

TEST REPORT

APPLICANT : SAMSUNG ELECTRONICS Co., Ltd.
ADDRESS : 1, Samsungjeonja-ro,
Hwaseong-si, Gyeonggi-do, Korea

PAGE: 1 of 7

REPORT NO. RT23R-S0559-004-E1

DATE: Feb. 02, 2023

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

NAME/TYPE OF PRODUCT : 12inch wafer (No C/F, No Bump)
NAME OF MATERIAL : Wafer (Patterned)
SAMPLE ID NO. : RT23R-S0559-004
MANUFACTURER/VENDOR : SAMSUNG ELECTRONICS Co., Ltd.
NAME OF BUYER : SAMSUNG ELECTRONICS Co., Ltd.

SAMPLE RECEIVED : Jan. 26, 2023
TESTING DATE : Jan. 26, 2023 ~ Feb. 02, 2023

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.

Approved by,



Jade Jang / Lab. Technical Manager

Authorized by,



Bo Park / Lab. General Manager



Authenticity check

Intertek Testing Services Korea Ltd.
Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0025 Web Site : intertek.co.kr
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REPORT NO. RT23R-S0559-004-E1

SAMPLE ID NO. : RT23R-S0559-004

SAMPLE DESCRIPTION : 12inch wafer (No C/F, No Bump)

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 ⁶⁺)	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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TEST REPORT

PAGE: 3 of 7

DATE: Feb. 02, 2023

REPORT NO. RT23R-S0559-004-E1

SAMPLE ID NO. : RT23R-S0559-004

SAMPLE DESCRIPTION : 12inch wafer (No C/F, No Bump)

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.
Iodine (I)	mg/kg	With reference to EN 14582, by oxygen combustion with bomb and determined by IC	30	N.D.

Tested by : Chano Kim

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PAGE: 4 of 7
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REPORT NO. RT23R-S0559-004-E1

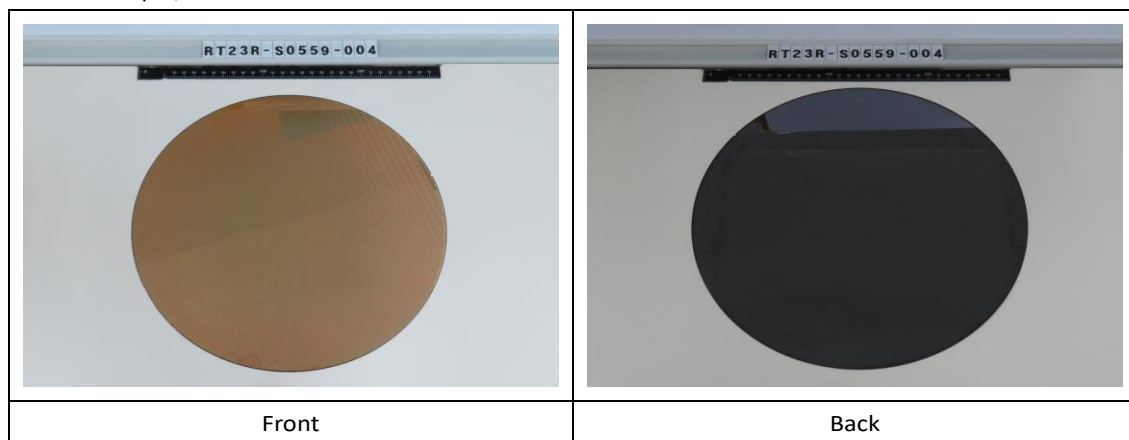
SAMPLE ID NO. : RT23R-S0559-004
SAMPLE DESCRIPTION : 12inch wafer (No C/F, No Bump)

TEST ITEM	CAS NO.	UNIT	TEST METHOD	MDL	RESULT
Dibutyl phthalate (DBP)	84-74-2	mg/kg	With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS	50	N.D.
Di(2-ethylhexyl) phthalate (DEHP)	117-81-7	mg/kg		50	N.D.
Benzyl butyl phthalate (BBP)	85-68-7	mg/kg		50	N.D.
Diisobutyl phthalate (DIBP)	84-69-5	mg/kg		50	N.D.

Tested by : Hayan Park

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* View of sample;-



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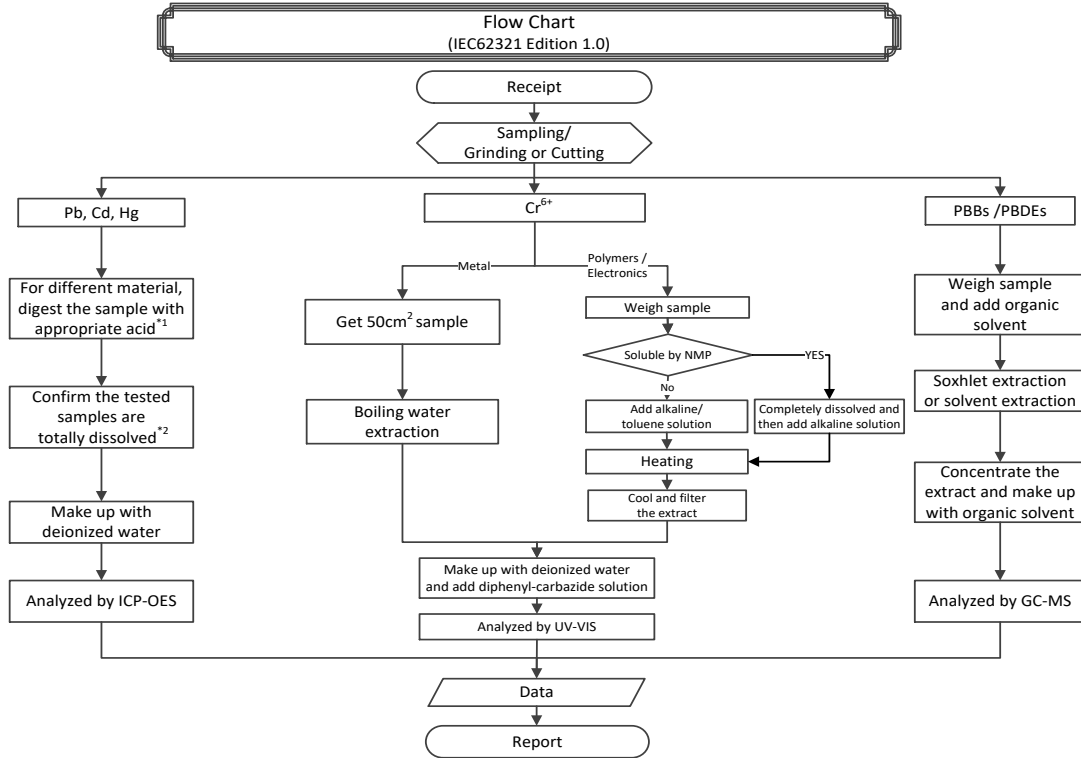


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SAMPLE ID NO. : RT23R-S0559-004
SAMPLE DESCRIPTION : 12inch wafer (No C/F, No Bump)



Remarks :

*1 : List of appropriate acid :

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

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



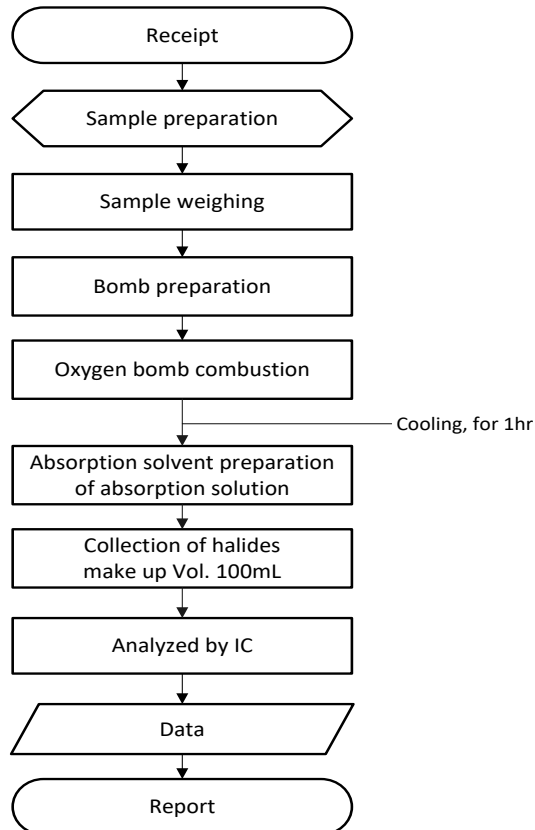
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Flow Chart (EN14582)



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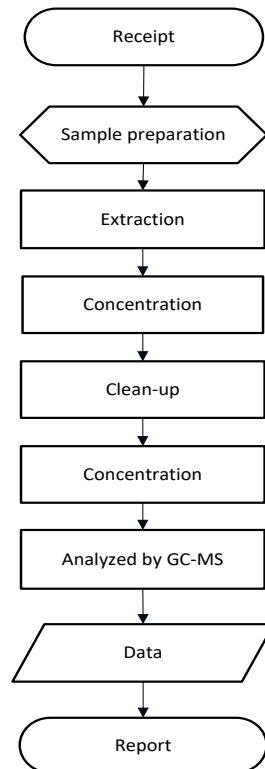
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PAGE: 7 of 7
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SAMPLE ID NO. : RT23R-S0559-004
SAMPLE DESCRIPTION : 12inch wafer (No C/F, No Bump)

Flow Chart (Phthalates)



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

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