

TEST REPORT

APPLICANT : KOSTIC KOREA LTD.
ADDRESS : 120, LG-ro 360beon-gil, Wollong-myeon,
Paju-si, Gyeonggi-do, Korea

PAGE: 1 of 10

REPORT NO. RT18R-S3327-005-E

DATE: Jul. 31, 2018

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

NAME/TYPE OF PRODUCT : Release Film
NAME OF MATERIAL : PET, Si
SAMPLE ID NO. : RT18R-S3327-005
ITEM NO. : KBS, KCS, KDS Release Film
MANUFACTURER/VENDOR : KOSTIC KOREA LTD.
NAME OF BUYER : LG, SAMSUNG

SAMPLE RECEIVED : Jul. 25, 2018
TESTING DATE : Jul. 25, 2018 ~ Jul. 31, 2018

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



Authenticity check

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TEST REPORT

PAGE: 2 of 10
DATE: Jul. 31, 2018

REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

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 Edition 1.0 : 2013, 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, Seulgi Park, Sujung Lee

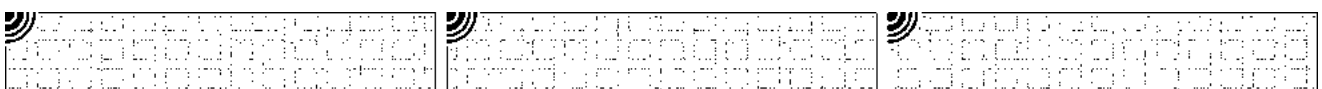
Notes : mg/kg = ppm = parts per million
< = Less than
N.D. = Not detected (<MDL)
MDL = Method detection limit

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DATE: Jul. 31, 2018

REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

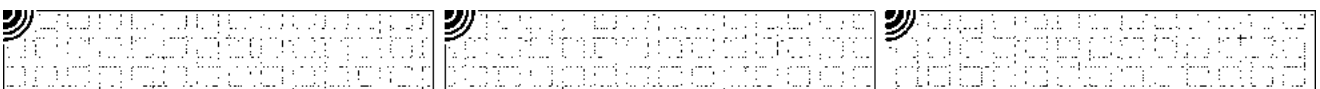
SAMPLE DESCRIPTION : Release Film

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.
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	138

Tested by : Hyojoo kim, Jooyeon Lee

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PAGE: 4 of 10
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REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

TEST ITEM	CAS NO.	UNIT	TEST METHOD	MDL	RESULT
Phthalates					
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.
Di-n-octyl phthalate (DNOP)	117-84-0	mg/kg		50	N.D.
Diisononyl phthalate (DINP)	28553-12-0 68515-48-0	mg/kg		100	N.D.
Diisodecyl phthalate (DIDP)	26761-40-0 68515-49-1	mg/kg		100	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.
Di-n-pentyl phthalate (DPP)	131-18-0	mg/kg		50	N.D.
Di-n-hexyl phthalate (DNHP)	84-75-3	mg/kg		50	N.D.
1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	71888-89-6	mg/kg		50	N.D.
1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	mg/kg		50	N.D.
Di(2-methoxyethyl) phthalate (DMEP)	117-82-8	mg/kg		50	N.D.

Tested by : Sujung Lee

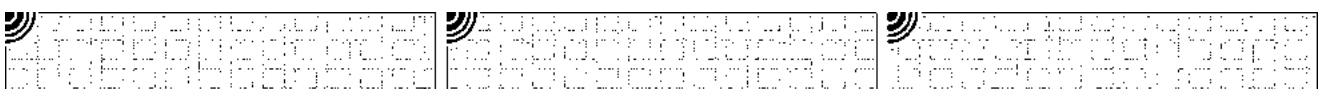
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SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

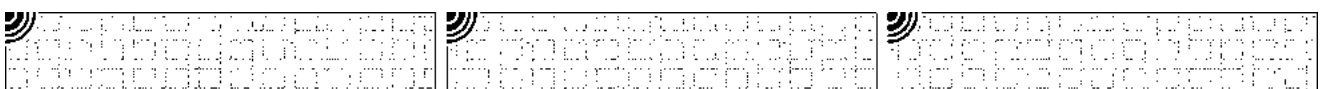
TEST ITEM	CAS NO.	UNIT	TEST METHOD	MDL	RESULT
Diisopentyl phthalate (DIPP)	605-50-5	mg/kg	With reference to IEC 62321-8 Edition 1.0 : 2017, by solvent extraction and determined by GC/MS	50	N.D.
N-pentyl-isopentylphthalate (NPIP)	776297-69-9	mg/kg		50	N.D.
1,2-Benzenedicarboxylic acid, dihexylester, branched and linear	68515-50-4	mg/kg		50	N.D.
Hexahydromethylphthalic anhydride ¹⁾ , Hexahydro-4-methylphthalic anhydride ²⁾ , Hexahydro-1-methylphthalic anhydride ³⁾ , Hexahydro-3-methylphthalic anhydride ⁴⁾ *	25550-51-0 19438-60-9 48122-14-1 57110-29-9	mg/kg		100	N.D.
1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate	68515-51-5 68648-93-1	mg/kg		100	N.D.
Dicyclohexyl phthalate (DCHP)	84-61-7	mg/kg		50	N.D.

Tested by : Sujung Lee

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* The individual isomers 2), 3) and 4) (including their cis- and trans- stereo isomeric forms) and all possible combinations of the isomers 1) are covered by this entry.

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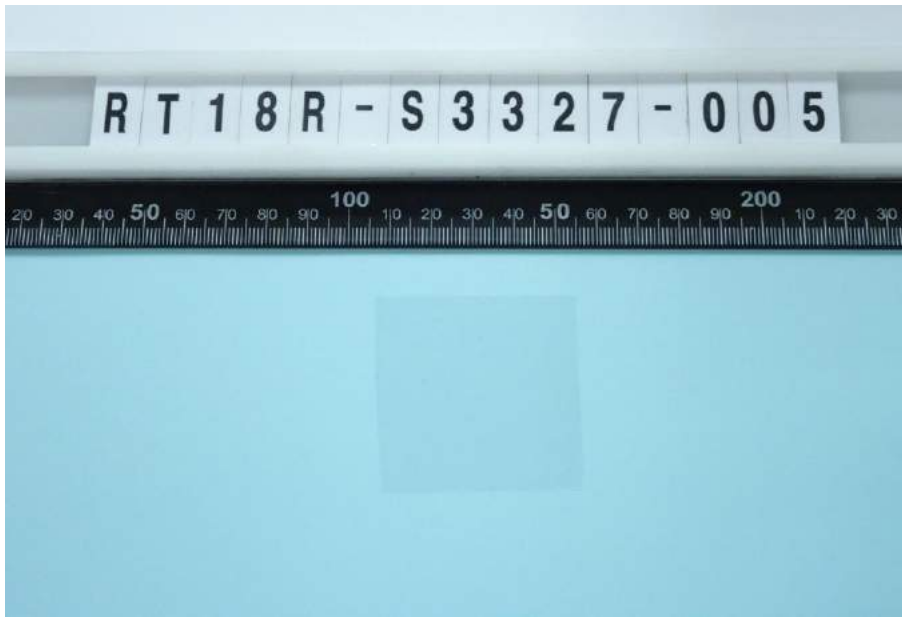
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REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

* View of sample as received;-

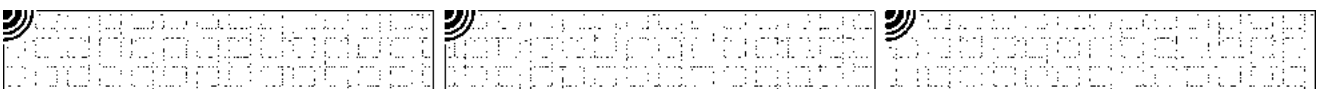


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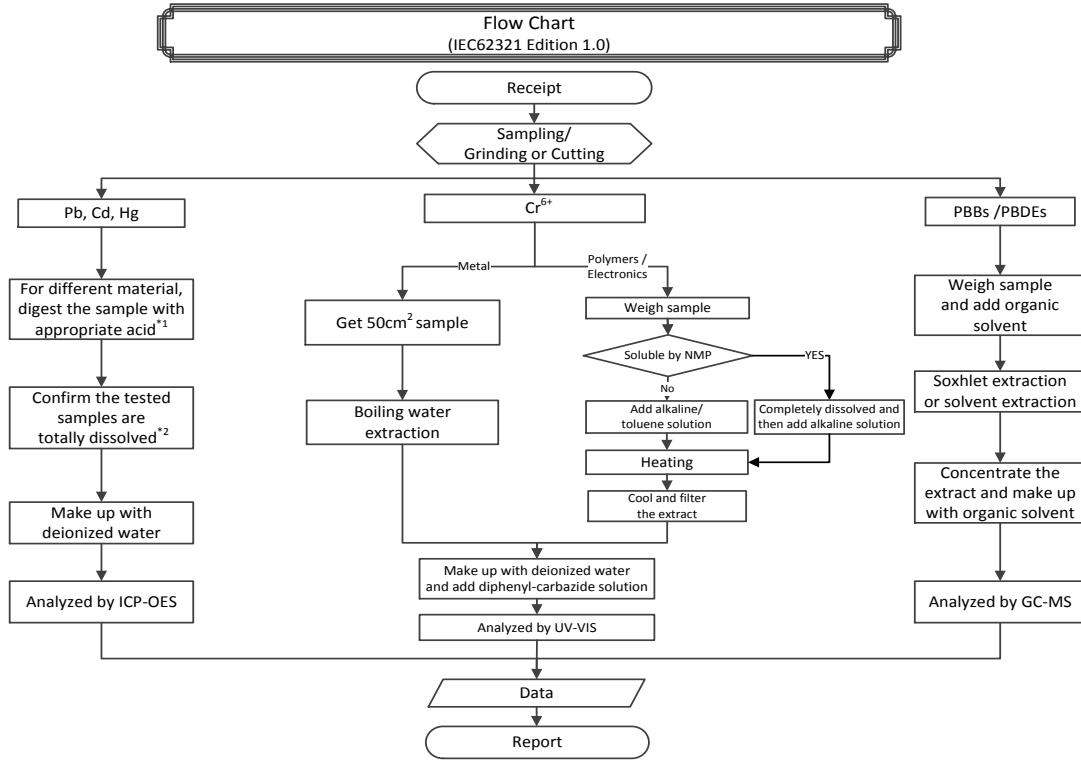
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SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film



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

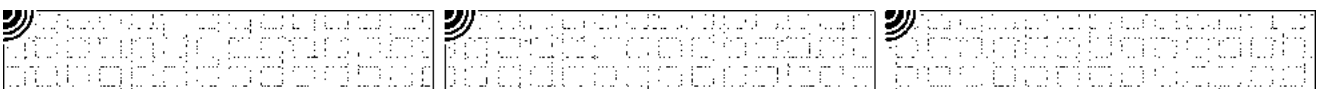
*2 : The samples were dissolved totally by pre-conditioning method according to above flow chart.

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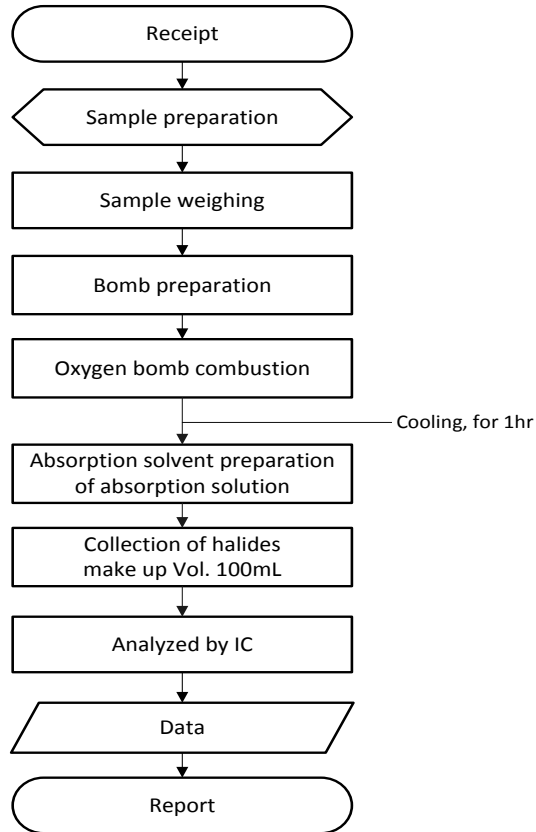
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SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

Flow Chart (EN14582)

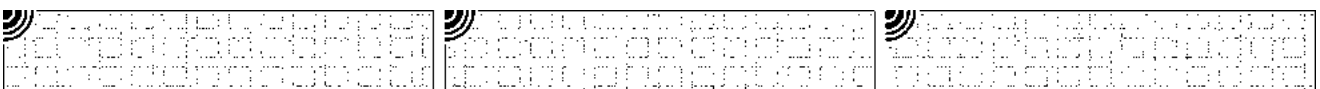


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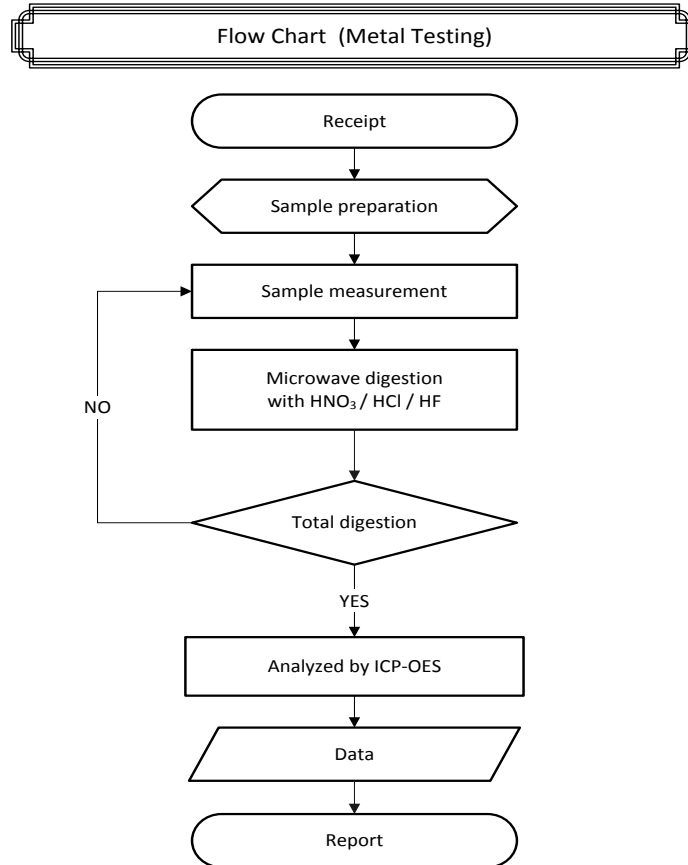
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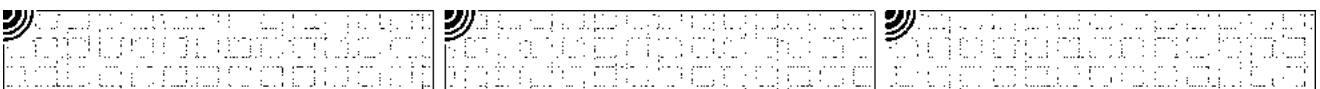
REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film



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



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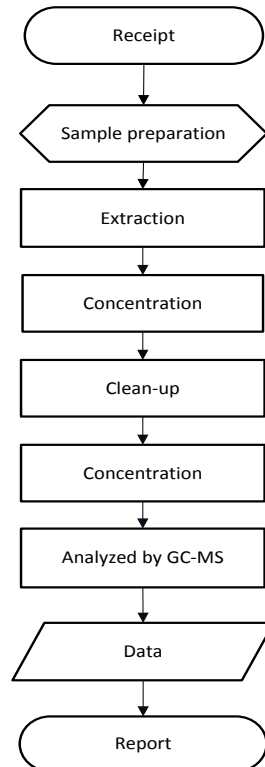
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REPORT NO. RT18R-S3327-005-E

SAMPLE ID NO. : RT18R-S3327-005

SAMPLE DESCRIPTION : Release Film

Flow Chart (Phthalates)



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

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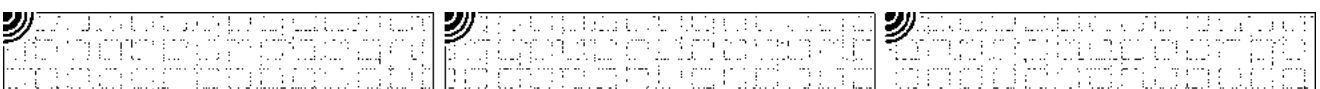
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