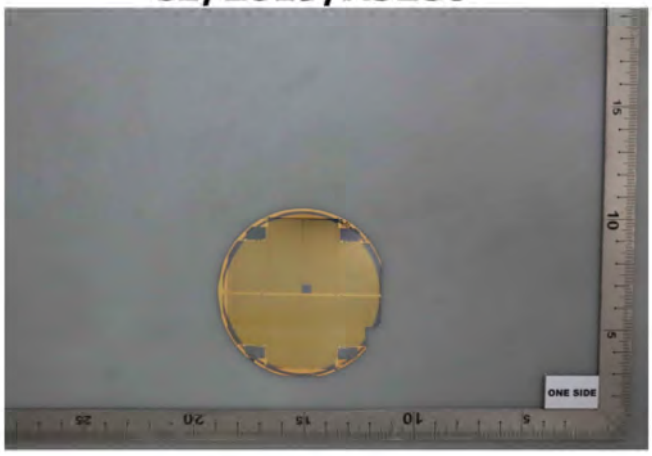
Test Report No. : CE/2019/A5280 Date : 2019/11/06 Page : 11 of 11

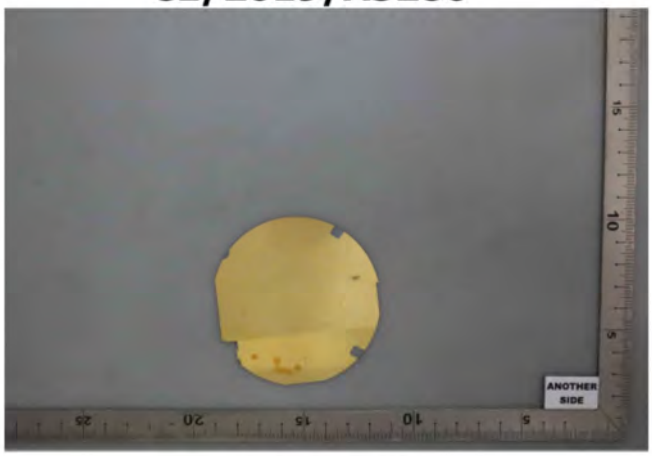
ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

CE/2019/A5280



CE/2019/A5280



** End of Report **

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16.SS

Signature Not Verified
For Question Please
Contact with SGS
www.sgs.com.tw

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Test Report

No. : CE/2019/A5276 Date : 2019/11/06 Page : 1 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	ROHM CO., LTD.
Sample Description	:	SS (SILICON SUBMOUNT)
Sample Receiving Date	:	2019/10/30
Testing Period	:	2019/10/30 to 2019/11/06

==========

Test Requested :

(1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

(2) Please refer to next pages for the other item(s).

Test Result(s) : Please refer to following pages.

Conclusion : (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

SGS TAIWAN LTD. SGS TAIWAN

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16.SS

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Test Report

No. : CE/2019/A5276 Date : 2019/11/06 Page : 2 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Result(s)

PART NAME No.1 : WAFER

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
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.	1000
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.	-

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16.SS

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Test Report

No. : CE/2019/A5276 Date : 2019/11/06 Page : 3 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50	n.d.	1000
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg		50	n.d.	-
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n.d.	-
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 335-67-1)	mg/kg		10	n.d.	-
Antimony (Sb)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	166	-
Beryllium (Be)	mg/kg		2	n.d.	-
Phosphorus (P)	mg/kg		2	74.0	-

Note :

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

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Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 4 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

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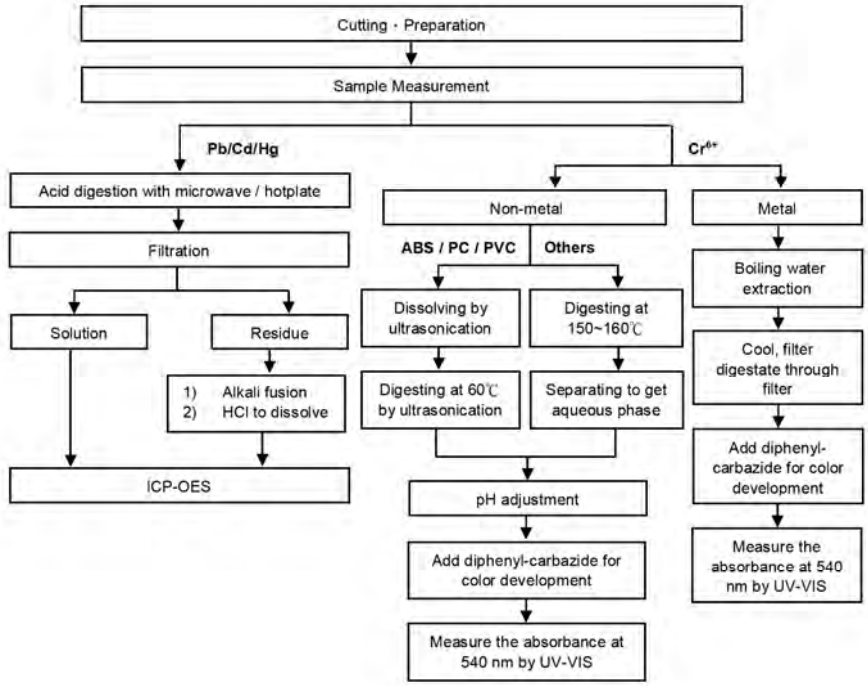
ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang



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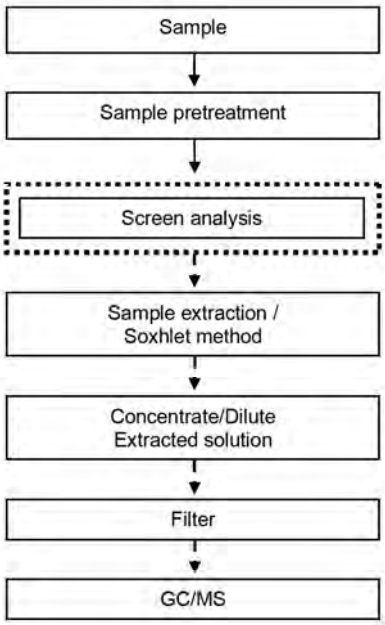
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 6 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang

First testing process →
Optional screen process ····
Confirmation process – ·►



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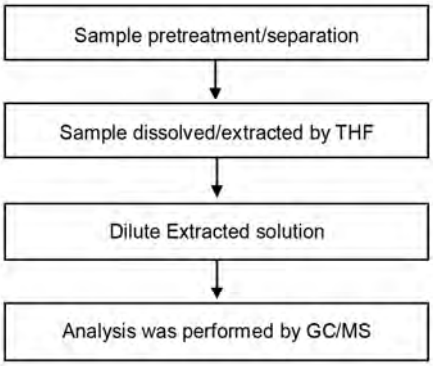
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 7 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



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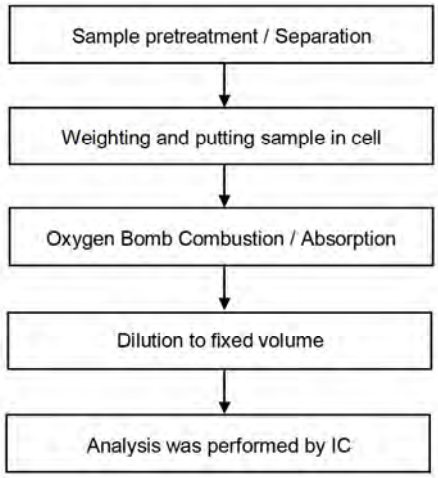
ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 9 of 11

ROHM CO., LTD.
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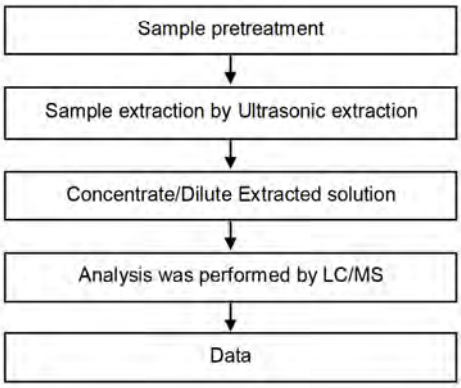
Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



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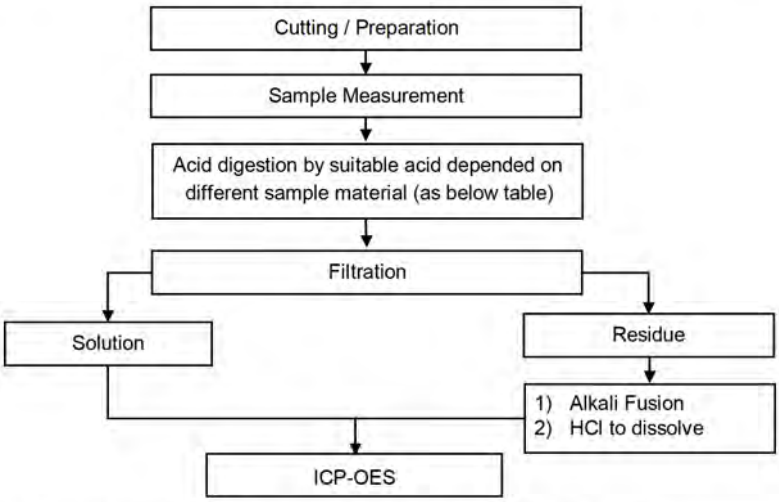
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 10 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

- Technician: Rita Chen
- Supervisor: Troy Chang

Flow Chart of digestion for the elements analysis performed by ICP-OES



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	Added appropriate reagent to total digestion

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Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 11 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

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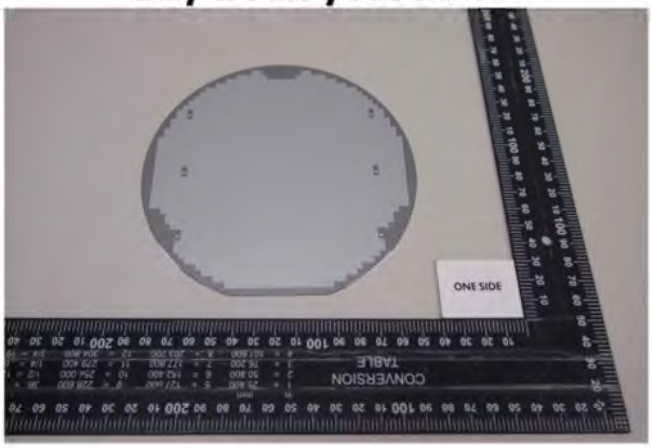
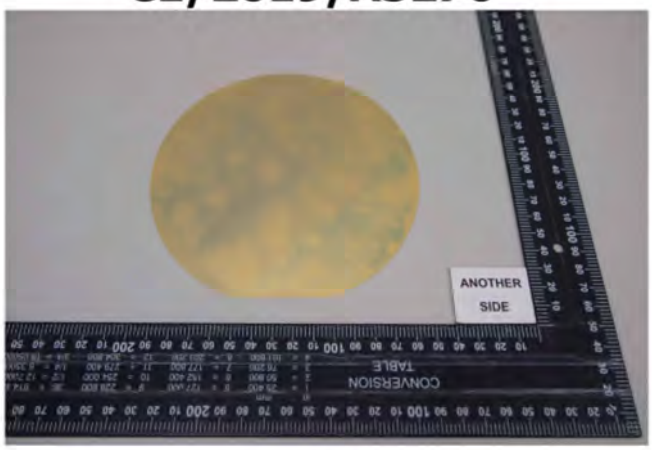


CE/2019/A5276



** End of Report **

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Signature Not Verified
For Question Please
Contact with SGS
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Test Report

No. : CE/2019/A5277 Date : 2019/11/06 Page : 1 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By	:	ROHM CO., LTD.
Sample Description	:	PD (PHOTO DIODE)
Sample Receiving Date	:	2019/10/30
Testing Period	:	2019/10/30 to 2019/11/06

==========

Test Requested :

(1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).

(2) Please refer to next pages for the other item(s).

Test Result(s) : Please refer to following pages.

Conclusion : (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

SGS TAIWAN LTD. SGS TAIWAN

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Test Report

No. : CE/2019/A5277 Date : 2019/11/06 Page : 2 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Result(s)

PART NAME No.1 : WAFER

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
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.	1000
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.	-

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Test Report

No. : CE/2019/A5277 Date : 2019/11/06 Page : 3 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Item(s)	Unit	Method	MDL	Result No.1	Limit
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50	n.d.	1000
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg		50	n.d.	1000
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg		50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg		50	n.d.	-
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n.d.	-
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 335-67-1)	mg/kg		10	n.d.	-
Antimony (Sb)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	125	-
Beryllium (Be)	mg/kg		2	n.d.	-
Phosphorus (P)	mg/kg		2	11.7	-

Note :

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

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Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 4 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².

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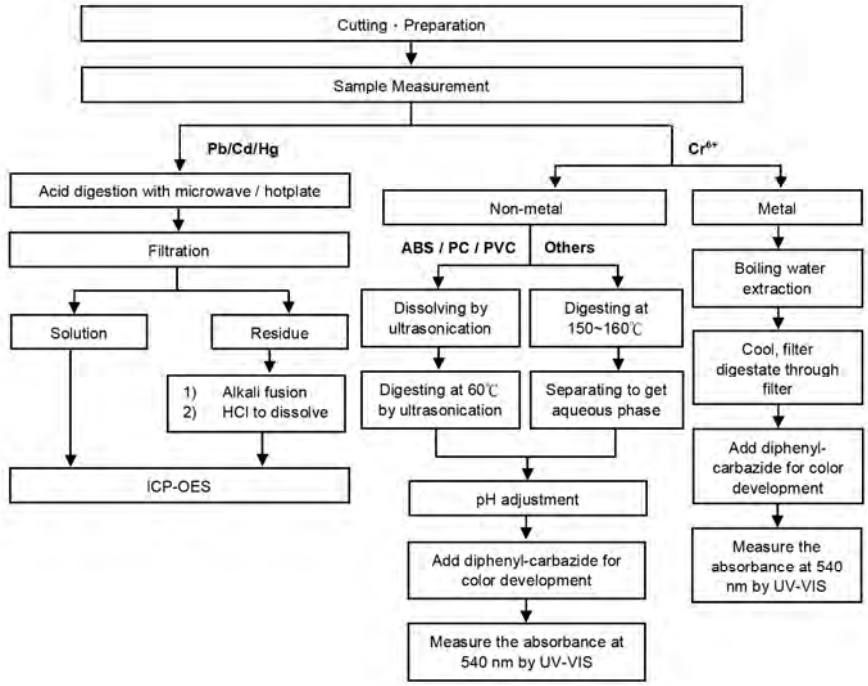
Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 5 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician : Rita Chen
- Supervisor: Troy Chang



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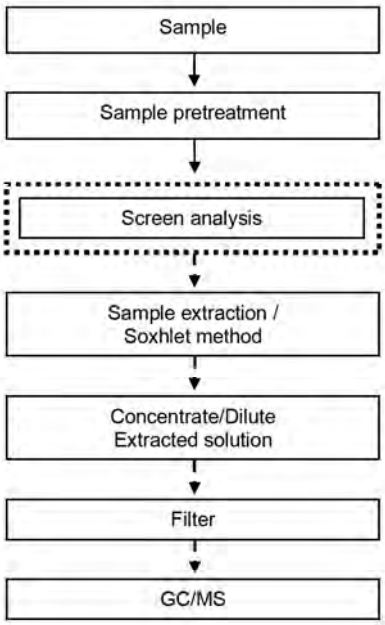
Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 6 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang

First testing process →
Optional screen process ····
Confirmation process – ·►



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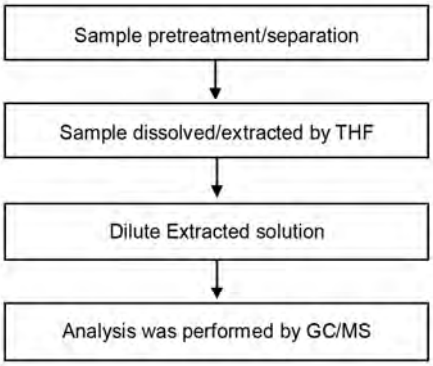
Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 7 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



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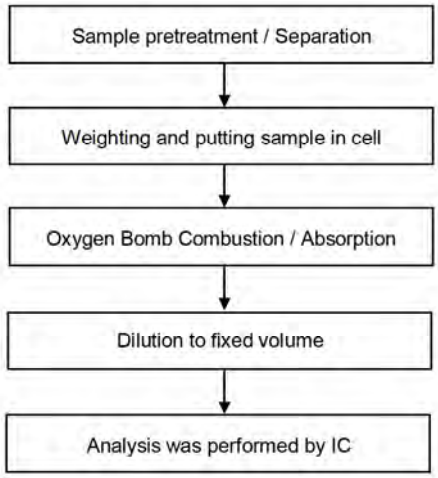
Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 8 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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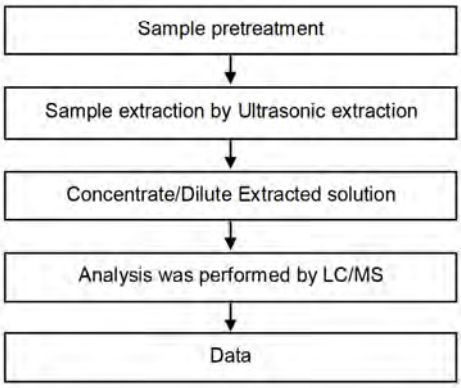
Test Report No. : CE/2019/A5277 Date : 2019/11/06 Page : 9 of 11

ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



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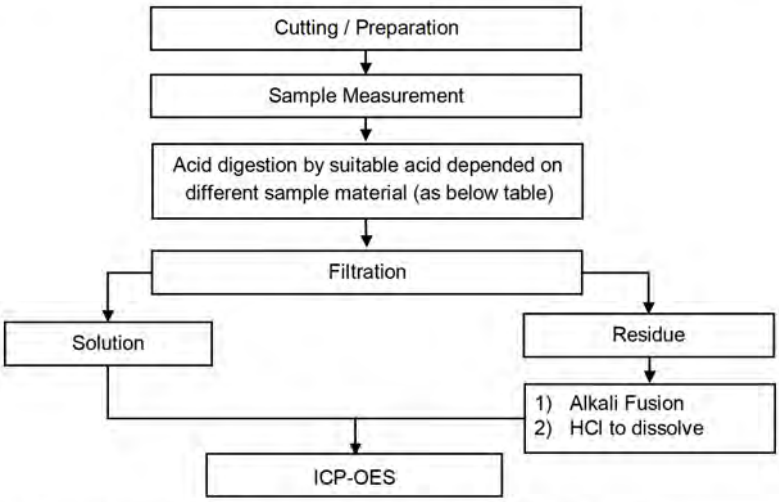
ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

- Technician: Rita Chen
- Supervisor: Troy Chang

Flow Chart of digestion for the elements analysis performed by ICP-OES



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	Added appropriate reagent to total digestion

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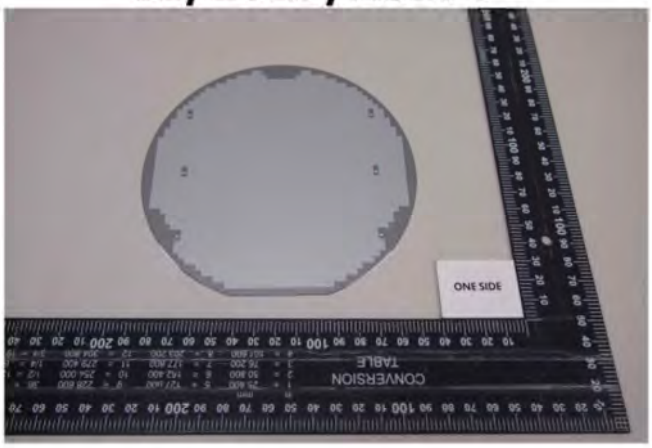
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 11 of 11

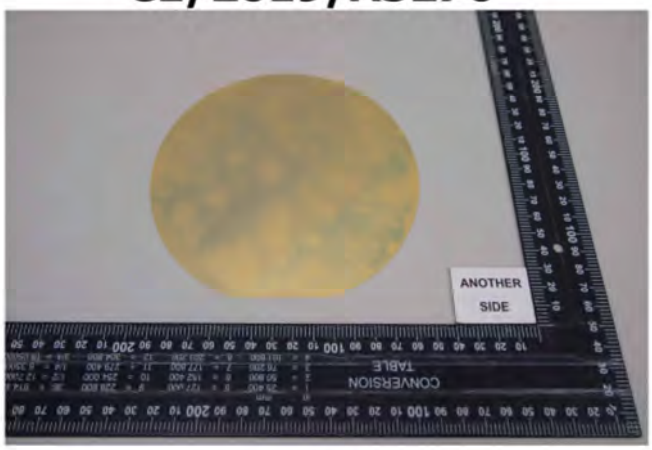
ROHM CO., LTD.
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

CE/2019/A5276



CE/2019/A5276



** End of Report **

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18.Die Attach(In)

To whom it may concern, Date: Nov 5 2019

Certificate of Chemical Ingredient for RoHS compatibility

[redacted]

This is to certify that the following analysis result for RoHS compatibility is correct.

1. Products: Indium Wire

2.Lot Number : [redacted]

Analysis result:

No.	Element	Judgement	Analysis result (ppm)	detection limit (ppm)	Analytical method	Remarks
1	Cadmium (Cd) and its compound	passed	1	<1	ICP analysis (by SII Technology, model: SPS3100)	
2	Hexavalent Chromium(Cr6+) and its compound	passed	<1	<3		As a whole Cr
3	Lead (Pb) and its compound	passed	<3	<3		
4	Mercury (Hg) and its compound	passed	<1	<1		
5	Polybrominated Biphenyls (PBB)	passed	<100	<100	Fluorescent X ray analysis (by RIGAKU, model ZSX PRIMUS II)	As Br
6	Polybrominated Biphenyl ether (PBDE)	passed	<100	<100		As Br
7	Bis (2-ethylhexyl) phthalate (DEHP)	passed	<100	<100		

p. 1

18.Die Attach(In)

					GC/MS	
8	Benzyl butyl phthalate (BBP)	passed	<100	<100		
9	Dibutyl phthalate (DBP)	passed	<100	<100		
10	Diisobutyl phthalate (DIBP)	passed	<100	<100		

Naoki Kosaka
Manager of Quality Control Dept.

18.Die Attach

05-Nov-19

ROHM Co., Ltd

[redacted]

Assurance of analytical data

The analysis data on the attached sheet has passed more than a year since the date of analysis in November 2019, but there has been no change regarding the inclusion of environmentally hazardous substances.
Therefore, [redacted] guarantees the content of this analysis data continuously.
In addition, we will inform you in advance of any changes related to the inclusion of environmentally hazardous substances.

Attached analysis data are as follows.

Attachment 1: TK PASTE [redacted] (RoHS 10 restricted substances)
Attachment 2: TK PASTE [redacted] (Halogen 4 restricted substances)
Attachment 3: TK PASTE [redacted] (RoHS 10 restricted substances)
Attachment 4: TK PASTE [redacted] (Halogen 4 restricted substances)

19.Die Attach

SGS

Test Report No. SHAEC1822489102 Date: 16 Oct 2018 Page 1 of 6

[redacted]

The following sample(s) was/were submitted and identified on behalf of the clients as : TK PASTE [redacted]

SGS Job No. :	SP18-033696 - SH
Composition :	conductive adhesive
Date of Sample Received :	09 Oct 2018
Testing Period :	09 Oct 2018 - 15 Oct 2018
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 :	Based on the performed tests on submitted sample(s), the results of Cadmium, Lead, Mercury, Hexavalent chromium, Polybrominated biphenyls (PBBs), Polybrominated diphenyl ethers (PBDEs) and Phthalates such as Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

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

Helen Liu
Approved Signatory

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19.Die Attach

SGS

Test Report No. SHAEC1822489102 Date: 16 Oct 2018 Page 2 of 6

Test Results :

Test Part Description :

Specimen No.	SGS Sample ID	Description
SN1	SHA18-224891.001	Grey mud

Remarks :

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

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

Test Method : With reference to IEC 62321-4:2013+AMD1:2017, IEC62321-5:2013, IEC62321-7-2:2017, IEC 62321-6:2015 and IEC62321-8:2017, analyzed by ICP-OES, UV-Vis and GC-MS.

Test Item(s)	Limit	Unit	MDL	*001*
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
Sum of PBBs	1000	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
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	-	mg/kg	5	ND
Decabromobiphenyl	-	mg/kg	5	ND
Sum of PBDEs	1000	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

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Test Report No. SHAEC1822489102 Date: 16 Oct 2018 Page 3 of 6

Test Item(s)	Limit	Unit	MDL	*001*
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
Di-butyl Phthalate (DBP)	1000	mg/kg	50	ND
Benzyl Butyl Phthalate (BBP)	1000	mg/kg	50	ND
Di-2-Ethyl Hexyl Phthalate (DEHP)	1000	mg/kg	50	ND
Diisobutyl Phthalates (DIBP)	1000	mg/kg	50	ND

Notes :

(1)The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
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

(2)On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.

(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.

(4)The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.

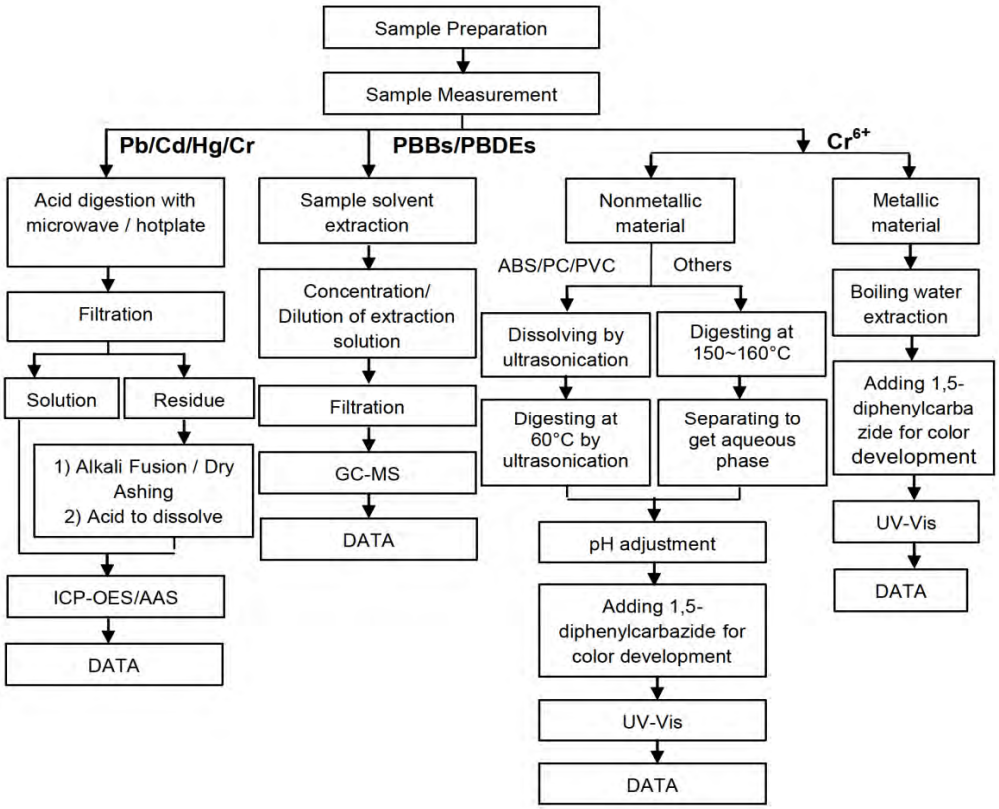
(5)The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

19.Die Attach

ATTACHMENTS

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

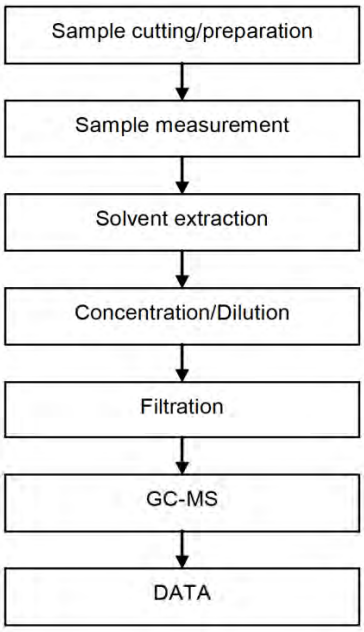
1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} and PBBs/PBDEs test method excluded)



19.Die Attach

ATTACHMENTS

Phthalates Testing Flow Chart



19.Die Attach

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Test Report No. SHAEC1822489102 Date: 16 Oct 2018 Page 6 of 6

Sample photo:

SHA18-224891.001

SGS authenticate the photo on original report only

*** End of Report ***

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20.Au Wire

Signature Not Verified
For Question Please
Contact with SGS
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Test Report

No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 1 of 14

[redacted]

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

Sample Submitted By	:	[redacted]
Sample Description	:	
Style/Item No.	:	Au WIRE
Color	:	GOLD
Sample Receiving Date	:	2019/11/01
Testing Period	:	2019/11/01 to 2019/11/08

==========

Test Requested : (1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).
(2) Please refer to next pages for the other item(s).

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

Conclusion : (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Ray Chang

SGS TAIWAN LTD SGS TAIWAN

Ray Chang Ph.D. / Manager
Signed for and on behalf of
SGS Taiwan Limited
Chemical Laboratory-Kaohsiung

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Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 2 of 14

[redacted]

Test Result(s)

PART NAME NO.1 : Au BONDING WIRE

Test Item (s)	Unit	Method	MDL	Result No.1	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-OES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5: 2013 and performed by ICP-OES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-OES.	2	n.d.	1000
Hexavalent Chromium Cr(VI)(#2)	µg/cm²	With reference to IEC 62321-7-1:2015 and performed by UV-VIS.	0.10	n.d.	-
Sum of PBBs	mg/kg	With reference to IEC 62321-6:2015 and performed by GC/MS.	-	n.d.	1000
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	With reference to IEC 62321-6:2015 and performed by GC/MS.	-	n.d.	1000
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.	-

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Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 3 of 14

[redacted]

Test Item (s)	Unit	Method	MDL	Result No.1	Limit
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0, 68515-48-0)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0, 68515-49-1)	mg/kg	With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	-
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2:2017 and performed by UV-VIS.	8	n.d.	-
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α- HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	With reference to IEC 62321: 2008. Analysis was performed by GC/MS.	5	n.d.	-
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	-
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 335-67-1)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	-

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Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 4 of 14

[redacted]

Test Item (s)	Unit	Method	MDL	Result No.1	Limit
Dimethyl Fumarate (CAS No.: 624-49-7)	mg/kg	With reference to US EPA 3550C: 2007. Analysis was performed by GC/MS.	0.1	n.d.	-
PVC	**	Analysis was performed by FTIR and FLAME Test.	-	Negative	-
Antimony (Sb)	mg/kg	With reference to US EPA 3052: 1996. Analysis was performed by ICP-OES.	2	n.d.	-
Phosphorus (P)	mg/kg	With reference to US EPA 3052: 1996. Analysis was performed by ICP-OES.	2	n.d.	-

Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. n.d. = Not Detected
3. MDL = Method Detection Limit
4. " - " = Not Regulated
5. (#2) =
   a. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13 μg/cm². The sample coating is considered to contain Cr(VI)
   b. The sample is negative for Cr(VI) if Cr(VI) is n.d. (concentration less than 0.10 μg/cm²). The coating is considered a non-Cr(VI) based coating
   c. The result between 0.10 μg/cm² and 0.13 μg/cm² is considered to be inconclusive - unavoidable coating variations may influence the determination.
6. ** = Qualitative analysis (No Unit)
7. Negative = Undetectable / Positive = Detectable
8. This is the additional test report of KA/2019/B0080 which was issued on 2019/11/08.

PFOS Reference Information : POPs - (EU) 2019/1021

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m².
PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamide, N-Ethylperfluorooctane sulfonamide, N-Methylperfluorooctane sulfonamidoethanol and N-Ethylperfluorooctane sulfonamidoethanol.

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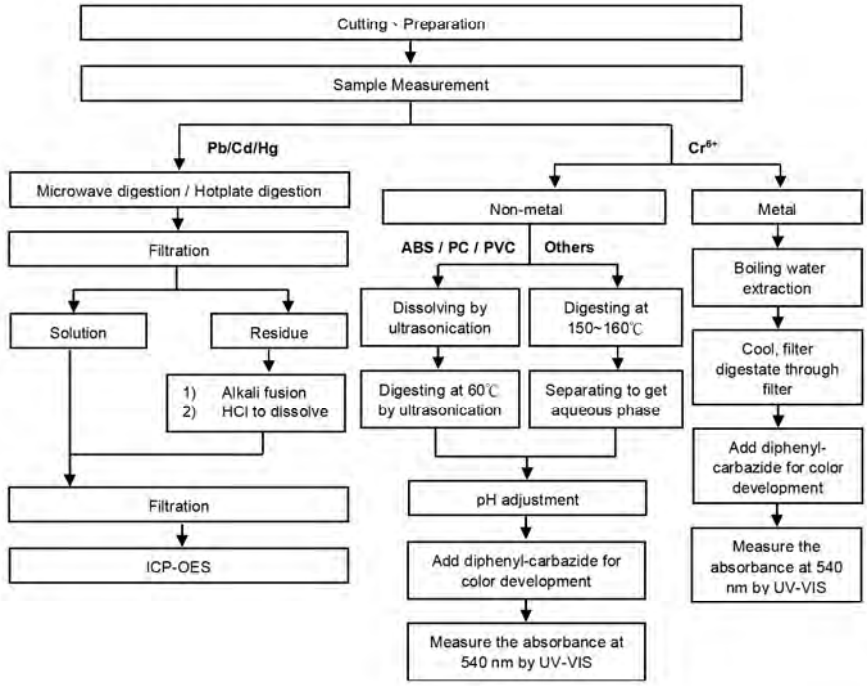
Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 5 of 14

[redacted]

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr^{6+} test method excluded)

- Technician: Jony Liu
- Supervisor: Ray Chang



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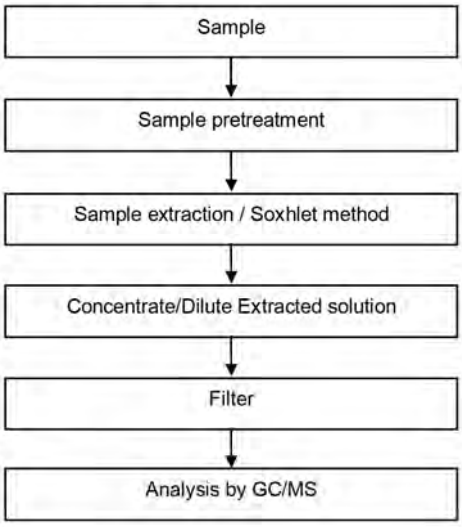
Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 6 of 14

[redacted]

PBB/PBDE analytical FLOW CHART

- Technician : Dorothy Chen
- Supervisor: Ray Chang



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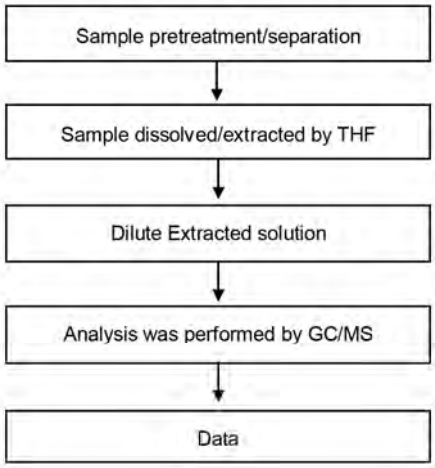
20.Au Wire

[redacted]

Analytical flow chart of phthalate content

- Technician: Dorothy Chen
- Supervisor: Ray Chang

【Test method: IEC 62321-8】



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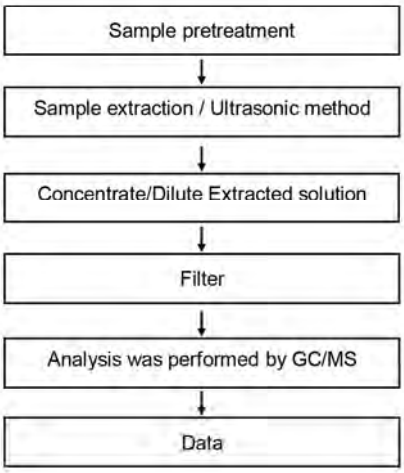
20.Au Wire

[redacted]

HBCDD analytical flow chart

- Technician : Dorothy Chen
- Supervisor: Ray Chang

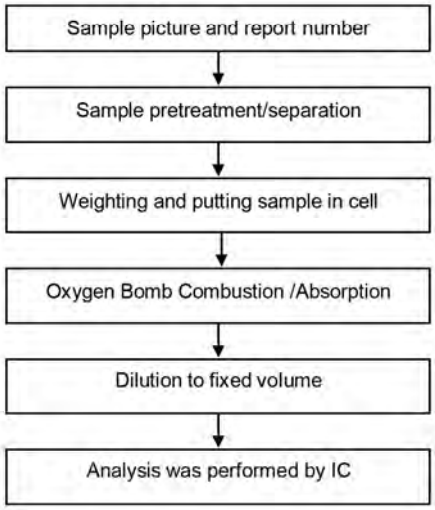


20.Au Wire

[redacted]

Analytical flow chart of halogen content

- Technician : Jean Hung
- Supervisor: Ray Chang



20.Au Wire

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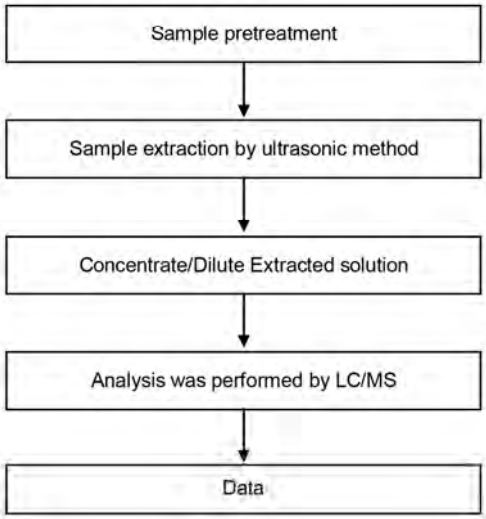
Test Report No. : KA/2019/B0080A-02 Date : 2019/11/08 Page: 10 of 14

[redacted]

Analytical flow chart of PFOA/PFOS content

- Technician : Ginny Huang
- Supervisor: Ray Chang



20.Au Wire

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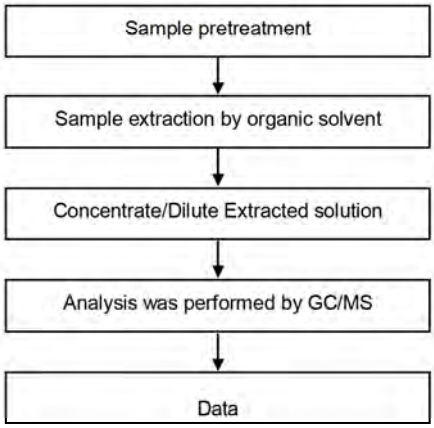
[redacted]

Analytical flow chart of Dimethyl Fumarate content

- Technician: Dorothy Chen
- Supervisor: Ray Chang



SGS Taiwan Ltd. 台灣檢驗科技股份有限公司 | No. 61, Kai-Fa Road, Nanzih Export Processing Zone, Kaohsiung, Taiwan / 高雄市楠梓加工出口區開發路61號
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20.Au Wire

SGS

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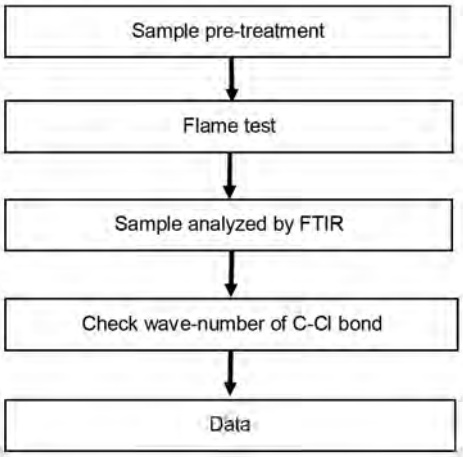
[redacted]

Analysis flow chart for determination of PVC in polymer material

- Technician: Hannah Tai
- Supervisor: Roger Lin



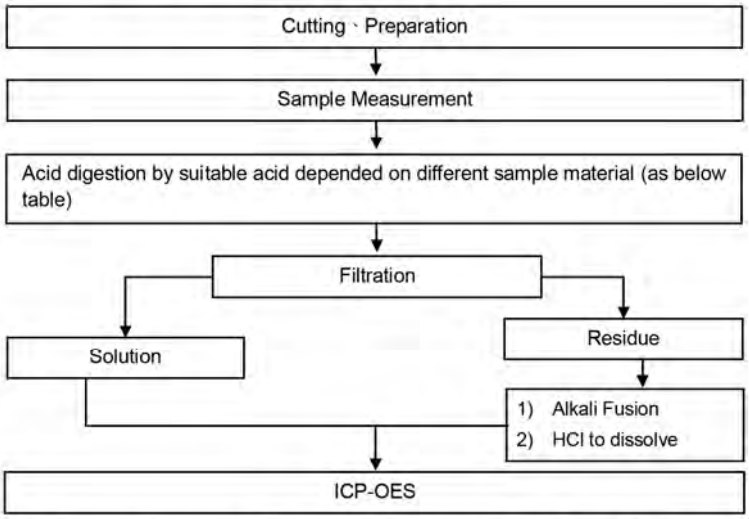
20.Au Wire

[redacted]

Flow Chart of digestion for the elements analysis performed by ICP-OES

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

- Technician: Jony Liu
- Supervisor: Ray Chang



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

20.Au Wire

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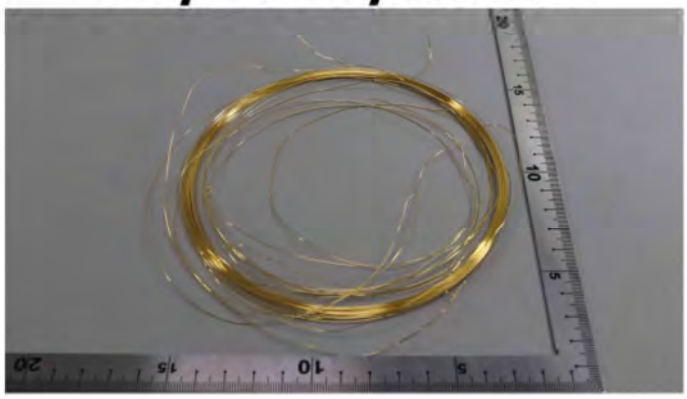
[redacted]

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

KA/2019/B0080



** End of Report **

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