TEST REPORT

Applicant : Samsung Electro-Mechanics Co., Ltd.

Address : 314, Maetan-3dong, Yeongtong-gu,
Suwon-si, Gyeonggi-do, 443-743 Korea

Report No. RT12R-S0178-017-E Date: Jan. 20, 2012

Sample Description	: The following submitted sample(s) said to be:-
Name/Type of Product	: Ceramic Chip Capacitor (MLCC)
Name of Material	: Materials are ceramic & metal / BrownCeramic, SilverMetal
Sample ID No.	: RT12R-S0178-017
Item No.	: MLCC B(X7R) TYPE (CL**B**********)
Manufacturer/Vender	: Samsung Electro-Mechanics Co., Ltd.
Sample received	: Jan. 13, 2012
Testing Date	: Jan. 13, 2012 ~ Jan. 20, 2012
Testing Environment	: Temperature : (24 ± 2) ℃, Humidity : (60 ± 5) % R.H.
Test Type	: RoHS wet chemical analysis
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 relate 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

Intertek Testing Services Korea Ltd.

Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0026 Daegu Office : Tel : 053-600-8647 Fax : 053-600-8645 Web Site : www.Intertek.co.kr
Seoul Lab. Address : 1/F, A-ju Digital Tower, #284-56, Seongsu 2-ga, Seongdong-Gu, Seoul, 133-833 Korea
Ulsan Lab. Address : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun, Ulsan 689-865 Korea

TEST REPORT

Report No. RT12R-S0178-017-E Date: Jan. 20, 2012

Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)

Test Item	Unit	Test Method	MDL	Result
Cadmium (Cd)	mg/kg	With reference to IEC 62321 Edition 1.0 : 2008, by acid digestion and determined by ICP-OES	0.5	N.D.
Lead (Pb)	mg/kg		5	N.D.
Mercury (Hg)	mg/kg		2	N.D.
Hexavalent Chromium (Cr^{6+}) (For non-metal)	mg/kg	With reference to IEC 62321 Edition 1.0 : 2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1	N.D.
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg	With reference to IEC 62321 Edition 1.0 : 2008, 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 Edition 1.0 : 2008, 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 : Nikkie Lee, Leo Kim, Ellen Jung, Jessica Kang

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

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TEST REPORT

Report No. RT12R-S0178-017-E Date: Jan. 20, 2012

Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)

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.
Antimony (Sb)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Phthalates				
Dibutyl phthalate (DBP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	50	N.D.
Di(2-ethylhexyl) phthalate (DEHP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	50	N.D.
Di-n-octyl phthalate (DNOP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	50	N.D.
Diisononyl phthalate* (DINP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	100	N.D.
Diisodecyl phthalate** (DIDP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	100	N.D.
Benzyl butyl phthalate (BBP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	50	N.D.
Diisobutyl phthalate (DIBP)	mg/kg	With reference to US EPA 8061A, by solvent extraction and determined by GC/MS	50	N.D.

Tested by : Nikkie Lee, Ellen Jung

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

* DINP include two types of phthalate (CAS No. 68515-48-0 and 28553-12-0).
** DIDP include two types of phthalate (CAS No. 68515-49-1 and 26761-40-0).

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Sample ID No. : RT12R-S0178-017
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* View of sample as received;-

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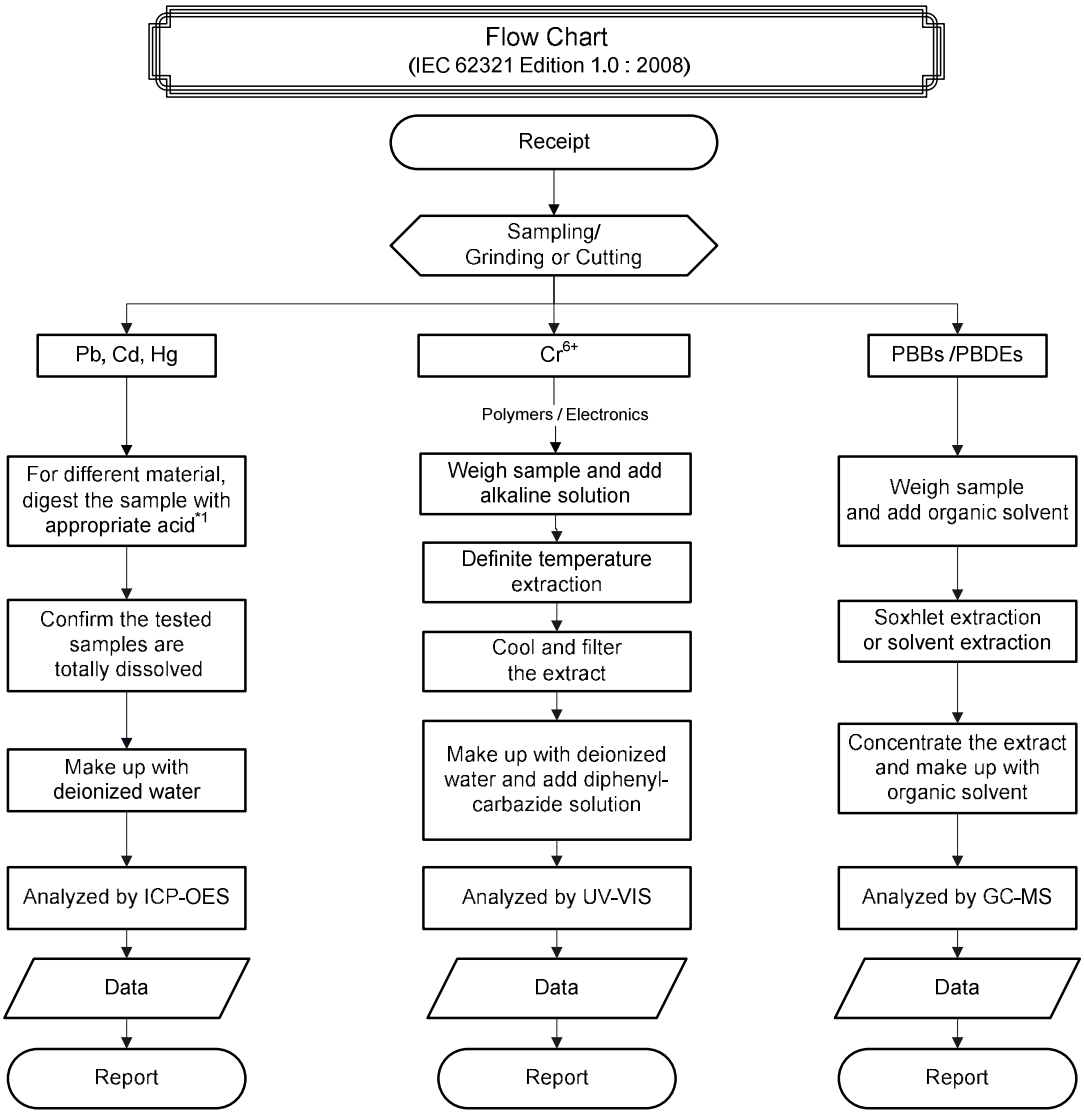
Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)



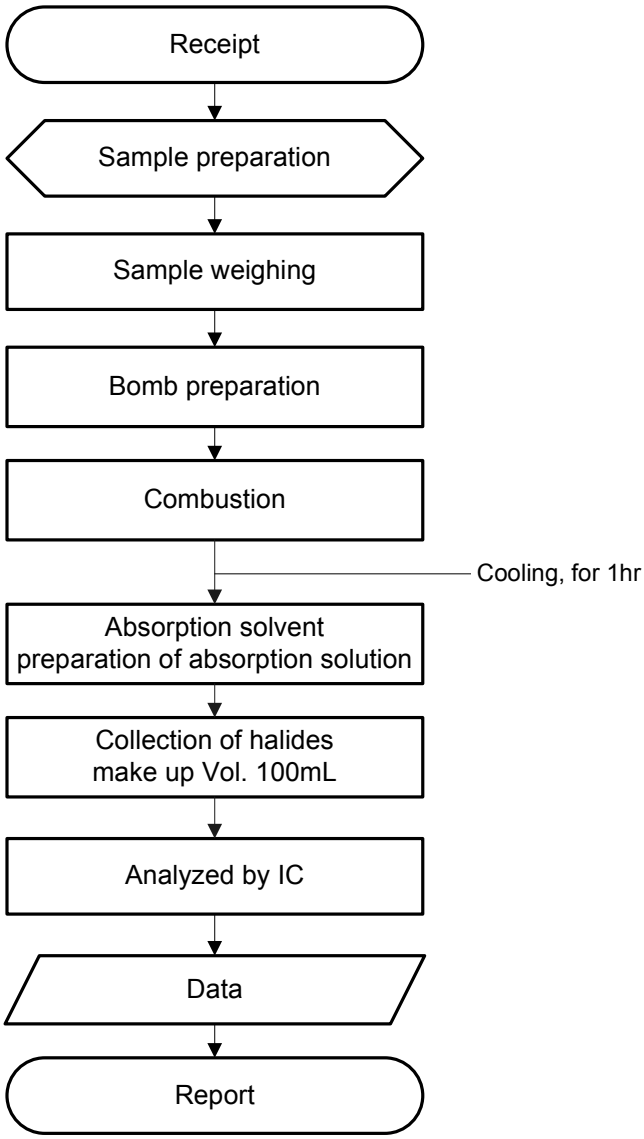
Remarks :

*1 : List of appropriate acid :

Material	Acid added for digestion
Polymers	HNO_3, HCl, HF, H_2O_2, H_3BO_3
Metals	HNO_3, HCl, HF
Electronics	HNO_3, HCl, H_2O_2, HBF_4

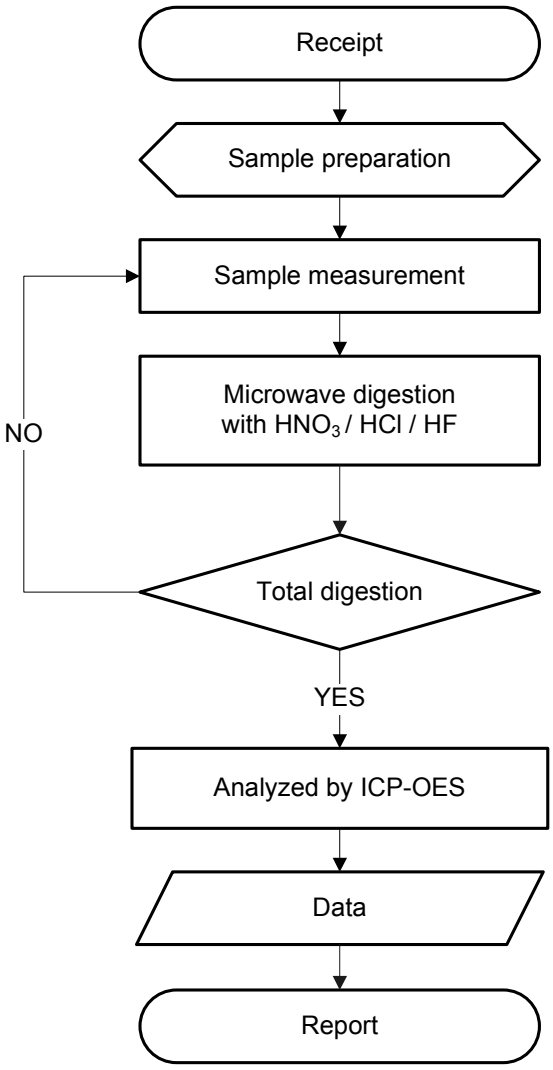
Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)

Flow Chart (Halogen)



Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)

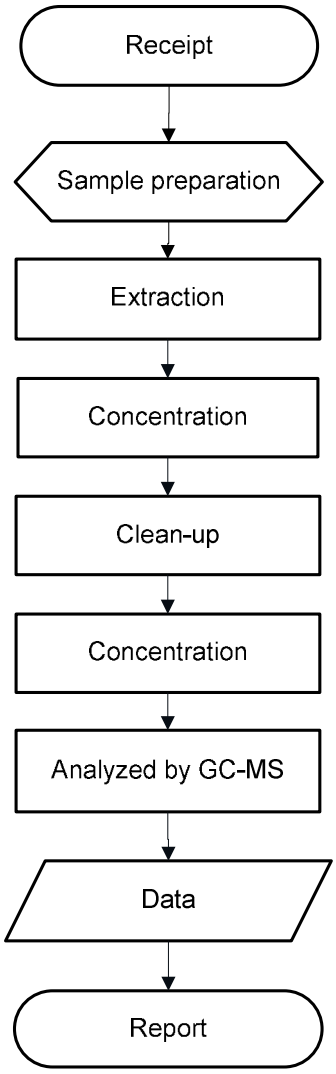
Flow Chart (Metal Testing)



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

Sample ID No. : RT12R-S0178-017
Sample Description : Ceramic Chip Capacitor (MLCC)

Flow Chart (Phthalates)



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