

## TEST REPORT

APPLICANT : Amkor Technology Korea, Inc.  
ADDRESS : 150, Songdomirae-ro, Yeonsu-gu,  
Incheon, Korea

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REPORT NO. RT24R-S8364-007-E

DATE: Dec. 20, 2024

SAMPLE DESCRIPTION : The following submitted sample(s) said to be:-

NAME/TYPE OF PRODUCT : Bumping - Plated layer (SnAg)  
SAMPLE ID NO. : RT24R-S8364-007  
ITEM NO. : Sputter + SnAg  
MANUFACTURER/VENDOR : Amkor Technology Korea, Inc.

SAMPLE RECEIVED : Dec. 10, 2024  
TESTING DATE : Dec. 10, 2024 ~ Dec. 20, 2024

TEST METHOD(S) : Please see the following page(s).  
TEST RESULT(S) : Please see the following page(s).

- \* Note 1 : The test results presented in this report refer only to the object tested.
- \* Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.
- \* Note 3 : The item no. is assigned by client and indicated according to their requirement and guarantee letter.

Approved by,



Jade Jang / Lab. Technical Manager

Authorized by,



Bo Park / Lab. General Manager



Authenticity check

Intertek Testing Services Korea Ltd.  
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## TEST REPORT

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DATE: Dec. 20, 2024

REPORT NO. RT24R-S8364-007-E

SAMPLE ID NO. : RT24R-S8364-007  
SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)

TEST ITEM	UNIT	TEST METHOD	MDL	RESULT
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 Edition 1.0 : 2013, by acid digestion and determined by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg		5	N.D.
Mercury (Hg)	mg/kg	With reference to IEC 62321-4 : 2013/AMD1 : 2017, by acid digestion and determined by ICP-OES	2	N.D.
Hexavalent Chromium (Cr <sup>6+</sup> )	mg/kg	With reference to IEC 62321-7-2 Edition 1.0 : 2017, by alkaline/toluene digestion and determined by UV-VIS Spectrophotometer	8	N.D.
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	5	N.D.
Dibromobiphenyl	mg/kg		5	N.D.
Tribromobiphenyl	mg/kg		5	N.D.
Tetrabromobiphenyl	mg/kg		5	N.D.
Pentabromobiphenyl	mg/kg		5	N.D.
Hexabromobiphenyl	mg/kg		5	N.D.
Heptabromobiphenyl	mg/kg		5	N.D.
Octabromobiphenyl	mg/kg		5	N.D.
Nonabromobiphenyl	mg/kg		5	N.D.
Decabromobiphenyl	mg/kg		5	N.D.
Polybrominated Diphenyl Ether (PBDEs)				
Monobromodiphenyl ether	mg/kg	With reference to IEC 62321-6 Edition 1.0 : 2015, by solvent extraction and determined by GC/MS	5	N.D.
Dibromodiphenyl ether	mg/kg		5	N.D.
Tribromodiphenyl ether	mg/kg		5	N.D.
Tetrabromodiphenyl ether	mg/kg		5	N.D.
Pentabromodiphenyl ether	mg/kg		5	N.D.
Hexabromodiphenyl ether	mg/kg		5	N.D.
Heptabromodiphenyl ether	mg/kg		5	N.D.
Octabromodiphenyl ether	mg/kg		5	N.D.
Nonabromodiphenyl ether	mg/kg		5	N.D.
Decabromodiphenyl ether	mg/kg		5	N.D.

Tested by : Jooyeon Lee, Chano Kim, Hayan Park

Notes : mg/kg = ppm = parts per million  
< = Less than  
N.D. = Not detected ( <MDL )  
MDL = Method detection limit

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DATE: Dec. 20, 2024

SAMPLE ID NO. : RT24R-S8364-007

SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)

TEST ITEM	UNIT	TEST METHOD	MDL	RESULT
Bromine (Br)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Chlorine (Cl)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Fluorine (F)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.
Arsenic (As)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Beryllium (Be)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Antimony (Sb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Perfluorooctanoic acid (PFOA)	mg/kg	With reference to US EPA 3550C/8321B, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.025	N.D.
Perfluorooctane sulfonate (PFOS)	mg/kg	With reference to US EPA 3550C/8321B, by ultrasonic extraction and determined by LC/MS or LC/MS/MS	0.025	N.D.

Tested by : Chano Kim, Jooyeon Lee, Hayan Park

Notes : mg/kg = ppm = parts per million

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MDL = Method detection limit

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REPORT NO. RT24R-S8364-007-E

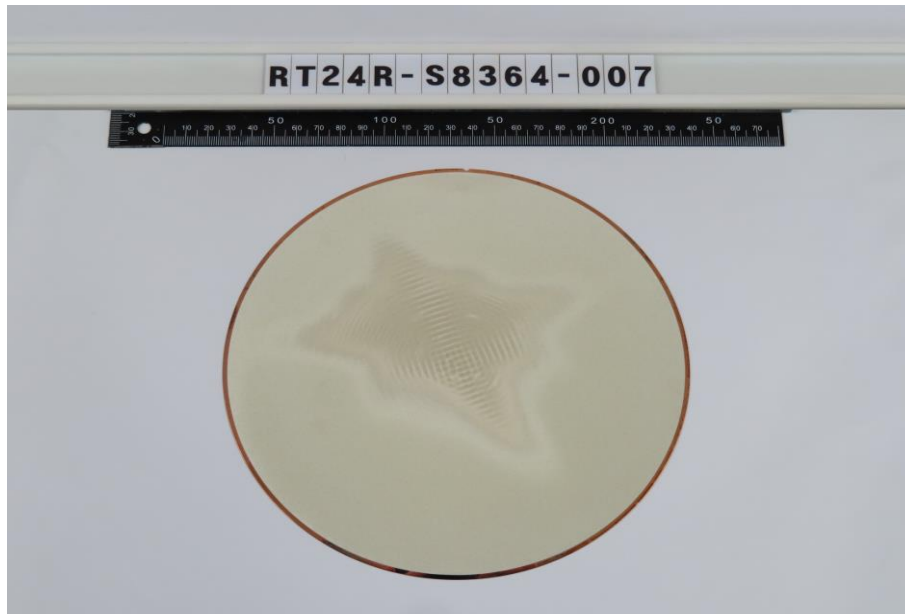
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SAMPLE ID NO. : RT24R-S8364-007

SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)

\* View of sample as received;-



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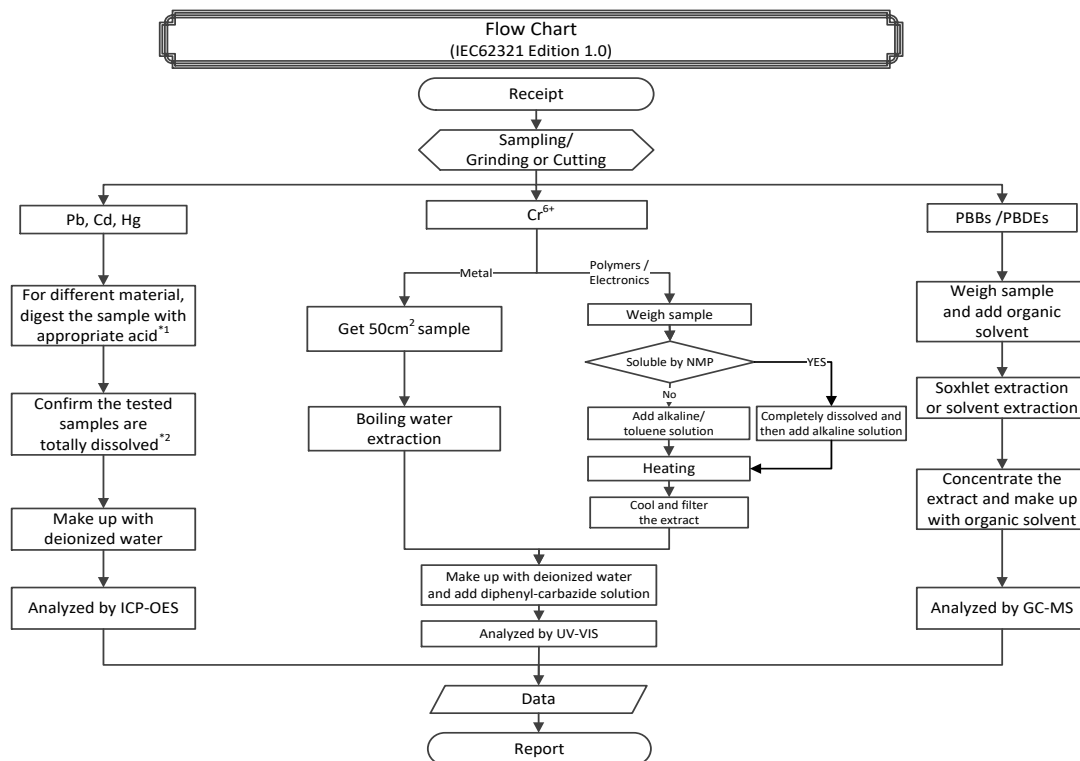
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DATE: Dec. 20, 2024

SAMPLE ID NO. : RT24R-S8364-007

SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)



**Remarks :**

\*1 : List of appropriate acid :

Material	Acid added for digestion
Polymers	HNO <sub>3</sub> , HCl, HF, H <sub>2</sub> O <sub>2</sub> , H <sub>3</sub> BO <sub>3</sub>
Metals	HNO <sub>3</sub> , HCl, HF
Electronics	HNO <sub>3</sub> , HCl, H <sub>2</sub> O <sub>2</sub> , HBF <sub>4</sub>

\*2 : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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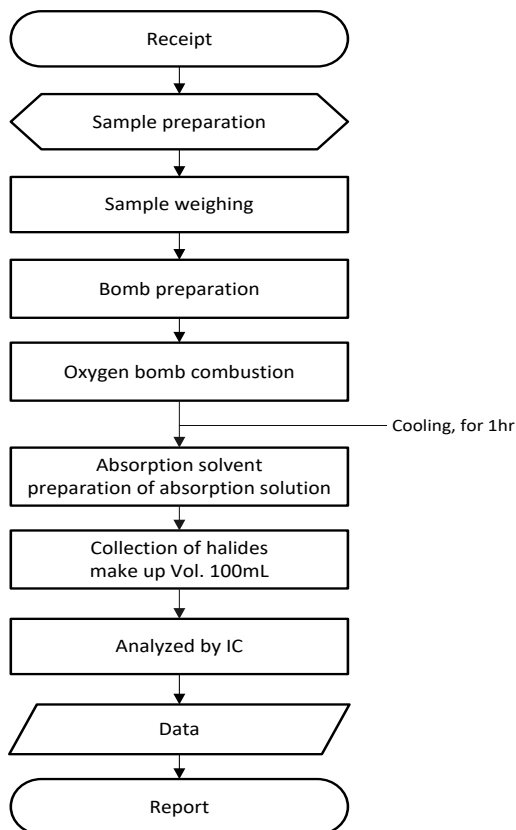
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SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)

### Flow Chart (EN14582)



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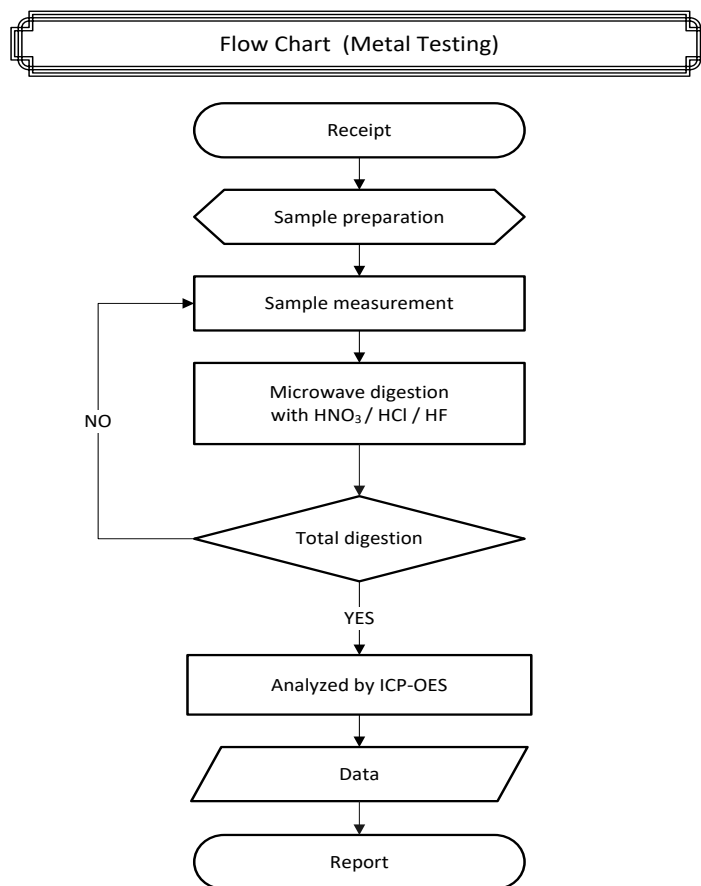
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SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)



\*\* Remarks : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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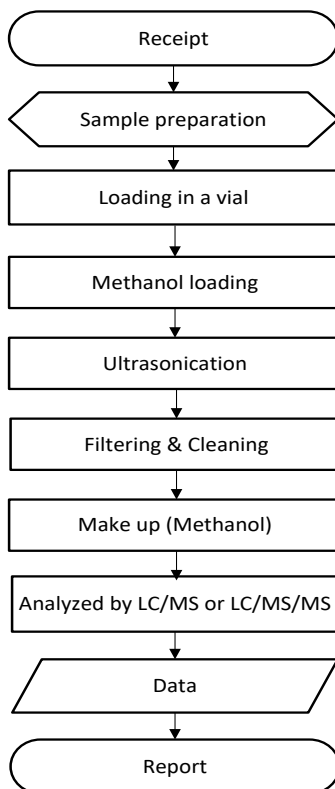
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SAMPLE DESCRIPTION : Bumping - Plated layer (SnAg)

### Flow Chart (PFOS, PFOA)



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

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