

Product	Laser diode
Package	Closed CAN-SS-PD







Test Report No. Date: 28-May-2019 4252261

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Client :

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

: SPCC-8D (COLD ROKKED STEEL) Sample Name

Manufacturer/Vendor Country of Origin Thailand

Country of Destination Thailand Buyer's Name

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

SGS Sample No.

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

: In accordance with the RoHS Directive 2011/65/EU (Annex II) [amended by Directive Test Requested

(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. IEC 62321-4 ,edition 1.1 : 2017 for Mercury Content, Analyzed by ICP-OES.

IEC 62321-7-1 edition 1.0 : 2015 for Hexavalent Chromium Content, Analyzed by (4) UV/Vis Spectrometry.

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)







Test Report No.

4252261

Date: 28-May-2019

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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 Treeporncharoen **Laboratory manager - Chemical**

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Test Report No. **TEST RESULTS**

4252261

Date: 28-May-2019

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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

(a) mg/kg = ppm , 0.1 W/8 = 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.

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Test Report No. **TEST RESULTS**

4252261

Date: 28-May-2019

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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.	15.	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	-3.
Nonabromobiphenyl		n.d.	5	-
Decabromobiphenyl		n.d.	5	2

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Test Report No. **TEST RESULTS**

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Date: 28-May-2019

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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	5
Dibromodiphenyl ether	_	n.d.	5	-
Tribromodiphenyl ether		n.d.	5	-21
Tetrabromodiphenyl ether		n.d.	5	7
Pentabromodiphenyl ether		n.d.	5	-
Hexabromodiphenyl ether		n.d.	5	8
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

- (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)







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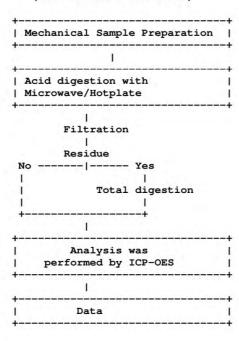
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Flow chart of Pb, Cd, Hg Testing

(Test method : IEC 62321)



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Date: 28-May-2019

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Flow chart of Hexavalent Chromium Testing (Test method : IEC 62321)

> Metallic material 1 Boiling water Extraction 1 |Adding Orthophosphoric acid| Solution and |1,5-diphenylcarbazide for |color development 1 Analysis was performed by UV-Vis 1

> > Data

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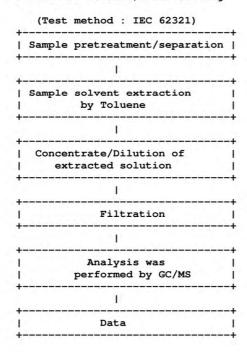
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Flow chart of PBBs, PBDEs Testing



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1.Stem(Basemetal)





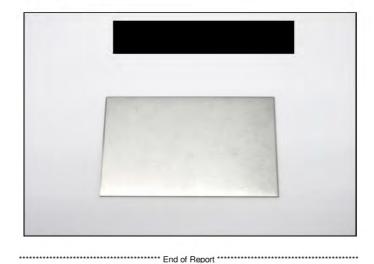


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Date: 28-May-2019

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SAMPLE/ATTACHMENT PICTURE



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2.Stem S lead



Test Report No. F690101/LF-CTSAYAA19-11807

Issued Date: 2019. 02. 22

Page 1 of 5



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

SGS File No. : AYAA19-11807

Product Name :

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)

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Jeff Jang / Chemical Lab Mgr

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2.Stem S lead



Test Report No. F690101/LF-CTSAYAA19-11807

Sample No. : AYAA19-11807.001

Sample Description : N/A : N/A Materials : N/A

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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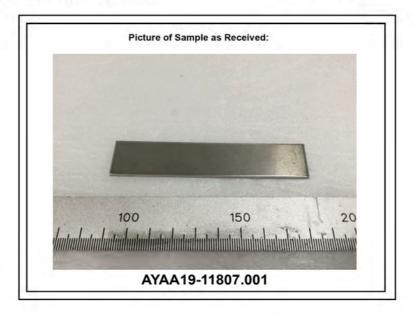
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2.Stem S lead



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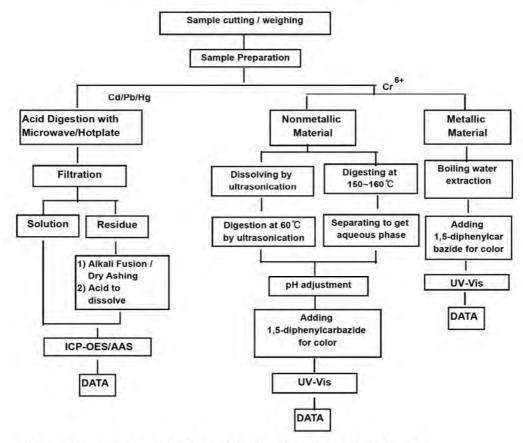


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Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr6+ Testing

Issued Date: 2019. 02. 22



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

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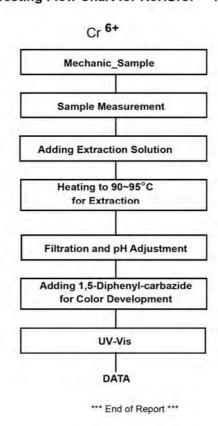


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Testing Flow Chart for RoHS:Cr6+ Testing

Issued Date: 2019. 02. 22



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3.Stem L lead



Test Report No. F690101/LF-CTSAYAA19-11804

Issued Date: 2019. 02. 22

Page 1 of 5



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

SGS File No. : AYAA19-11804

Product Name :

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)

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3.Stem L lead



Test Report No. F690101/LF-CTSAYAA19-11804

: AYAA19-11804.001 Sample No.

Sample Description : N/A Item No./Part No. Materials : N/A

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.

(1) N.D. = Not detected.(<MDL) NOTE:

(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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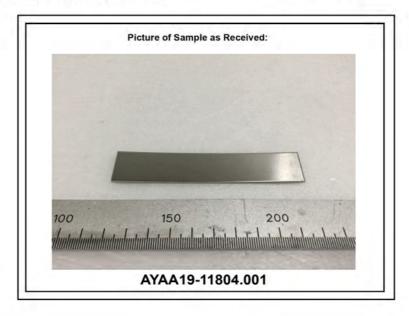
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3.Stem L lead



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3.Stem L lead

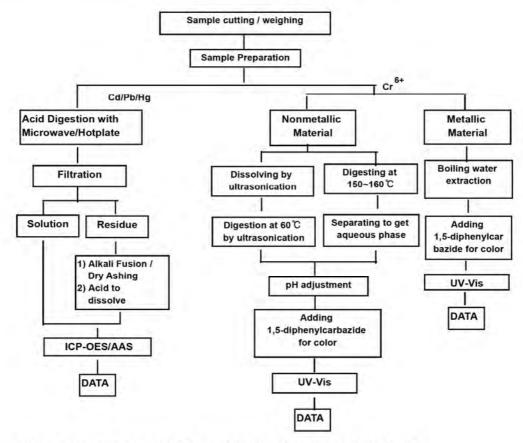


Test Report No. F690101/LF-CTSAYAA19-11804

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Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr6+ Testing

Issued Date: 2019. 02. 22



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

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3.Stem L lead

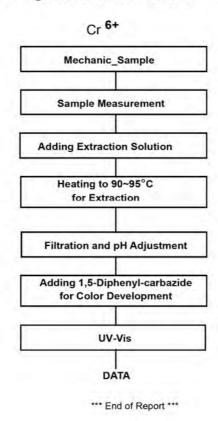


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Testing Flow Chart for RoHS:Cr6+ Testing

Issued Date: 2019. 02. 22



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4.Stem E lead



Test Report No. F690101/LF-CTSAYAA19-11804

Issued Date: 2019. 02. 22

Page 1 of 5



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

SGS File No. : AYAA19-11804

Product Name

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)

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Jeff Jang / Chemical Lab Mgr

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4.Stem E lead



Test Report No. F690101/LF-CTSAYAA19-11804

: AYAA19-11804.001 Sample No.

Sample Description : N/A Item No./Part No. 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.			

(1) N.D. = Not detected.(<MDL) NOTE:

(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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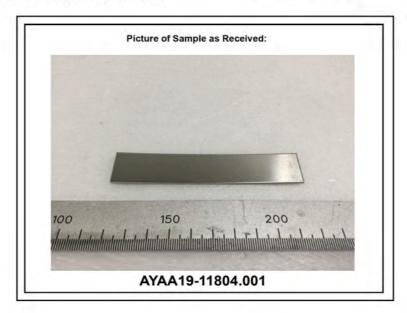
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4.Stem E lead

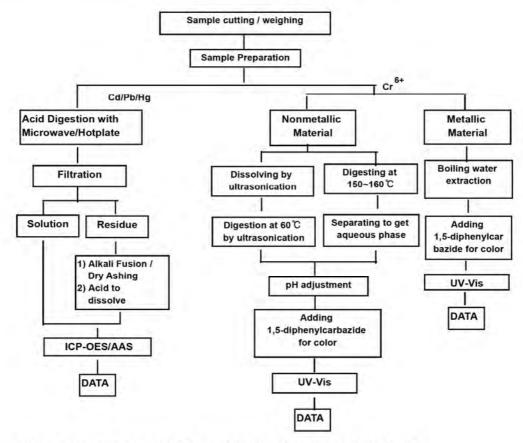


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Testing Flow Chart for RoHS:Cd/Pb/Hg/Cr6+ Testing

Issued Date: 2019. 02. 22



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

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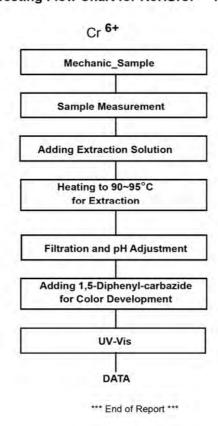


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Testing Flow Chart for RoHS:Cr6+ Testing

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5.Stem Ni Au Plating







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

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

: CE Ni Au Plating Sample Name

Sample Description Metal

Part No.

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

In accordance with the RoHS Directive 2011/65/EU (Annex II) [amended by Directive Test Requested

(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.

IEC 62321-6 edition 1.0 : 2015 for PBBs/PBDEs content, Analyzed by GC/MS. 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 (DIBP) 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 Treeporncharoen Laboratory manager - Chemical

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Test Report No.

4206102

Date : 5-Apr-2019

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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	7.05

Test Part Description Result (1) metal with plating

(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.

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Test Report No.
TEST RESULTS

4206102

Date : 5-Apr-2019

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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.	14	1000
Monobromobiphenyl		n.d.	5	£ 7
Dibromobiphenyl		n.d.	5	24
Tribromobiphenyl		n.d.	5	1
Tetrabromobiphenyl		n.d.	5	2.0
Pentabromobiphenyl		n.d.	5	-
Hexabromobiphenyl		n.d.	5	-
Heptabromobiphenyl		n.d.	5	Ę
Octabromobiphenyl		n.d.	5	-
Nonabromobiphenyl		n.d.	5	
Decabromobiphenyl		n.d.	5	0.

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4206102

Date : 5-Apr-2019

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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	19
Dibromodiphenyl ether		n.d.	5	2
Tribromodiphenyl ether		n.d.	5	- 13
Tetrabromodiphenyl ether		n.d.	5	-
Pentabromodiphenyl ether		n.d.	5	1.5
Hexabromodiphenyl ether		n.d.	5	12
Heptabromodiphenyl ether		n.d.	5	- F-
Octabromodiphenyl ether		n.d.	5	D10
Nonabromodiphenyl ether		n.d.	5	15
Decabromodiphenyl ether		n.d.	5	1

Test Part Description Result (1) metal with plating

(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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4206102

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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

- (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

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5.Stem Ni_Au Plating



Test Report No.



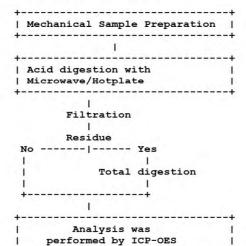
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Flow chart of Pb,Cd,Hg Testing

4206102

(Test method : IEC 62321)



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5.Stem Ni_Au Plating







Test Report No.

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Date: 5-Apr-2019

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Flow chart of Hexavalent Chromium Testing

(Test method : IEC 62321) | Metallic material Boiling water Extraction 1 |Adding Orthophosphoric acid| Solution and |1,5-diphenylcarbazide for |color development - 1 Analysis was performed by UV-Vis Data

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5.Stem Ni_Au Plating







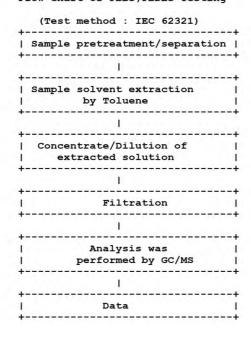
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Flow chart of PBBs, PBDEs Testing



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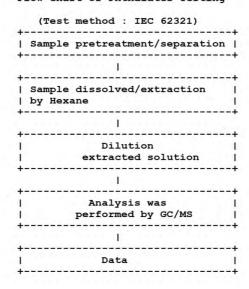
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Flow chart of Phthalates Testing



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5.Stem Ni_Au Plating





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Test Report No. 4206102 Date : 5-Apr-2019

SAMPLE/ATTACHMENT PICTURE



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6.Stem(glass)





Test Report

No.: CE/2019/32276

Date: 2019/03/18

Page: 1 of 7

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

Sample Submitted By

Sample Description **GLASS POWDER**

Style/Item No.

: 2019/03/11 Sample Receiving Date

Testing Period : 2019/03/11 to 2019/03/18

: As specified by client, with reference to RoHS 2011/65/EU Annex II and amending **Test Requested**

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

: Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Conclusion

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.

Signed for and SĞS TAIWAN LTO Chemical Laboratory - Taipei

SGS TaiWan Ltd. 台灣抢航科技股份有限公司 25, Wu Chyuan 7th Road, New Taipei Industrial Park, Wu Ku District, New Taipei City, Taiwan 衛北市五股區新北淮樂園區五樓七段25號 1+886 (02)2299 3939 1+886 (02)2299 3237 www.sqs.com.tW

6.Stem(glass)





Test Report

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

Test Result(s)

: GRAY POWDER PART NAME No.1

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		- 4	n.d.	1000
Monobromobiphenyl	mg/kg		5	n.d.	-
Dibromobiphenyl	mg/kg		5	n.d.	
Tribromobiphenyl	mg/kg		5	n.d.	ini.
Tetrabromobiphenyl	mg/kg		5	n.d.	12.0
Pentabromobiphenyl	mg/kg		5	n.d.	
Hexabromobiphenyl	mg/kg		5	n.d.	-18
Heptabromobiphenyl	mg/kg		5	n.d.	
Octabromobiphenyl	mg/kg		5	n.d.	1.0
Nonabromobiphenyl	mg/kg		5	n.d.	1 94
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6 (2015) and	5	n.d.	1.00
Sum of PBDEs	mg/kg	performed by GC/MS.		n.d.	1000
Monobromodiphenyl ether	mg/kg		5	n.d.	1-1-1
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.	-143
Hexabromodiphenyl ether	mg/kg		5	n.d.	1
Heptabromodiphenyl ether	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	5	n.d.	
Octabromodiphenyl ether	mg/kg		5	n.d.	
Nonabromodiphenyl ether	mg/kg		5	n.d.	-
Decabromodiphenyl ether	mg/kg		5	n.d.	I to

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6.Stem(glass)





Test Report

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

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

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6.Stem(glass)





Test Report

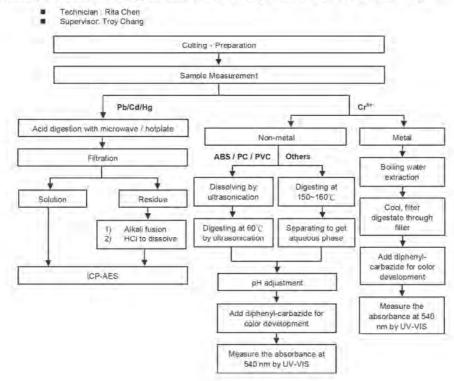
No.: CE/2019/32276

Date: 2019/03/18

Page: 4 of 7

Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ test method excluded)



6.Stem(glass)





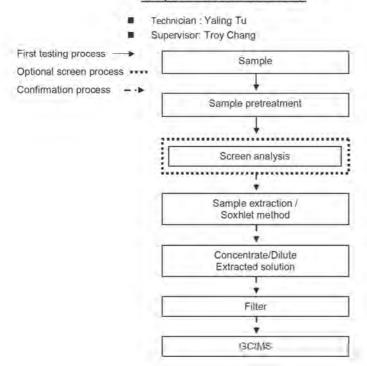
Test Report

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Date: 2019/03/18

Page : 5 of 7

Analytical flow chart - PBB / PBDE



6.Stem(glass)





Test Report

No.: CE/2019/32276

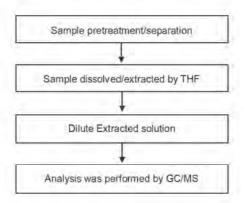
Date: 2019/03/18

Page: 6 of 7

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

[Test method: IEC 62321-8]



6.Stem(glass)





Test Report

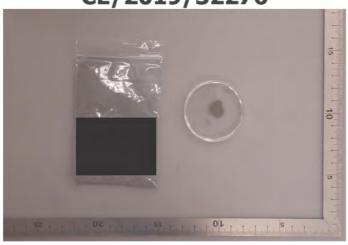
No.: CE/2019/32276

Date: 2019/03/18

Page: 7 of 7

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

CE/2019/32276



** End of Report **

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7.Stem (brazing)

2019年3月28日

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



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

言己

1. はじめに

ご依頼のありました

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		分析測定値(ppm)				
分析サンプル	Pb	Cd	Cr	Hg	Lot.No.	
1	<5	<1	<1	<5	LL80166	
2	<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)



TEST REPORT

REPORT NO. JP/2018/111297

DATE: December 3,2018 PAGE: 1 OF 4

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 :

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)

: WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 6 SUBSTANCES. 分析方法

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。

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

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8.Cap(Base Material)



TEST REPORT

REPORT NO. JP/2018/111297

DATE: December 3,2018 PAGE: 2 OF 4



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))	μ g/cm ²	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 10cm.

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8.Cap(Base Material)



REPORT NO. JP/2018/111297

DATE: December 3,2018 PAGE: 3 OF 4



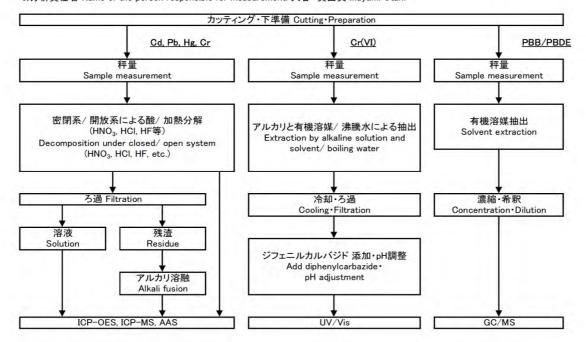
分析フローチャート MEASUREMENT FLOW CHART

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)

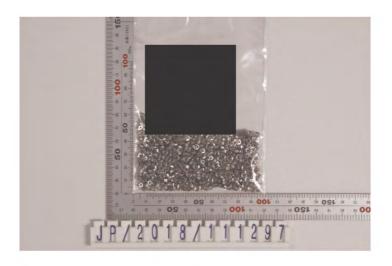


REPORT NO. JP/2018/111297

DATE: December 3,2018 PAGE: 4 OF 4



SAMPLE IMAGE



<END>

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9.Cap(Ni plating)



TEST REPORT

REPORT NO. JP/2019/080387

DATE: August 20,2019

PAGE: 1 OF 4

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

CLIENT REF.NO SAMPLE RECEIVED

: 2019/08/07

TESTING DATE

: 2019/08/07 TO 2019/08/20

TEST REQUESTED

SELECTED TEST(S) AS REQUESTED BY CLIENT. 分析項目は顧客の要求によります。

分析項目

TEST METHOD(S) 分析方法

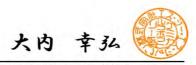
: WITH REFERENCE TO LATEST EDITION OF IEC62321 FOR RoHS 10 SUBSTANCES.

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。



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

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9.Cap(Ni plating)



TEST REPORT

REPORT NO. JP/2019/080387

DATE: August 20,2019

PAGE: 2 OF 4



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))	μ g/cm ²	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 10cm.

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9.Cap(Ni plating)



REPORT NO. JP/2019/080387

DATE: August 20,2019

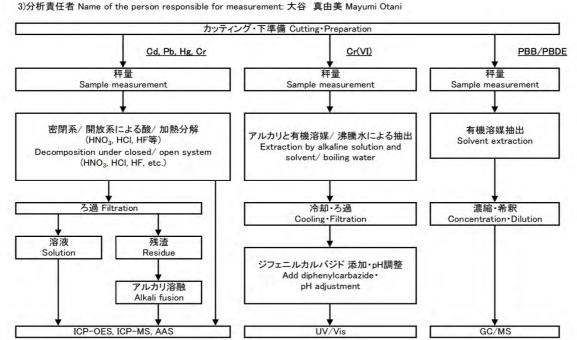
PAGE: 3 OF 4

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



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9.Cap(Ni plating)



REPORT NO. JP/2019/080387

DATE: August 20,2019 PAGE: 4 OF 4



SAMPLE IMAGE



<END>

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10.Cap(Window glass)



TEST REPORT

REPORT NO. JP/2018/111294

DATE: December 3,2018 PAGE: 1 OF 3

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

CLIENT REF.NO : 2018111900209000

SAMPLE RECEIVED 2018/11/20

TESTING DATE : 2018/11/20 TO 2018/11/30

TEST REQUESTED

SELECTED TEST(S) AS REQUESTED BY CLIENT.

分析項目は顧客の要求によります。 分析項目

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) : PLEASE REFER TO THE NEXT PAGE(S). 以下のページをご参照願います。 分析結果

Yukihiro Ouchi / Quality Manager

SGS Japan Inc., Chemical Laboratory

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10.Cap(Window glass)



TEST REPORT

REPORT NO. JP/2018/111294

DATE: December 3,2018 PAGE: 2 OF 3

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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10.Cap(Window glass)



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SAMPLE IMAGE



<END>

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11.Cap(AR coating1)



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測試報告

Test Report

頁數(Page): 1 of 9 號碼(No.): CE/2019/91530 日期(Date): 2019/09/20

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)

樣品名稱(Sample Description) 收件日期(Sample Receiving Date) 2019/09/10

: 2019/09/10 to 2019/09/20 測試期間(Testing Period)

測試需求(Test Requested):

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

(1) 依據客戶指定,參考RoHS 2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鍋、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,其鎬、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.)

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11.Cap(AR coating1)



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測試結果(Test Results)

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

测試項目 (Test Items)	單位 (Unit)	测試方法 (Method)	MDL	結果 (Result) No.1	限值 (Limit)
鍋 / Cadmium (Cd)	mg/kg	参考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-0ES.	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	参考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	参考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		=	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	4 + IFC 00001 0 (0015) 31 5 1- 11 1/66	5	n. d.	Ī
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n. d.	Ī
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n. d.	ĵ
六溴聯苯 / Hexabromobiphenyl	mg/kg	普儀檢測. / With reference to IEC -62321-6 (2015) and performed by	5	n. d.	
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n. d.	Α.
八溴聯苯 / Octabromobiphenyl			5	n. d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg	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-0ES. 零考IEC 62321-7-2 (2017),以UV-VIS檢測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	5	n. d.	9
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n. d.	Ŧ

11.Cap(AR coating1)



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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		-	n. d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg	1	5	n. d.) - (-) - (-)
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg	1	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.	71.05
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n. d.	1 = 1
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n. d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg	1	5	n. d.	
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n. d.	11.78.11
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		50	n. d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	/kg /kg /kg /kg /kg /kg /kg /kg /kg /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		50	721	-
鹵素 (氣) / Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg	参考BS EN 14582 (2016), 以離子層析儀	50	n. d.	791
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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11.Cap(AR coating1)



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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)

11.Cap(AR coating1)



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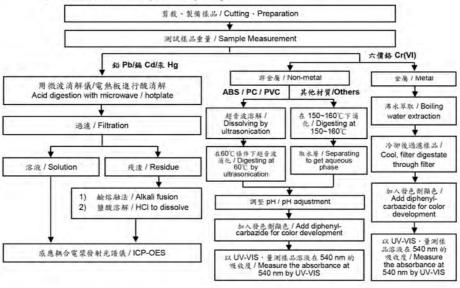
頁數(Page): 5 of 9

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. (Cr6+ test method excluded)

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



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11.Cap(AR coating1)



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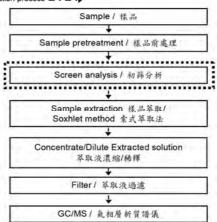
號碼(No.): CE/2019/91530 日期(Date): 2019/09/20

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

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

初次测试程序 / First testing process _ 選擇性篩檢程序 / Optional screen process ******* 確認程序 / Confirmation process - · - ·▶



11.Cap(AR coating1)



測試報告

Test Report

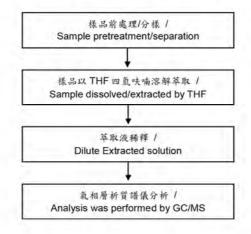
號碼(No.): CE/2019/91530 日期(Date): 2019/09/20

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

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

【测試方法/Test method: IEC 62321-8】



11.Cap(AR coating1)



測試報告

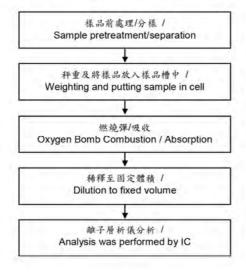
Test Report

號碼(No.): CE/2019/91530 日期(Date): 2019/09/20

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

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



11.Cap(AR coating1)



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* 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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12.Cap(AR coating2)



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測試報告

Test Report

頁數(Page): 1 of 9 號碼(No.): CE/2019/91535 日期(Date): 2019/09/20

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) 樣品名稱(Sample Description)

: 2019/09/10 收件日期(Sample Receiving Date)

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測試鍋、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,其編、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 - Te Signed for and behalf of SĞS TAIWAN LTD. Chemical Laboratory - Taipei

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12.Cap(AR coating2)



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測試結果(Test Results)

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

测試項目 (Test Items)	單位 (Unit)	测試方法 (Method)	MDL	結果 (Result) No.1	限值 (Limit)
鍋 / Cadmium (Cd)	mg/kg	参考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-0ES.	2	n. d.	100
鉛 / Lead (Pb)	mg/kg	参考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-0ES.	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-0ES.	2	n. d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	参考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		=	n. d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n. d.	1
二溴聯苯 / Dibromobiphenyl	mg/kg	reference to IEC 62321-4:2013+ AMD1:2017 and performed by ICP-0ES. mg/kg 参考IEC 62321-7-2 (2017),以UV-VIS檢 測. / With reference to IEC 62321-7-2 (2017) and performed by UV-VIS. mg/kg mg/kg mg/kg mg/kg mg/kg s考IEC 62321-6 (2015),以氣相層析/質	5	n. d.	1
三溴聯苯 / Tribromobiphenyl	mg/kg	A 11 THO ASSOCIATION OF A 12 THE ASSOCIATION OF A 12 T	5	n. d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n. d.	9 9
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n. d.	ĵ
六溴聯苯 / Hexabromobiphenyl	mg/kg	***	5	n. d.) (9)
七溴聯苯 / Heptabromobiphenyl	mg/kg	GO/ MO.	5	n. d.	Ţ
八溴聯苯 / Octabromobiphenyl	mg/kg	-)	5	n. d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg	/kg 參考IEC 62321-5 (2013),以感應耦合電	5	n. d.	3
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n. d.	-

12.Cap(AR coating2)



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測試項目 (Test Items)	單位 (Unit)	测試方法 (Method)	MDL	結果 (Result)	限值 (Limit)
N7227 33322	X-2-2-27	(mo shou)		No. 1	
多溴聯苯醚總和 / Sum of PBDEs	mg/kg		-	n. d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n. d.	-
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg	/ kg	5	n. d.	
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n. d.	9
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n. d.	
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n. d.	11.05
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.	11.78.11
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		50	n. d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	g 参考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	分析. / With reference to BS EN 14582	50	n. d.	-
鹵素(氣)/ Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg		50	n. d.	12
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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12.Cap(AR coating2)



測試報告

Test Report

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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)

12.Cap(AR coating2)



測試報告

Test Report

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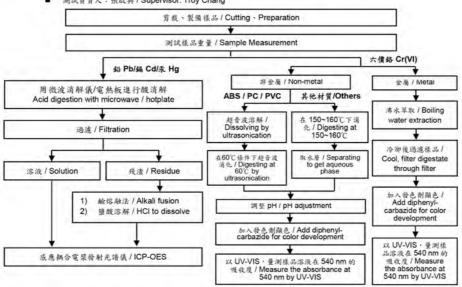
頁數(Page): 5 of 9

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。(六價絡測試方法除外) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr6+ 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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18:6ap(AR coatings)



測試報告

Test Report

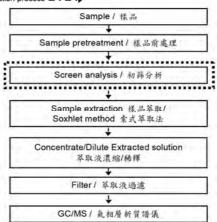
號碼(No.): CE/2019/91535 日期(Date): 2019/09/20

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

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

初次测试程序 / First testing process _ 選擇性篩檢程序 / Optional screen process ******* 確認程序 / Confirmation process - · - ·▶



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12.Cap(AR coating2)



測試報告

Test Report

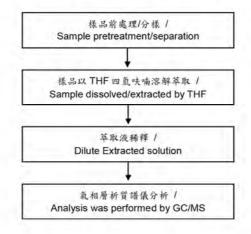
號碼(No.): CE/2019/91535 日期(Date): 2019/09/20

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

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

【测試方法/Test method: IEC 62321-8】



12.Cap(AR coating2)



測試報告

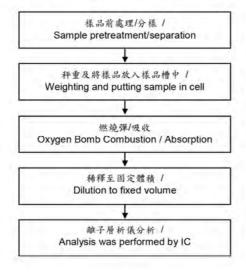
Test Report

號碼(No.): CE/2019/91535 日期(Date): 2019/09/20

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

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



12.Cap(AR coating2)



測試報告

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Test Report

* 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/2019/91535 OL

** 報告結尾 (End of Report) **

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13.Cap(AR coating3)



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測試報告

Test Report

號碼(No.): CE/2019/91539 日期(Date): 2019/09/20

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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) 樣品名稱(Sample Description)

: 2019/09/10 收件日期(Sample Receiving Date)

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測試鍋、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,其鎬、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 - Te Signed for and behalf of SĞS TAIWAN LTD. Chemical Laboratory - Taipei

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13.Cap(AR coating3)



測試報告

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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)	测試方法 (Method)	MDL	結果 (Result) No.1	限值 (Limit)
鍋 / 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-0ES.	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-0ES.	2	n. d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	参考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			n. d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg	1	5	n. d.	-
二溴聯苯 / Dibromobiphenyl	mg/kg	1	5	n. d.	1
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n. d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg	参考IEC 62321-6 (2015), 以氣相層析/質	5	n. d.	9 1
五溴聯苯 / Pentabromobiphenyl	mg/kg	譜儀檢測. / With reference to IEC 62321-6 (2015) and performed by	5	n. d.	1
六溴聯苯 / Hexabromobiphenyl	mg/kg	GC/MS.	5	n. d.	9
七溴聯苯 / Heptabromobiphenyl	mg/kg	-GC/MS.	n. d.	Υ.	
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n. d.	4
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n. d.	(8)
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n. d.	

13.Cap(AR coating3)



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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			n. d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg	1	5	n. d.	
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg	1	5	n. d.	
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n. d.	- 50
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg	參考IEC 62321-6 (2015), 以氣相層析/質	5	n. d.	-
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg	譜儀檢測. / With reference to IEC	5	n. d.	1000
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg	62321-6 (2015) and performed by GC/MS.	5	n. d.	11 1-11
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg	GC/MS.	5	n. d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n. d.	1
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n. d.	11.75.11
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		50	n. d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	參考IEC 62321-8 (2017), 以氣相層析/質 譜儀檢測. / With reference to IEC	50	n. d.	1000
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	62321-8 (2017). Analysis was performed by GC/MS.	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 (氣) / Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg		50	n. d.	-
鹵素 (氣) / Halogen-Chlorine (C1) (CAS No.: 22537-15-1)	mg/kg	参考BS EN 14582 (2016),以離子層析儀	50	n. d.	-75
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	分析. / With reference to BS EN 14582- (2016). Analysis was performed by IC.	50	n. d.	-
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n. d.	

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13.Cap(AR coating3)



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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)

13.Cap(AR coating3)



測試報告

Test Report

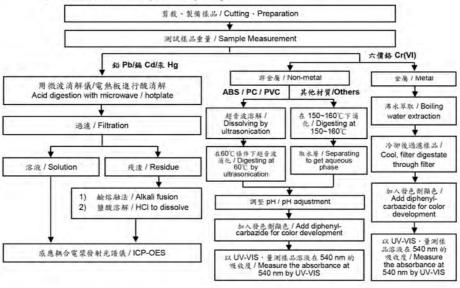
號碼(No.): CE/2019/91539 日期(Date): 2019/09/20

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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. (Cr6+ test method excluded)

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



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13.Cap(AR coating3)



測試報告

Test Report

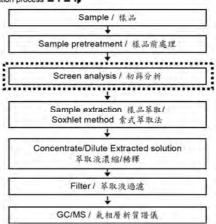
號碼(No.): CE/2019/91539 日期(Date): 2019/09/20

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

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

初次测试程序 / First testing process _ 選擇性篩檢程序 / Optional screen process ******* 確認程序 / Confirmation process - · - ·▶



13.Cap(AR coating3)



測試報告

Test Report

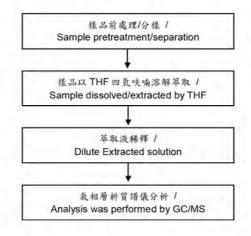
號碼(No.): CE/2019/91539 日期(Date): 2019/09/20

頁數(Page): 7 of 9

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

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

【测試方法/Test method: IEC 62321-8】



13.Cap(AR coating3)



測試報告

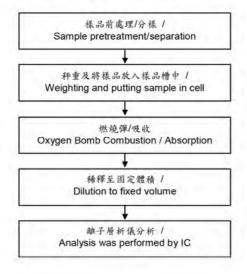
Test Report

號碼(No.): CE/2019/91539 日期(Date): 2019/09/20

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

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



13.Cap(AR coating3)



測試報告

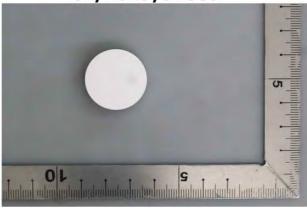
Test Report

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* 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) **

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14.Cap(Low-melting glass)



TEST REPORT

REPORT NO. JP/2018/111426

DATE: December 5,2018 PAGE: 1 OF 4

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

CLIENT REF.NO : 2018112000721400

SAMPLE RECEIVED : 2018/11/22

TESTING DATE : 2018/11/22 TO 2018/12/04

TEST REQUESTED

SELECTED TEST(S) AS REQUESTED BY CLIENT.

分析項目は顧客の要求によります。 分析項目

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。



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14.Cap(Low-melting glass)



TEST REPORT

REPORT NO. JP/2018/111426

DATE: December 5,2018 PAGE: 2 OF 4



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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14.Cap(Low-melting glass)



REPORT NO. JP/2018/111426

DATE: December 5,2018 PAGE: 3 OF 4

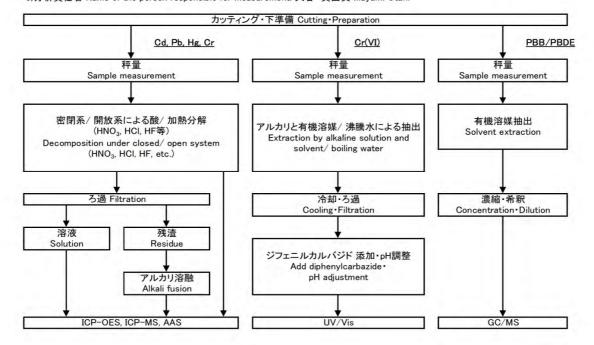
分析フローチャート MEASUREMENT FLOW CHART

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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14.Cap(Low-melting glass)



REPORT NO. JP/2018/111426

DATE: December 5,2018 PAGE: 4 OF 4



SAMPLE IMAGE



<END>

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15.LD CHIP



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

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

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

: Please refer to following pages. Test Result(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.

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

15.LD CHIP



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

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			n.d.	1000
Monobromobiphenyl	mg/kg	T .	5	n.d.	5
Dibromobiphenyl	mg/kg	1	5	n.d.	
Tribromobiphenyl	mg/kg		5	n.d.	- J*-
Tetrabromobiphenyl	mg/kg		5	n.d.	11911
Pentabromobiphenyl	mg/kg		5	n.d.	
Hexabromobiphenyl	mg/kg	Ī	5	n.d.	· *
Heptabromobiphenyl	mg/kg	1	5	n.d.	1.8
Octabromobiphenyl	mg/kg		5	n.d.	LC
Nonabromobiphenyl	mg/kg		5	n.d.	
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6 (2015) and	5	n.d.	11.6
Sum of PBDEs	mg/kg	performed by GC/MS.	1.0	n.d.	1000
Monobromodiphenyl ether	mg/kg		5	n.d.	0.4
Dibromodiphenyl ether	mg/kg		5	n.d.	li linger
Tribromodiphenyl ether	mg/kg		5	n.d.	100
Tetrabromodiphenyl ether	mg/kg		5	n.d.	112
Pentabromodiphenyl ether	mg/kg		5	n.d.	in age
Hexabromodiphenyl ether	mg/kg		5	n.d.	P. D. TU
Heptabromodiphenyl ether	mg/kg		5	n.d.	-04
Octabromodiphenyl ether	mg/kg		5	n.d.	0.40.5
Nonabromodiphenyl ether	mg/kg		5	n.d.	1.6
Decabromodiphenyl ether	mg/kg	1	5	n.d.	- 5

15.LD CHIP



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

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		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	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	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		50	n.d.	1651
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)	mg/kg	With reference to BS EN 14582 (2016).	50	n.d.	•
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	Analysis was performed by IC.	50	n.d.	1 . 7 .
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).	10	n.d.	
PFOA (CAS No.: 335-67-1)	mg/kg	Analysis was performed by LC/MS.	10	n.d.	
Antimony (Sb)	mg/kg	William Communication Communic	2	n.d.	
Beryllium (Be)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	-
Phosphorus (P)	mg/kg	Analysis was performed by ICF-OES.	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

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15.LD CHIP



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

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. ($Cr^{\delta*}$ test method excluded)

Technician: Rita Chen Supervisor: Troy Chang Cutting · Preparation Sample Measurement Pb/Cd/Hg Cr6 Acid digestion with microwave / hotplate Non-metal Metal ABS / PC / PVC Others Filtration Boiling water extraction Dissolving by Digesting at ultrasonication 150~160°C Solution Residue Cool, filter digestate through Alkali fusion Digesting at 60°C Separating to get filter by ultrasonication 2) HCI to dissolve aqueous phase Add diphenylcarbazide for color ICP-OES development pH adjustment Measure the Add diphenyl-carbazide for absorbance at 540 color development nm by UV-VIS Measure the absorbance at

540 nm by UV-VIS

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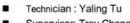


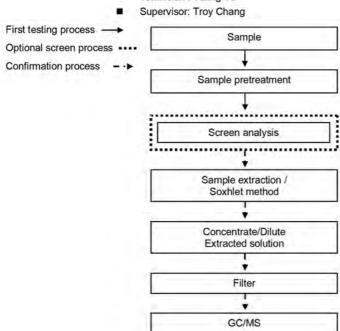
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ROHM CO., LTD.

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Analytical flow chart - PBB / PBDE





15.LD CHIP



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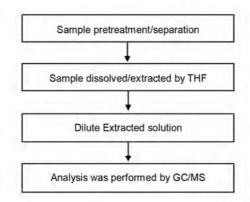
ROHM CO., LTD.

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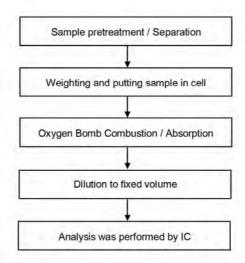
Test Report No.: CE/2019/A5280 Page: 8 of 11 Date: 2019/11/06

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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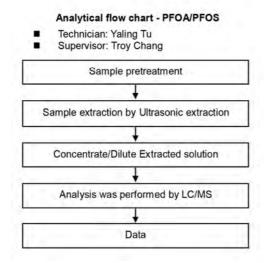
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ROHM CO., LTD.

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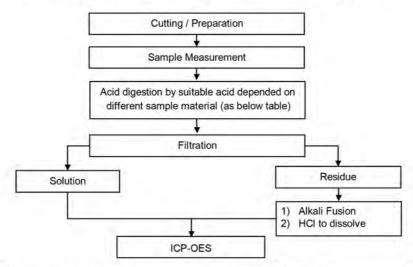
ROHM CO., LTD.

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 , HCI, HF, H ₂ O ₂
Glass	HNO₃/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Added appropriate reagent to total digestion

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

ROHM CO., LTD.

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

CE/2019/A5280

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** End of Report **

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16.SS



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

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

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

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

(1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Conclusion

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 -Signed for and behalf of SGS TAIWAN LTD. Chemical Laboratory - Taipei

16.SS



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

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	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	No.1 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		-	n.d.	1000
Monobromobiphenyl	mg/kg		5	n.d.	
Dibromobiphenyl	mg/kg	1	5	n.d.	
Tribromobiphenyl	mg/kg		5	n.d.	- 3
Tetrabromobiphenyl	mg/kg		5	n.d.	-
Pentabromobiphenyl	mg/kg	1	5	n.d.	-
Hexabromobiphenyl	mg/kg		5	n.d.	- 12
Heptabromobiphenyl	mg/kg	1	5	n.d.	1.8
Octabromobiphenyl	mg/kg	1	5	n.d.	104
Nonabromobiphenyl	mg/kg		5	n.d.	1 × ×
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6 (2015) and	5	n.d.	11.6
Sum of PBDEs	mg/kg	performed by GC/MS.	7.0	n.d.	1000
Monobromodiphenyl ether	mg/kg		5	n.d.	0.4
Dibromodiphenyl ether	mg/kg		5	n.d.	1109
Tribromodiphenyl ether	mg/kg		5	n.d.	-
Tetrabromodiphenyl ether	mg/kg		5	n.d.	12.
Pentabromodiphenyl ether	mg/kg		5	n.d.	19
Hexabromodiphenyl ether	mg/kg		5	n.d.	- 0.0
Heptabromodiphenyl ether	mg/kg		5	n.d.	184
Octabromodiphenyl ether	mg/kg		5	n.d.	9.5
Nonabromodiphenyl ether	mg/kg	1	5	n.d.	1.6
Decabromodiphenyl ether	mg/kg		5	n.d.	

16.SS



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

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		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	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	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		50	n.d.	165
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)	mg/kg	With reference to BS EN 14582 (2016).	50	n.d.	•
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	Analysis was performed by IC.	50	n.d.	1 . 7 .
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).	10	n.d.	1
PFOA (CAS No.: 335-67-1)	mg/kg	Analysis was performed by LC/MS.	10	n.d.	
Antimony (Sb)	mg/kg	WINE - C	2	166	
Beryllium (Be)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	
Phosphorus (P)	mg/kg	Analysis was performed by ICF-CES.	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

16.SS



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

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.

16.SS



Test Report No.: CE/2019/A5276 Page: 5 of 11 Date: 2019/11/06

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. ($Cr^{\delta*}$ test method excluded)

Technician: Rita Chen Supervisor: Troy Chang Cutting · Preparation Sample Measurement Pb/Cd/Hg Cr6 Acid digestion with microwave / hotplate Non-metal Metal ABS / PC / PVC Others Filtration Boiling water extraction Dissolving by Digesting at ultrasonication 150~160°C Solution Residue Cool, filter digestate through Alkali fusion Digesting at 60°C Separating to get filter by ultrasonication 2) HCI to dissolve aqueous phase Add diphenylcarbazide for color ICP-OES development pH adjustment Measure the Add diphenyl-carbazide for absorbance at 540 color development nm by UV-VIS

Measure the absorbance at 540 nm by UV-VIS

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16.SS

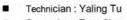


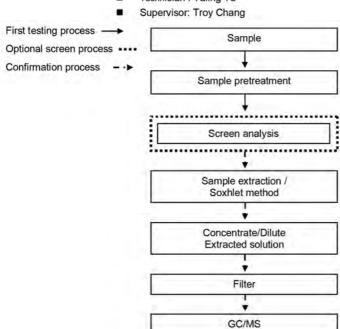
Test Report No.: CE/2019/A5276 Page: 6 of 11 Date: 2019/11/06

ROHM CO., LTD.

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Analytical flow chart - PBB / PBDE





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

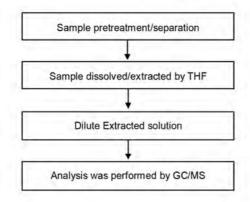
ROHM CO., LTD.

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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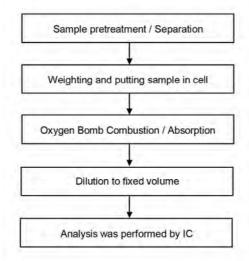
Test Report No.: CE/2019/A5276 Page: 8 of 11 Date: 2019/11/06

ROHM CO., LTD.

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Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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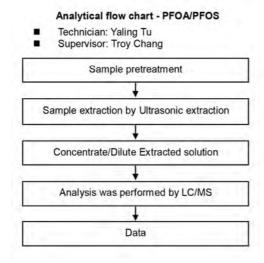
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ROHM CO., LTD.

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

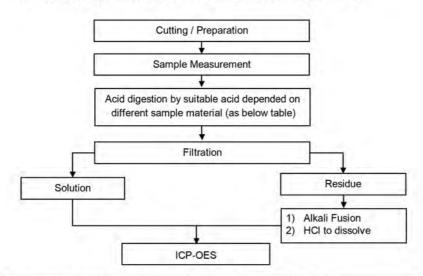
ROHM CO., LTD.

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 ₂ O ₂
Glass	HNO₃/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Added appropriate reagent to total digestion

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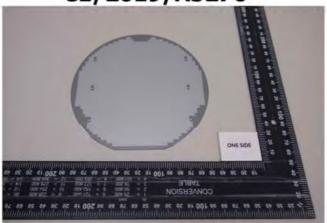
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 11 of 11

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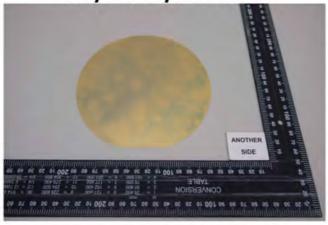
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

CE/2019/A5276



CE/2019/A5276



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17.PD



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

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

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

Conclusion

(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

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

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

(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 -Signed for and behalf of SGS TAIWAN LTD. Chemical Laboratory - Taipei

17.PD



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

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		Result	Limit
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	No.1 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		-	n.d.	1000
Monobromobiphenyl	mg/kg		5	n.d.	
Dibromobiphenyl	mg/kg	1	5	n.d.	
Tribromobiphenyl	mg/kg		5	n.d.	- 3
Tetrabromobiphenyl	mg/kg		5	n.d.	-
Pentabromobiphenyl	mg/kg		5	n.d.	-
Hexabromobiphenyl	mg/kg		5	n.d.	- 12
Heptabromobiphenyl	mg/kg		5	n.d.	1.8
Octabromobiphenyl	mg/kg	1	5	n.d.	104
Nonabromobiphenyl	mg/kg		5	n.d.	1 × ×
Decabromobiphenyl	mg/kg	With reference to IEC 62321-6 (2015) and	5	n.d.	11.6
Sum of PBDEs	mg/kg	performed by GC/MS.	7.0	n.d.	1000
Monobromodiphenyl ether	mg/kg		5	n.d.	0.
Dibromodiphenyl ether	mg/kg		5	n.d.	1109
Tribromodiphenyl ether	mg/kg		5	n.d.	-
Tetrabromodiphenyl ether	mg/kg		5	n.d.	12.
Pentabromodiphenyl ether	mg/kg		5	n.d.	19
Hexabromodiphenyl ether	mg/kg		5	n.d.	- 0.0
Heptabromodiphenyl ether	mg/kg		5	n.d.	184
Octabromodiphenyl ether	mg/kg		5	n.d.	9.5
Nonabromodiphenyl ether	mg/kg	1	5	n.d.	1.6
Decabromodiphenyl ether	mg/kg		5	n.d.	

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

ROHM CO., LTD.

21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Test Item(s)	Test Item(s) Unit Method		MDL	Result No.1	Limit
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		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	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		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		50	n.d.	137
Halogen-Chlorine (CI) (CAS No.: 22537-15-1)	mg/kg	With reference to BS EN 14582 (2016).	50	n.d.	1
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	Analysis was performed by IC.	50	n.d.	1 1 7 1
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).	10	n.d.	1
PFOA (CAS No.: 335-67-1)	mg/kg	Analysis was performed by LC/MS.	10	n.d.	T
Antimony (Sb)	mg/kg	WINE - C	2	125	- U-
Beryllium (Be)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	
Phosphorus (P)	mg/kg	Analysis was performed by ICF-CES.	2	11.7	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 Page: 4 of 11 Date: 2019/11/06

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

Technician: Rita Chen

2)

ICP-OES

HCI to dissolve

Analytical flow chart of Heavy Metal

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

Supervisor: Troy Chang Cutting · Preparation Sample Measurement Pb/Cd/Hg Cr6 Acid digestion with microwave / hotplate Non-metal Metal ABS / PC / PVC Others Filtration Boiling water extraction Dissolving by Digesting at ultrasonication 150~160°C Solution Residue Cool, filter digestate through Alkali fusion Digesting at 60°C Separating to get filter

by ultrasonication

aqueous phase

pH adjustment

Add diphenyl-carbazide for

color development

Measure the absorbance at 540 nm by UV-VIS

Add diphenylcarbazide for color

development

Measure the

absorbance at 540

nm by UV-VIS

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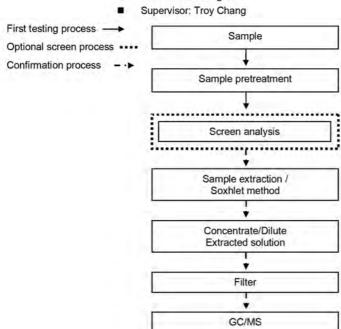
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ROHM CO., LTD.

21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - PBB / PBDE

Technician: Yaling Tu



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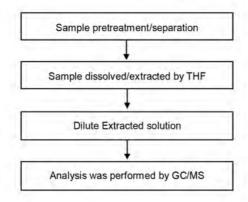
ROHM CO., LTD.

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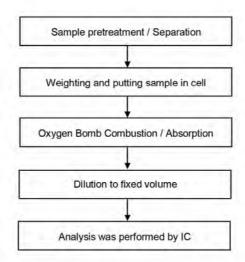
Test Report No.: CE/2019/A5277 Page: 8 of 11 Date: 2019/11/06

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21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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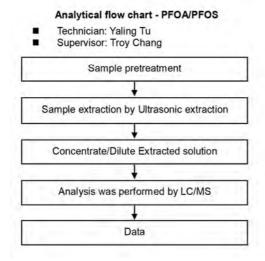
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Test Report No.: CE/2019/A5277 Page: 9 of 11 Date: 2019/11/06

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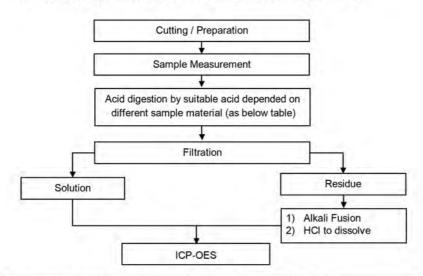
ROHM CO., LTD.

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 ₂ O ₂
Glass	HNO₃/HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Added appropriate reagent to total digestion

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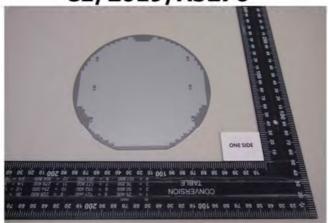
Test Report No. : CE/2019/A5276 Date : 2019/11/06 Page : 11 of 11

ROHM CO., LTD.

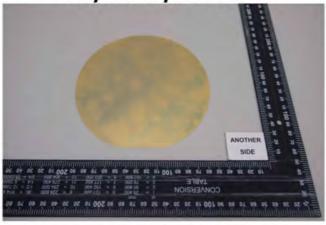
21, SAIIN MIZOSAKI-CHO, UKYOU-KU, KYOTO 615-8585, JAPAN

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

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18.Die Attach(In)

To whom it may concern,

Date: Nov 5 2019

Certificate of Chemical Ingredient for RoHS compatibility



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

1. Products: Indium Wire

2.Lot Number :

Analysis result:

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



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, 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 (RoHS 10 restricted substances)
Attachment 2: TK PASTE (Halogen 4 restricted substances)
Attachment 3: TK PASTE (RoHS 10 restricted substances)
Attachment 4: TK PASTE (Halogen 4 restricted substances)

19.Die Attach



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

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

SP18-033696 - SH SGS Job No.: Composition: conductive adhesive

09 Oct 2018 Date of Sample Received :

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).

Based on the performed tests on submitted sample(s), the results of Cadmium, Conclusion:

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



3"Building, No. 889 Yishan Road Xuhui District, Shanghai China 200233

t E&E (86-21) 61402553 f E&E (86-21)64953679 中国·上海·徐汇区宜山路889号3号楼 邮编: 200233

19.Die Attach



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	<u>Unit</u>	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	19-7	ND
Monobromobiphenyl	-	mg/kg	5	ND
Dibromobiphenyl	2	mg/kg	5	ND
Tribromobiphenyl	(¥)	mg/kg	5	ND
Tetrabromobiphenyl	-	mg/kg	5	ND
Pentabromobiphenyl	÷	mg/kg	5	ND
Hexabromobiphenyl	2	mg/kg	5	ND
Heptabromobiphenyl		mg/kg	5	ND
Octabromobiphenyl	-	mg/kg	5	ND
Nonabromobiphenyl	2	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. SHAEC18224891	02	Date:	16 Oct 2018	Page 3 of 6
Test Item(s)	<u>Limit</u>	<u>Unit</u>	MDL	<u>001</u>	
Pentabromodiphenyl ether	ė i	mg/kg	5	ND	
Hexabromodiphenyl ether	÷ 1	mg/kg	5	ND	
Heptabromodiphenyl ether	20	mg/kg	5	ND	
Octabromodiphenyl ether		mg/kg	5	ND	
Nonabromodiphenyl ether		mg/kg	5	ND	
Decabromodiphenyl ether	2514	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.



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Test Report

No. SHAEC1822489102

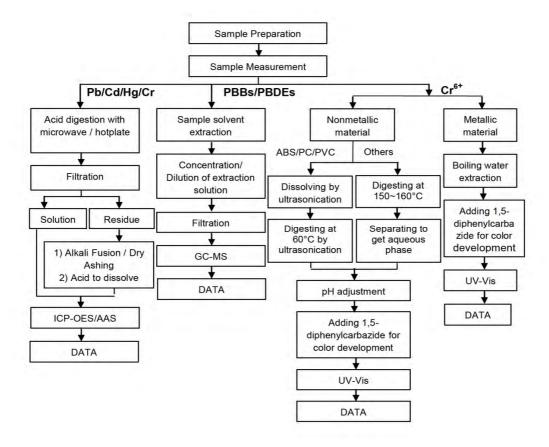
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Pb/Cd/Hg/Cr⁶⁺/PBBs/PBDEs Testing Flow Chart

1) These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ and PBBs/PBDEs test method excluded)





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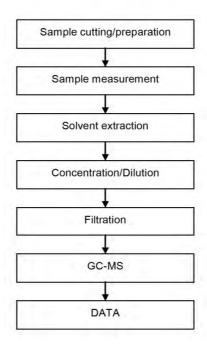
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Phthalates Testing Flow Chart





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Sample photo:



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20.Au Wire



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Test Report

No.: KA/2019/B0080A-02

Date: 2019/11/08

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

Sample Submitted By

Sample Description

Style/Item No. Au WIRE Color : GOLD : 2019/11/01 Sample Receiving Date

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).

: (1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Conclusion

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 Ph.D. / Ma Signed for and on beh

SGS Taiwan Limited

Chemical Laboratory-Kaoh

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

Test Result(s)

PART NAME NO.1 : Au BONDING WIRE

Test Item (s)	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.	1.3
Sum of PBBs	mg/kg		-	n.d.	1000
Monobromobiphenyl	mg/kg		5	n.d.	1.5
Dibromobiphenyl	mg/kg		5	n.d.	-
Tribromobiphenyl	mg/kg	With reference to IEC 62321-6:2015 and performed by GC/MS.	5	n.d.	
Tetrabromobiphenyl	mg/kg		5	n.d.	-
Pentabromobiphenyl	mg/kg		5	n.d.	- 2-
Hexabromobiphenyl	mg/kg		5	n.d.	1
Heptabromobiphenyl	mg/kg		5	n.d.	- 3
Octabromobiphenyl	mg/kg		5	n.d.	- 9
Nonabromobiphenyl	mg/kg	1	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	l'ann and a l'i	5	n.d.	1 14
Tribromodiphenyl ether	mg/kg		5	n.d.	-
Tetrabromodiphenyl ether	mg/kg	With reference to IEC 62224 6:2045	5	n.d.	
Pentabromodiphenyl ether	mg/kg	With reference to IEC 62321-6:2015 and performed by GC/MS.	5	n.d.	- 2
Hexabromodiphenyl ether	mg/kg	and portornied by Gorivio.	5	n.d.	- 4
Heptabromodiphenyl ether	mg/kg		5	n.d.	1.6
Octabromodiphenyl ether	mg/kg	i F	5	n.d.	- 3
Nonabromodiphenyl ether	mg/kg		5	n.d.	
Decabromodiphenyl ether	mg/kg		5	n.d.	- +

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Test Item (s)	Unit	it Method		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.	Q.
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 (CI) (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.	7.4
Halogen-lodine (I) (CAS No.: 14362-44-8)	mg/kg	With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	1.5
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.	-14	

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Test Item (s)	Unit	Method	MDL	Result	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	No.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 1µ

PFOS refer to Perfluoroctanesulfonic acid and its derivatives including Perfluoroctanesulfonic acid, Perfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamidoethanol and N-Ethylperfluoroctane sulfonamidoethanol.

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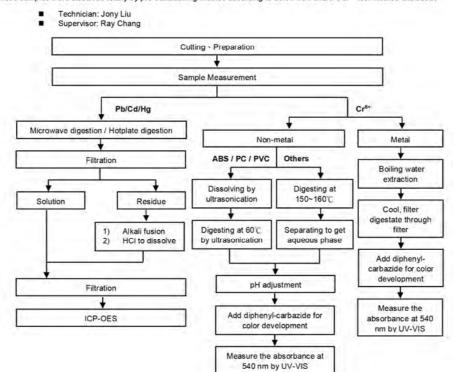
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Analytical flow chart of Heavy Metal

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



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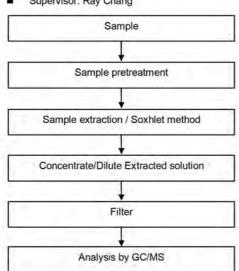
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PBB/PBDE analytical FLOW CHART

Technician: Dorothy Chen Supervisor: Ray Chang



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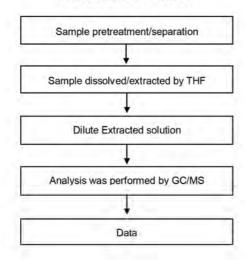
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Analytical flow chart of phthalate content

Technician: Dorothy ChenSupervisor: Ray Chang

[Test method: IEC 62321-8]



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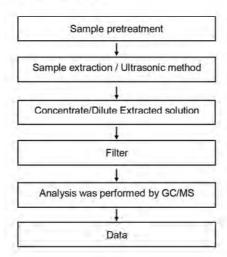
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HBCDD analytical flow chart

Technician: Dorothy Chen Supervisor: Ray Chang



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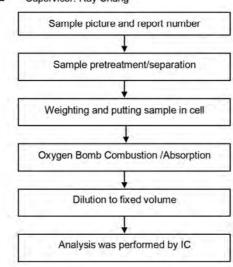
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Analytical flow chart of halogen content

Technician: Jean Hung Supervisor: Ray Chang



20.Au Wire



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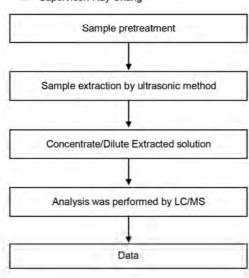
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Analytical flow chart of PFOA/PFOS content

Technician: Ginny Huang Supervisor: Ray Chang



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20.Au Wire



Test Report

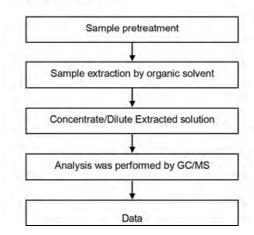
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Analytical flow chart of Dimethyl Fumarate content

Technician: Dorothy ChenSupervisor: Ray Chang



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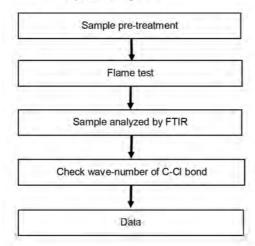
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Analysis flow chart for determination of PVC in polymer material

- Technician: Hannah Tai
- Supervisor: Roger Lin



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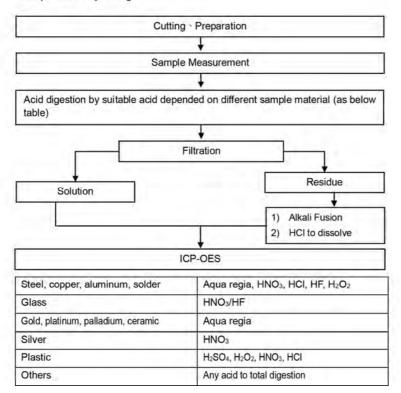


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Flow Chart of digestion for the elements analysis performed by ICP-OES

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

■ Technician: Jony Liu ■ Supervisor: Ray Chang



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

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** End of Report **

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