



TEST REPORT

Applicant : INNOX Corporation
Address : I6-1BL Asan Techno Valley, Dunpo-myeon,
Asan-city, Chungcheongnam-do, Korea

Page: 1 of 17

Report No. RT12R-S1076-003-E1

Date: Mar. 22, 2012

Sample Description : The following submitted sample(s) said to be:-

Name/Type of Product : Halogen Free Coverlay
Sample ID No. : RT12R-S1076-003
Item No. : MAH
Manufacturer/Vender : INNOX Corporation

Sample received : Mar. 13, 2012
Testing Date : Mar. 13, 2012 ~ Mar. 22, 2012
Testing Environment : Temperature : (24 ± 2) °C, 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

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

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

Page: 2 of 17
Date: Mar. 22, 2012

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

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

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

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-S1076-003-E1

Page: 3 of 17
Date: Mar. 22, 2012

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

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	366
Beryllium (Be)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Antimony Trioxide (Sb ₂ O ₃)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Tin (Sn)	mg/kg	With reference to US EPA 3052, by acid digestion and determined by ICP-OES	2	N.D.
Polyvinyl chloride (PVC)	-	With reference to KS K 0210-1, and determined by FT-IR	N.A.	Negative
Asbestos	-	Determined by FT-IR	N.A.	Negative

Tested by : Nikkie Lee, Leo Kim

Notes : mg/kg = ppm = parts per million

< = Less than

N.D. = Not detected (<MDL)

MDL = Method detection limit

N.A. = Not applicable

Negative = Undetectable

Positive = Detectable

Sb₂O₃ calculated from Sb by the equation.

$$\begin{aligned} * \text{Sb}_2\text{O}_3 \text{ concentration} &= (\text{Sb}_2\text{O}_3 \text{ molecular weight} \times \text{Sb concentration}) / (2 \times \text{Sb molecular weight}) \\ &= 1.197 \times \text{Sb concentration} \end{aligned}$$

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

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

Page: 4 of 17
Date: Mar. 22, 2012

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Test Item	Unit	Test Method	MDL	Result
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 : 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).

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

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-S1076-003-E1

Page: 5 of 17
Date: Mar. 22, 2012

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Test Item	Unit	Test Method	MDL	Result
Pentachlorophenol (PCP)	mg/kg	With reference to DIN 53313, by solvent extraction and determined by GC/MS	5	N.D.
Medium-chain chlorinated paraffin (MCCP)	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS and/or GC/ECD	10	N.D.
Tetrabromobisphenol-A (TBBP-A)	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS	5	N.D.
Hexabromocyclododecane (HBCDD)	mg/kg	With reference to US EPA 3540C, by solvent extraction and determined by GC/MS	10	N.D.
Bisphenol A (BPA)	mg/kg	With reference to In-house method, determined by LC/MS/MS	0.1	N.D.
Perfluorooctanoic acid (PFOA)	mg/kg	With reference to US EPA 3550C & 8321B, by ultrasonic extraction and determined by LC/MS/MS	0.1	N.D.
Perfluorooctane sulfonate (PFOS)	mg/kg	With reference to US EPA 3550C & 8321B, by ultrasonic extraction and determined by LC/MS/MS	0.1	N.D.

Tested by : Ellen Jung

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

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

Intertek Testing Services Korea Ltd.

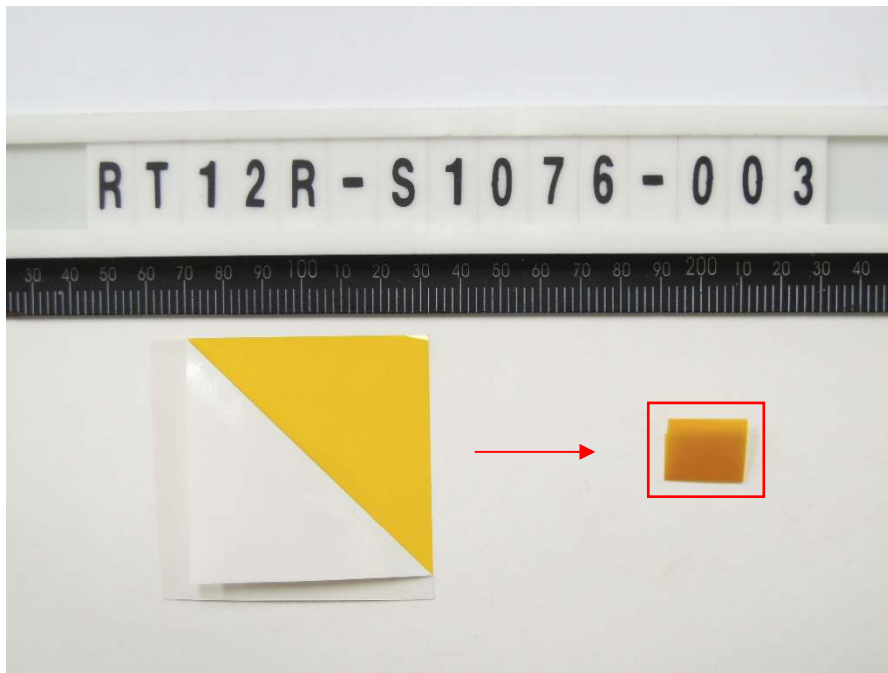
Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0026 Daegu Office : Tel : 053-600-8647 Fax : 053-600-8645 Web Site : www.Intertek.co.kr
Seoul Lab. Address : 1/F, A-ju Digital Tower, #284-56, Seongsu 2-ga, Seongdong-Gu, Seoul, 133-833 Korea
Ulsan Lab. Address : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun,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

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

* View of sample as received;-



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

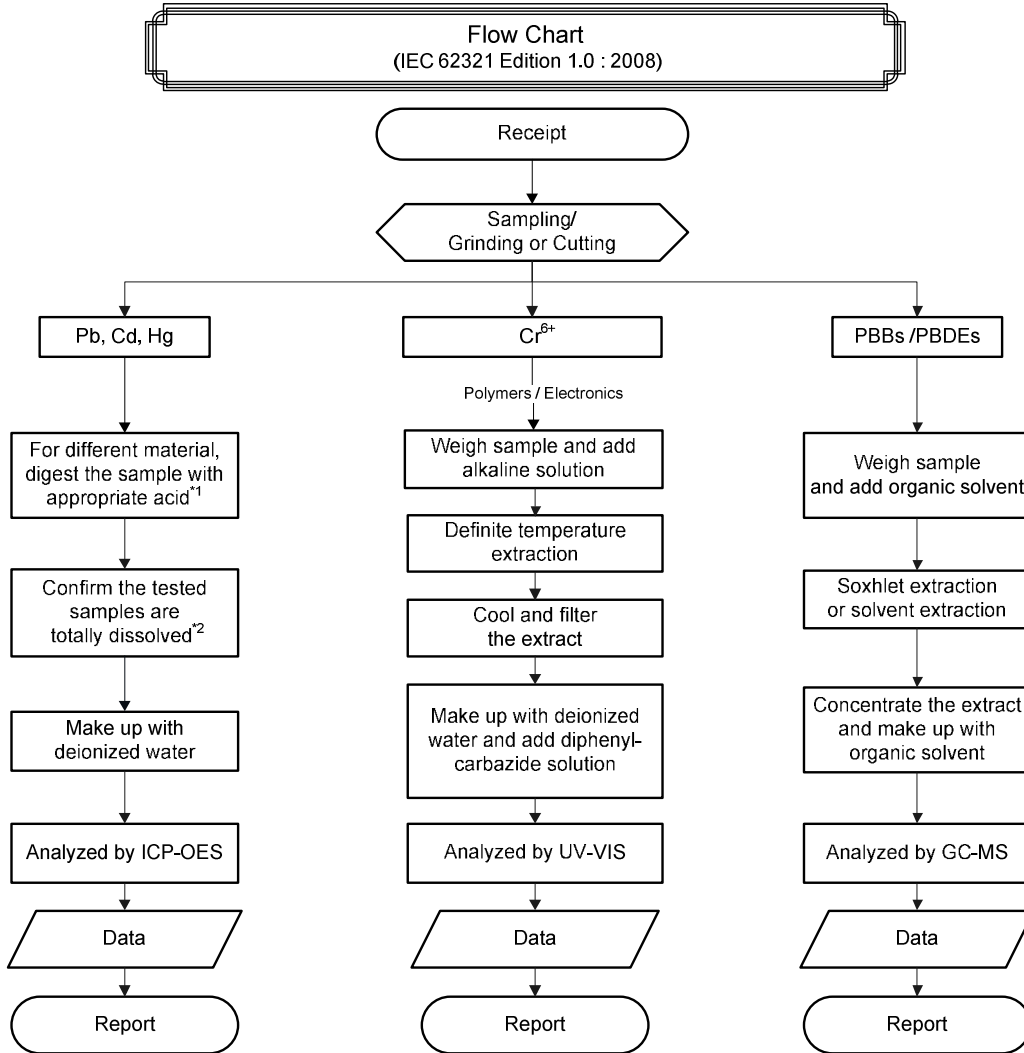
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Page: 7 of 17
Date: Mar. 22, 2012

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay



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.

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

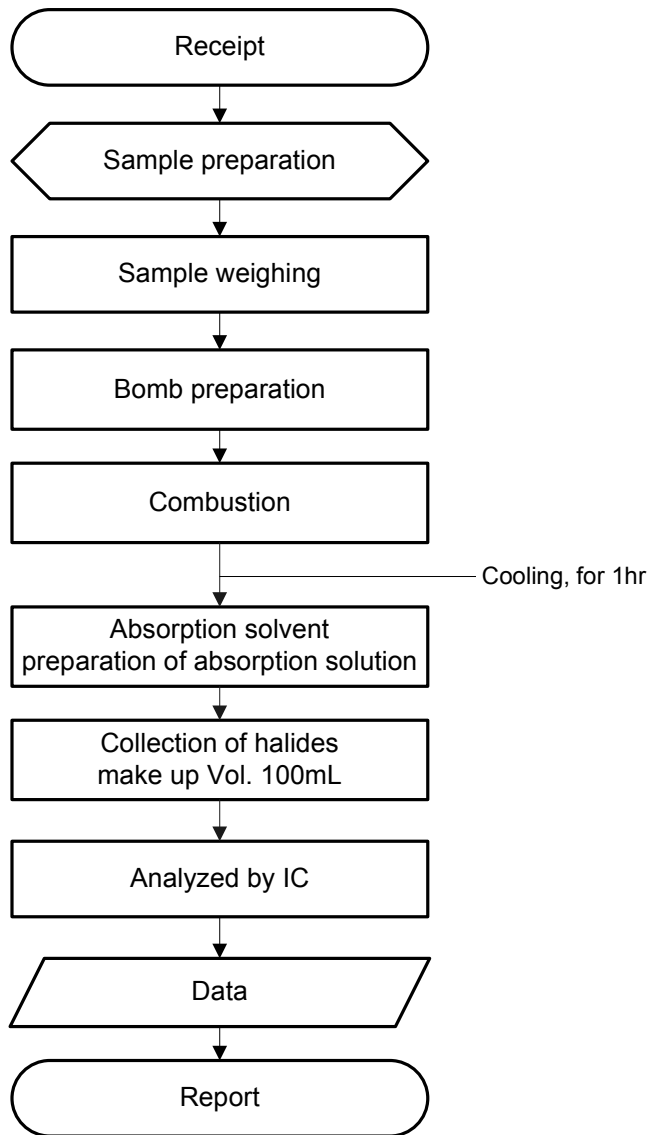
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (Halogen)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

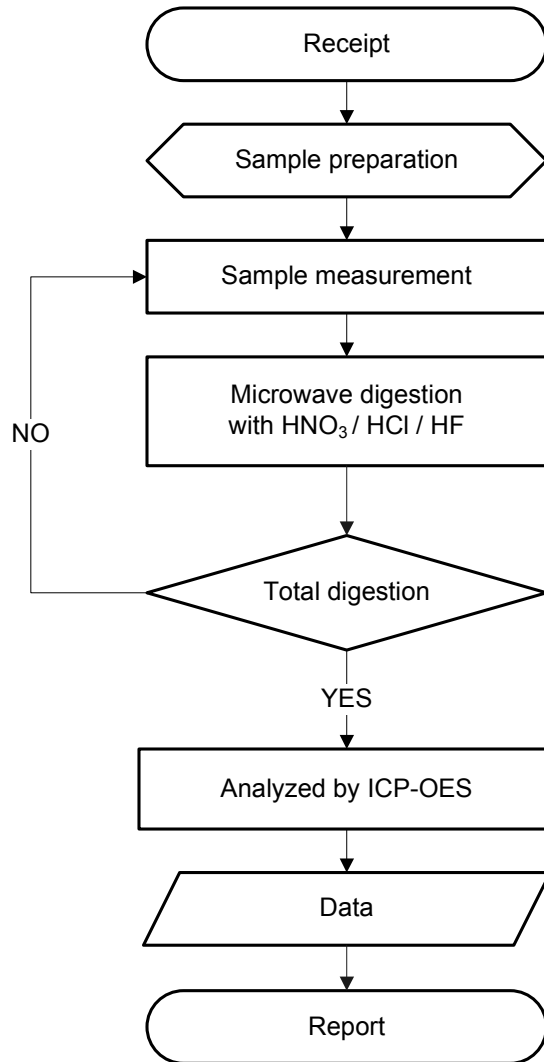
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (Metal Testing)



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

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

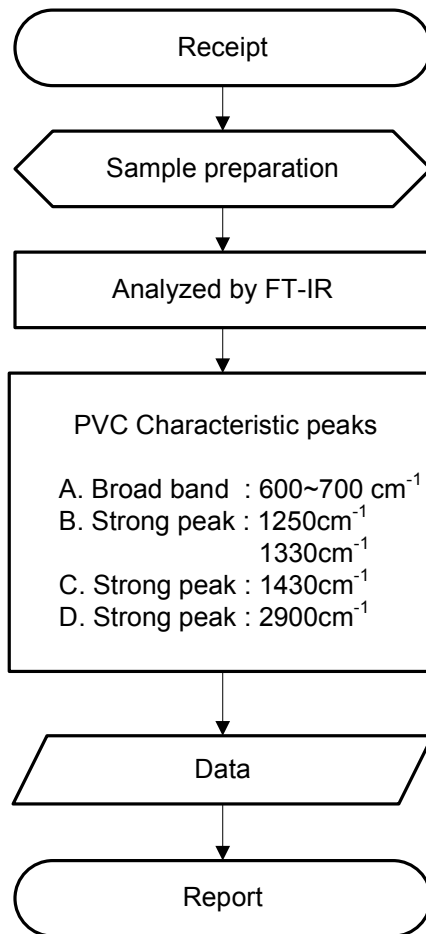
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (PVC)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

Intertek Testing Services Korea Ltd.



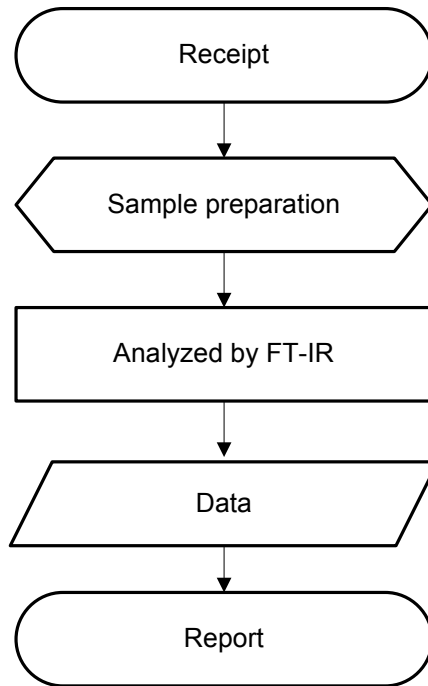
TEST REPORT

Page: 11 of 17
Date: Mar. 22, 2012

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (Asbestos)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

Intertek Testing Services Korea Ltd.

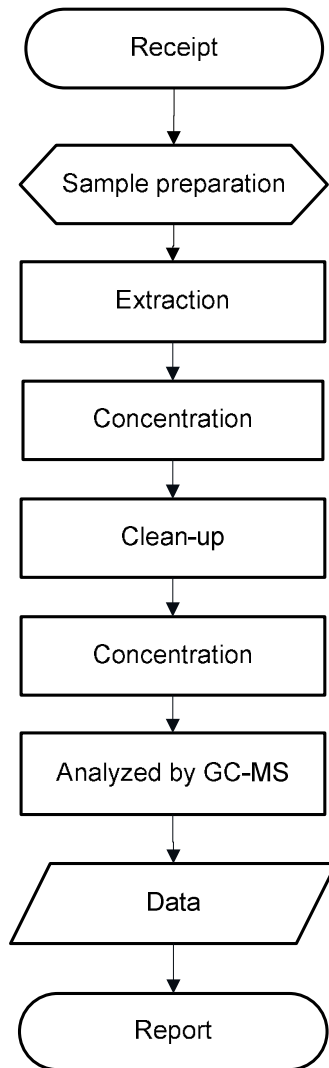
Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0026 Daegu Office : Tel : 053-600-8647 Fax : 053-600-8645 Web Site : www.Intertek.co.kr
Seoul Lab. Address : 1/F, A-ju Digital Tower, #284-56, Seongsu 2-ga, Seongdong-Gu, Seoul, 133-833 Korea
Ulsan Lab. Address : #340-2, Yongam-Ri, Chongryang-Myun, Ulju-Gun,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

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (Phthalates)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

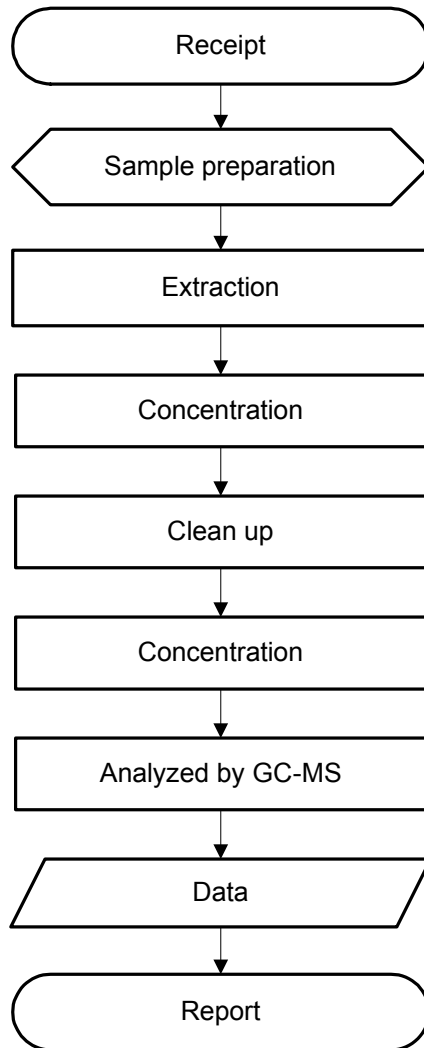
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (PCP)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

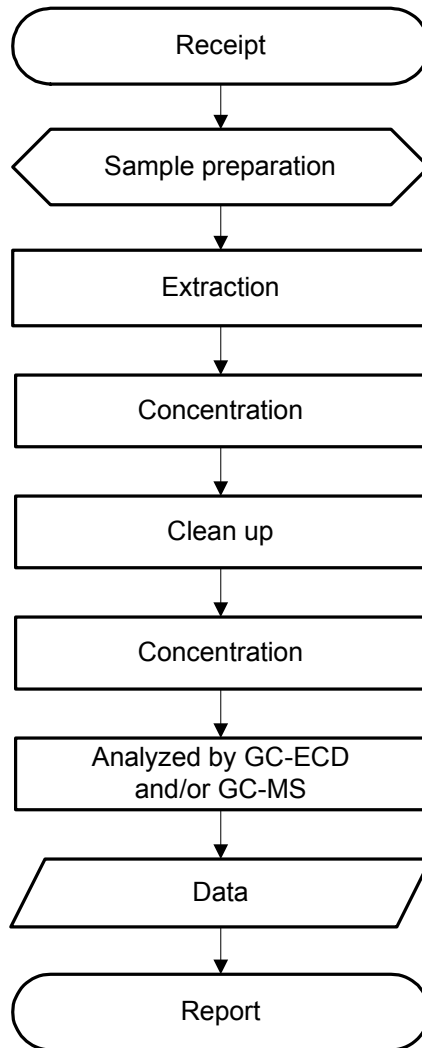
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (MCCP)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

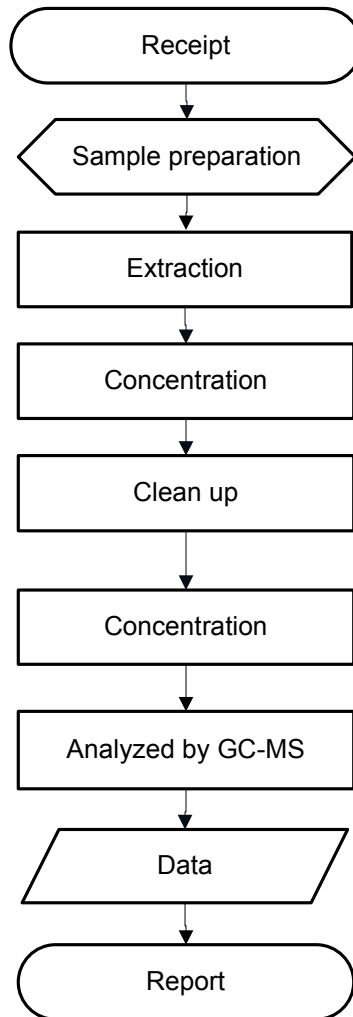
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (HBCDD, TBBPA)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

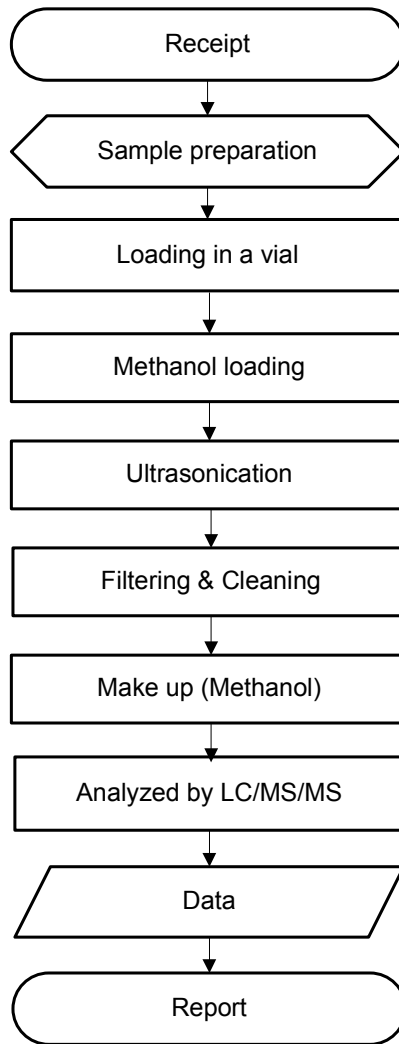
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (BPA)



This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

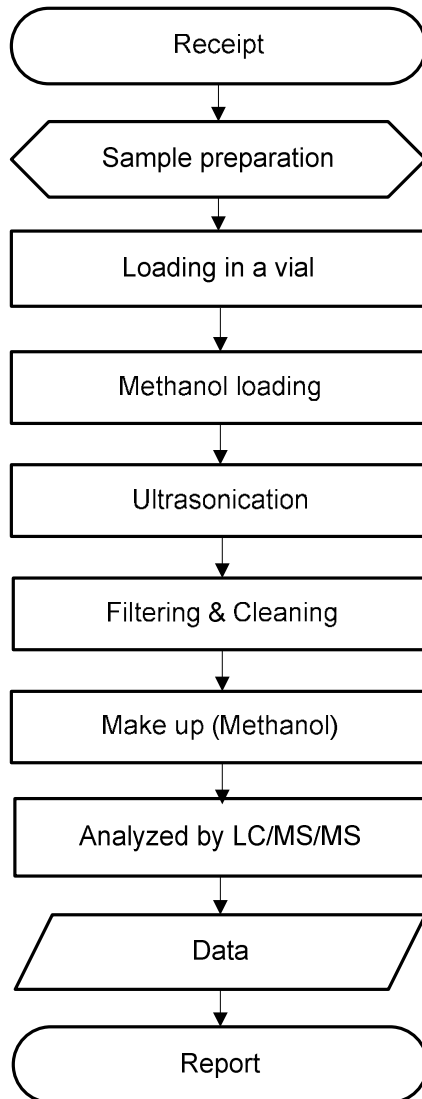
Intertek Testing Services Korea Ltd.

TEST REPORT

Report No. RT12R-S1076-003-E1

Sample ID No. : RT12R-S1076-003
Sample Description : Halogen Free Coverlay

Flow Chart (PFOS, PFOA)



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

This Test Report is issued by the Company subject to its Terms and Conditions of Business printed overleaf. Attention is drawn to the limitations of liability, indemnification and jurisdictional issues defined therein. This Test Report shall not be reproduced, except in full, without prior written consent of the Company.

Intertek Testing Services Korea Ltd.