

Applicant Address		Techno Valley, Dunpo-myeon,	
	Asan-City, Ci	nungcheongnam-do, Korea	Page: 1 of 17
Report No.	RT12R-S1076-0	01-E1-R	Date: Mar. 23, 2012
Sample Des	scription	: The following submitted sample(s) said to be:-
Name/Type	of Product	: Halogen Free CCL	
Sample ID I	No.	: RT12R-S1076-001	
Item No.		: MCH/MDH	
Manufactur	er/Vender	: INNOX Corporation	
Sample rece Testing Date		: Mar. 13, 2012 : Mar. 13, 2012 ~ Mar. 22, 2012	
Testing Env	ironment	: Temperature : (24 \pm 2) $^{\circ}$ C,	Humidity : (60 \pm 5) % R.H.
Test Type Test Methoe	d(s)	: RoHS wet chemical analysis : 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.

: Please see the following page(s).

* Note 3 : The item no. is assigned by client and indicated according to their requirement and guarantee letter.

Approved by,

Test Result(s)

2625

Jade Jang / Lab. Technical Manager

Authorized by,

ne

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.



Page: 2 of 17 Date: Mar. 23, 2012

Report No. RT12R-S1076-001-E1-R

Sample ID No.	: RT12R-S1076-001
Sample Description	: Halogen Free CCL

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 metal)	-	With reference to IEC 62321 Edition 1.0 : 2008, by Spot test	(Threshold of 1 mg/kg)	Negative
Hexavalent Chromium (Cr ⁶⁺) (For metal)	-	With reference to IEC 62321 Edition 1.0 : 2008, by boiling water extraction and determined by UV-VIS Spectrophotometer	(Threshold of 0.02 mg/kg with 50 cm ²)	Negative

Tested by : Nikkie Lee, Leo Kim

Notes : mg/kg = ppm = parts per million

 ${\rm mg/kg}~$ with 50 ${\rm cm}^2$ = milligram per kilogram with 50 square centimeter ${\rm <=}$ Less than

N.D. = Not detected (< MDL)

MDL = Method detection limit

- Positive = A positive test result indicated the presence of Cr(VI) at the time of testing, equal to or greater than threshold of 1 mg/kg for spot test procedures or 0.02 mg/kg for boiling water extraction procedures with a sample surface area of 50 cm² used. However, it shall not be interpreted as the Cr(VI) concentration in the coating layer of the sample and should not be used as a method detection limit for this qualitative test.
- Negative = A negative test result indicates above positive observation was not found at the time of testing. When the spot test showed a negative result, the boiling water extraction procedure shall be used to verify the result.

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.



Report No. RT12R-S1076-001-E1-R

Sample ID No. : RT12R-S1076-001 Sample Description : Halogen Free CCL

Test Item	Unit	Test Method	MDL	Result
Polybrominated Biphenyl (PBBs)				
Monobromobiphenyl	mg/kg		5	N.D.
Dibromobiphenyl	mg/kg		5	N.D.
Tribromobiphenyl	mg/kg		5	N.D.
Tetrabromobiphenyl	mg/kg	With reference to	5	N.D.
Pentabromobiphenyl	mg/kg	IEC 62321 Edition 1.0 : 2008,	5	N.D.
Hexabromobiphenyl	mg/kg	by solvent extraction and	5	N.D.
Heptabromobiphenyl	mg/kg	determined by GC/MS	5	N.D.
Octabromobiphenyl	mg/kg		5	N.D.
Nonabromobiphenyl	mg/kg		5	N.D.
Decabromobiphenyl	mg/kg		5	N.D.
Polybrominated Diphenyl Ether (P	BDEs)	· · · · · · · · · · · · · · · · · · ·		
Monobromodiphenyl ether	mg/kg		5	N.D.
Dibromodiphenyl ether	mg/kg	With reference to IEC 62321 Edition 1.0 : 2008, by solvent extraction and determined by GC/MS	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 : 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 : <u>www.Intertek.co.kr</u> 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

Page: 3 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Page: 4 of 17 Date: Mar. 23, 2012

Sample ID No. : RT12R-S1076-001 Sample Description : Halogen Free CCL

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	79
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 thanN.D. = Not detected (<MDL) MDL = Method detection limit N.A. = Not applicable Negative = Undetectable Positive = Detectable Sb₂O₃ calculated from Sb by the equation. * Sb₂O₃ concentration = (Sb₂O₃ molecular weight × Sb concentration) / (2 × Sb molecular weight) = 1.197 × Sb concentration

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.



Report No. RT12R-S1076-001-E1-R

Page: 5 of 17 Date: Mar. 23, 2012

Sample ID No.: RT12R-S1076-001Sample Description: Halogen Free CCL

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.



Report No. RT12R-S1076-001-E1-R

Page: 6 of 17 Date: Mar. 23, 2012

Sample ID No. : RT12R-S1076-001 Sample Description : Halogen Free CCL

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.
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.

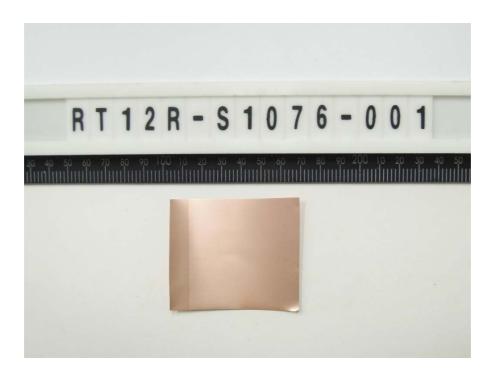


Report No. RT12R-S1076-001-E1-R

Page: 7 of 17 Date: Mar. 23, 2012

Sample ID No.	: RT12R-S1076-001
Sample Description	: Halogen Free CCL

* 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.

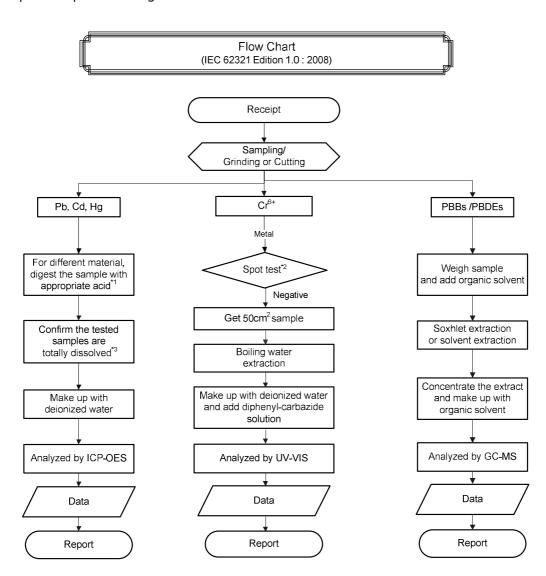


Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001

Page: 8 of 17 Date: Mar. 23, 2012



Remarks :

*1 : List of appropriate acid :

Acid added for digestion
HNO_{3} , HCI, HF, H_2O_2 , H_3BO_3
HNO3, HCI, HF
HNO ₃ , HCI, H ₂ O ₂ , HBF ₄
-

*2 : If the result of spot test is positive, Chromium (VI) would be determined as detected. No further analysis is required.

*3 : 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.

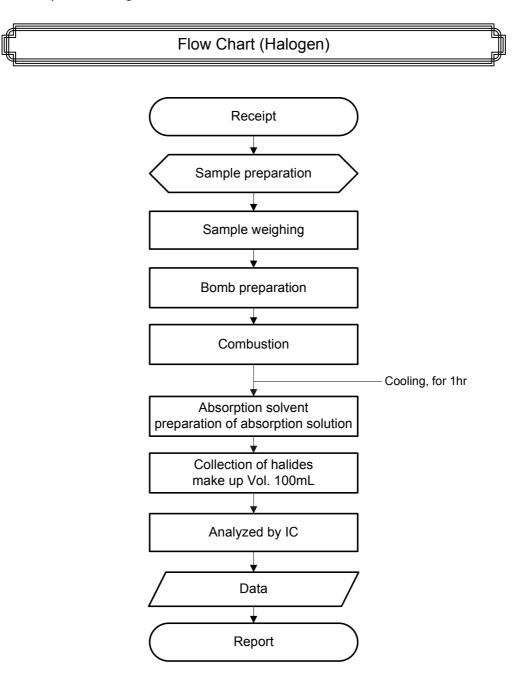
Intertek Testing Services Korea Ltd.



Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001



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 : <u>www.Intertek.co.kr</u> 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

Page: 9 of 17 Date: Mar. 23, 2012

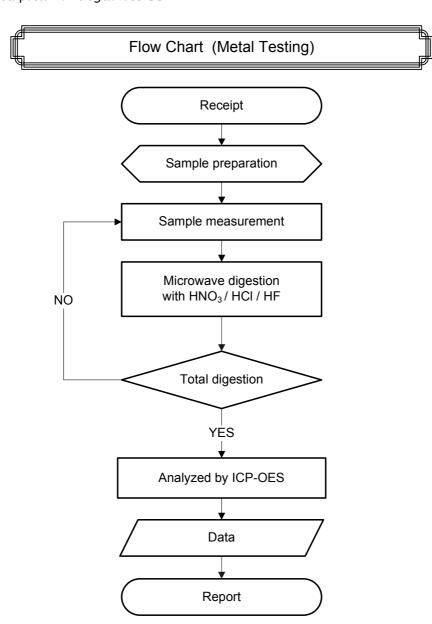


Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001

Page: 10 of 17 Date: Mar. 23, 2012



** 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.

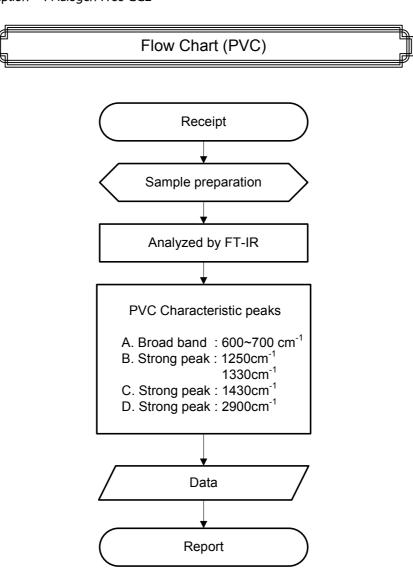
Intertek Testing Services Korea Ltd.



Report No. RT12R-S1076-001-E1-R

Sample ID No.

: RT12R-S1076-001 Sample Description : Halogen Free CCL



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 : <u>www.Intertek.co.kr</u> 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

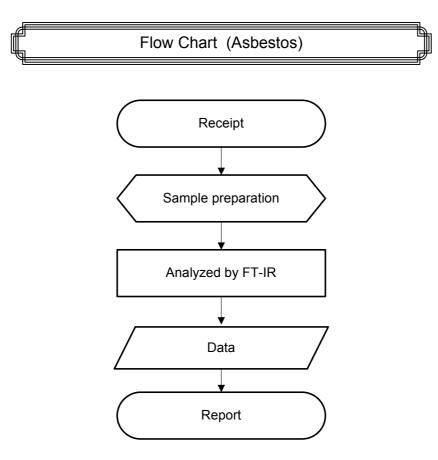
Page: 11 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001



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 : <u>www.Intertek.co.kr</u> 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

Page: 12 of 17 Date: Mar. 23, 2012

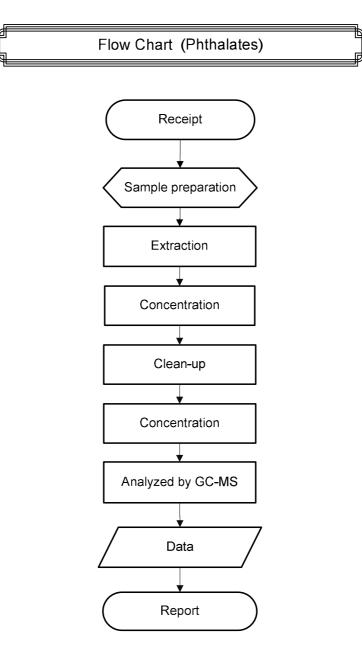


Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Descriptio

: RT12R-S1076-001

Sample Description : Halogen Free CCL



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 : <u>www.Intertek.co.kr</u> 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

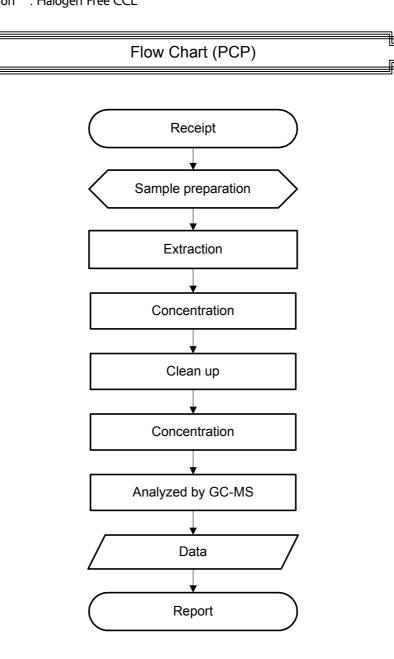
Page: 13 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001



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 : <u>www.Intertek.co.kr</u> 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

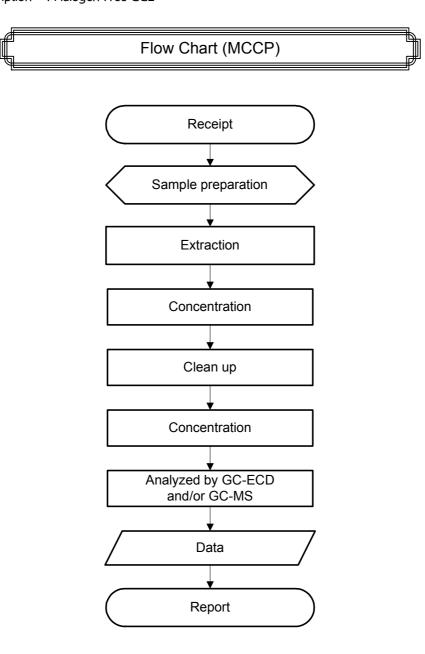
Page: 14 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Sample ID No.

: RT12R-S1076-001 Sample Description : Halogen Free CCL



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 : <u>www.Intertek.co.kr</u> 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

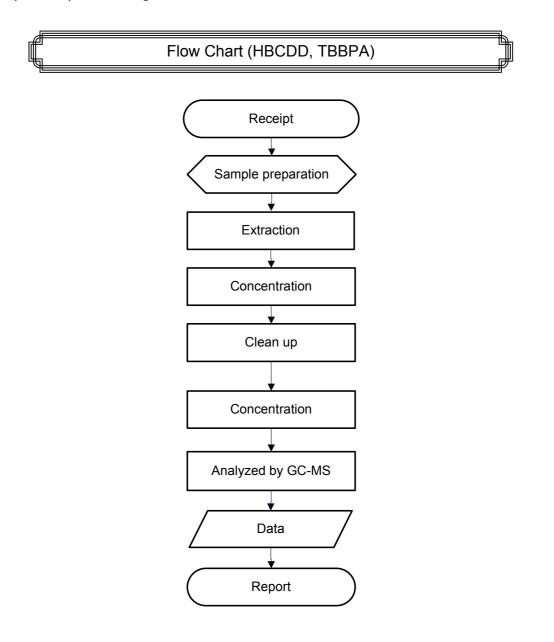
Page: 15 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001



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 : <u>www.Intertek.co.kr</u> 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

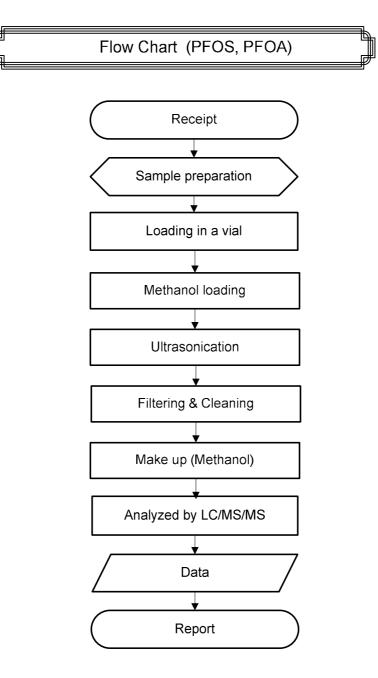
Page: 16 of 17 Date: Mar. 23, 2012



Report No. RT12R-S1076-001-E1-R

Sample ID No. Sample Description : Halogen Free CCL

: RT12R-S1076-001



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.

Seoul Office: Tel : 02-6090-9500 Fax : 02-3409-0026 Daegu Office : Tel : 053-600-8647 Fax : 053-600-8645 Web Site : <u>www.Intertek.co.kr</u> 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

Page: 17 of 17 Date: Mar. 23, 2012