

TEST REPORT (测试报告件)

申请公司(APPLICANT) : SAMSUNG ELECTRO-MECHANICS
公司住所(ADDRESS) : 150, Maeyeong-ro, Yeongtong-gu,
Suwon-si, Gyeonggi-do, Korea

报告号(REPORT NO.) : RT19R-S4740-027-C

日期(DATE) : 2019 年 11 月 06 日

样品描述(SAMPLE DESCRIPTION) :

样品名称 : Alumina Substrate
(NAME/TYPE OF PRODUCT)
样品编号 : RT19R-S4740-027
(SAMPLE ID NO.)
生产商/贸易商 : SAMSUNG ELECTRO-MECHANICS
(MANUFACTURER/VENDOR)
样品收到日期 : 2019年 10月23日
(SAMPLE RECEIVED)
测试进行日期 : 2019年 10月23日至 2019年 11月05日
(TESTING DATE)
测试方法 : 参考续页.
(TEST METHOD(S)) : Please see the following page(s).
测试结果 : 参考续页.
(TEST RESULT(S)) : Please see the following page(s).

注1 : 检测结果只是针对来样所做的测试.
(Note 1 : The test results presented in this report relate only to the object tested.)

注2 : 未经测试实验室书面允许, 报告不能被部分复制.
(Note 2 : This report shall not be reproduced except in full without the written approval of the testing laboratory.)

注3 : 此报告所测试项目并不属于KOLAS 认证范围内.
(Note 3 : This report is not related to the scope of Korea laboratory accreditation scheme.)

测试 (Approved by) :



Jade Jang / 测试负责人

批准 (Authorized by) :



Bo Park / 实验室经理



Authenticity check

Intertek Testing Services Korea Ltd.

Seoul Office: Tel : 02-6090-9550 Fax : 02-3409-0025 Web Site : intertek.co.kr

Seoul Lab. Address : 7, Ahasan-ro 5-gil, Seongdong-gu, Seoul, 04793 Korea

Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea

第 1 页 共 17 页



※ You can verify the forgery and authenticity by the barcode at the end of this document.

TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

测试项目 (Test Item)	单位 (Unit)	测试方法 (Test Method)	报告限量 值 (MDL)	结果 (Result)
镉 (Cadmium, Cd)	mg/kg	参照 IEC 62321-5 Edition 1.0 : 2013, 用 ICP-OES 进行的分析	0.5	N.D.
铅 (Lead, Pb)	mg/kg	参照 IEC 62321-5 Edition 1.0 : 2013, 用 ICP-OES 进行的分析	5	N.D.
汞 (Mercury, Hg)	mg/kg	参照 IEC 62321-4 Edition 1.0 : 2013, 用 ICP-OES 进行的分析	2	N.D.
六价铬 (Hexavalent Chromium, Cr ⁶⁺) (For metal, 金属)	μg/cm ²	参照 IEC 62321-7-1 Edition 1.0 : 2015, 用 UV-VIS Spectrophotometer 进行的分析	0.10	Negative

Tested by : Jooyeon Lee, Hyojoo Kim

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 μg/cm² = microgram per square centimeter < 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)

Remarks : Interpretation of Cr⁶⁺ results

Qualitative result	Concentration of Cr ⁶⁺ (μg /cm ²)	Meaning
Negative	< 0.10	The sample coating is considered a non-Cr ⁶⁺ based coating.
Inconclusive	0.10 ≤ and ≤ 0.13	Unavoidable coating variation may influence the determination.
Positive	> 0.13	The sample coating is considered to contain Cr ⁶⁺ .

1. The qualitative results should be determination by the average result of three test results.

(If concentration of Cr⁶⁺ is over 0.10 μg/cm²)

2. The above results will be carried out by visual comparison only with the standard.



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期(DATE) : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

测试项目 (Test Item)	单位 (Unit)	测试方法 (Test Method)	报告限量值 (MDL)	结果 (Result)
多溴联苯 (Polybrominated Biphenyl, PBBs)				
一溴联苯 (Monobromobiphenyl)	mg/kg	参照 IEC 62321-6 Edition 1.0 : 2015, 用 GC/MS 进行的分析	5	N.D.
二溴联苯 (Dibromobiphenyl)	mg/kg		5	N.D.
三溴联苯 (Tribromobiphenyl)	mg/kg		5	N.D.
四溴联苯 (Tetrabromobiphenyl)	mg/kg		5	N.D.
五溴联苯 (Pentabromobiphenyl)	mg/kg		5	N.D.
六溴联苯 (Hexabromobiphenyl)	mg/kg		5	N.D.
七溴联苯 (Heptabromobiphenyl)	mg/kg		5	N.D.
八溴联苯 (Octabromobiphenyl)	mg/kg		5	N.D.
九溴联苯 (Nonabromobiphenyl)	mg/kg		5	N.D.
十溴联苯 (Decabromobiphenyl)	mg/kg		5	N.D.
多溴联苯醚 (Polybrominated Diphenyl Ether, PBDEs)				
一溴联苯醚 (Monobromodiphenyl ether)	mg/kg	参照 IEC 62321-6 Edition 1.0 : 2015, 用 GC/MS 进行的分析	5	N.D.
二溴联苯醚 (Dibromodiphenyl ether)	mg/kg		5	N.D.
三溴联苯醚 (Tribromodiphenyl ether)	mg/kg		5	N.D.
四溴联苯醚 (Tetrabromodiphenyl ether)	mg/kg		5	N.D.
五溴联苯醚 (Pentabromodiphenyl ether)	mg/kg		5	N.D.
六溴联苯醚 (Hexabromodiphenyl ether)	mg/kg		5	N.D.
七溴联苯醚 (Heptabromodiphenyl ether)	mg/kg		5	N.D.
八溴联苯醚 (Octabromodiphenyl ether)	mg/kg		5	N.D.
九溴联苯醚 (Nonabromodiphenyl ether)	mg/kg		5	N.D.
十溴联苯醚 (Decabromodiphenyl ether)	mg/kg		5	N.D.

Tested by : Miseon Lee

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 <= 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

测试项目 (TEST ITEM)	单位 (UNIT)	测试方法 (TEST METHOD)	报告限量值 (MDL)	结果 (RESULT)
溴 (Bromine, Br)	mg/kg	参考 EN 14582, IC 测试定量	30	N.D.
氯 (Chlorine, Cl)	mg/kg	参考 EN 14582, IC 测试定量	30	N.D.
砷 (Arsenic, As)	mg/kg	参考 US EPA 3052, 酸消化法处理样品, ICP-OES 测试定量	2	N.D.
铍 (Beryllium, Be)	mg/kg	参考 US EPA 3052, 酸消化法处理样品, ICP-OES 测试定量	2	N.D.
锑 (Antimony, Sb)	mg/kg	参考 US EPA 3052, 酸消化法处理样品, ICP-OES 测试定量	2	N.D.
聚氯乙烯 (Polyvinyl chloride, PVC)	-	参考 KS K 0210-1, FT-IR 测试定量	N.A.	Negative

Tested by : Hyojoo Kim, Jooyeon Lee

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 <= 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)
 N.A. = 不适用 (Not applicable)
 Negative = Undetectable
 Positive = Detectable



※ You can verify the forgery and authenticity by the barcode at the end of this document.

TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

测试项目 (TEST ITEM)	单位 (UNIT)	测试方法 (TEST METHOD)	报告限量值 (MDL)	结果 (RESULT)
六溴环十二烷 (Hexabromocyclododecane, HBCDD)	mg/kg	参考 IEC 62321-9(111/409/CD), 溶剂萃取法, LC/MS 和 GC/MS 测试定量	10	N.D.
SCCP (Short-chain chlorinated paraffin)	mg/kg	参考 US EPA 3540C, 溶剂萃取法, LC/MS/MS 和/或 GC/ECD 测试定量	100	N.D.
PCBs (Polychlorinated biphenyls)	mg/kg	参考 US EPA 3540C/8082, 溶剂萃取法, GC/MS 测试定量	5	N.D.
PCTs (Polychlorinated terphenyls)	mg/kg	参考 US EPA 3540C, 溶剂萃取法, GC/MS 测试定量	5	N.D.
PCNs (Polychlorinated naphthalenes)	mg/kg	参考 US EPA 3540C, 溶剂萃取法, GC/MS 测试定量	5	N.D.
PCP (Pentachlorophenol)	mg/kg	参考 ISO 17070, GC/MS 测试定量	5	N.D.
PFOA (Perfluorooctanoic acid)	mg/kg	参考 US EPA 3550C/8321B, 超声萃取法, LC/MS 或 LC/MS/MS 测试定量	0.1	N.D.
PFOS (Perfluorooctane sulfonate)	mg/kg	参考 US EPA 3550C/8321B, 超声萃取法, LC/MS 或 LC/MS/MS 测试定量	0.1	N.D.

Tested by : Miseon Lee

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 < = 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

测试项目 (TEST ITEM)	CAS 数 (CAS NO.)	单位 (UNIT)	测试方法 (TEST METHOD)	报告限量值 (MDL)	结果 (RESULT)
邻苯二甲酸酯 (Phthalates)					
邻苯二甲酸二丁酯 (Di-n-butyl Phthalate, DBP)	84-74-2	mg/kg	参考 IEC 62321-8 Edition 1.0 : 2017, 溶剂萃取法, 气相色谱/质谱联用仪 测试定量	50	N.D.
邻苯二甲酸二(2-乙基己基)酯 (Di(2-ethyl hexyl) phthalate, DEHP)	117-81-7	mg/kg		50	N.D.
邻苯二甲酸二辛酯 (Di-n-octyl phthalate, DNOP)	117-84-0	mg/kg		50	N.D.
邻苯二甲酸二异壬酯 (Diisononyl phthalate, DINP)	28553-12-0 68515-48-0	mg/kg		100	N.D.
邻苯二甲酸二异癸酯 (Diisodecyl phthalate, DIDP)	26761-40-0 68515-49-1	mg/kg		100	N.D.
邻苯二甲酸丁酯苯甲酯 (Benzyl butyl phthalate, BBP)	85-68-7	mg/kg		50	N.D.
邻苯二甲酸二异丁酯 (Diisobutyl phthalate, DIBP)	84-69-5	mg/kg		50	N.D.
酞酸二甲酯 (Dimethyl phthalate, DMP)	131-11-3	mg/kg		50	N.D.
酞酸二乙酯 (Diethyl phthalate, DEP)	84-66-2	mg/kg		50	N.D.
邻苯二甲酸二戊酯 (Di-n-pentyl phthalate, DPP)	131-18-0	mg/kg		50	N.D.
邻苯二甲酸二己酯 (Di-n-hexyl phthalate, DNHP)	84-75-3	mg/kg		50	N.D.
邻苯二甲酸二 C6-8 支链烷基酯(富 C7) (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich, DIHP)	71888-89-6	mg/kg		50	N.D.

Tested by : Miseon Lee

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 <= 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

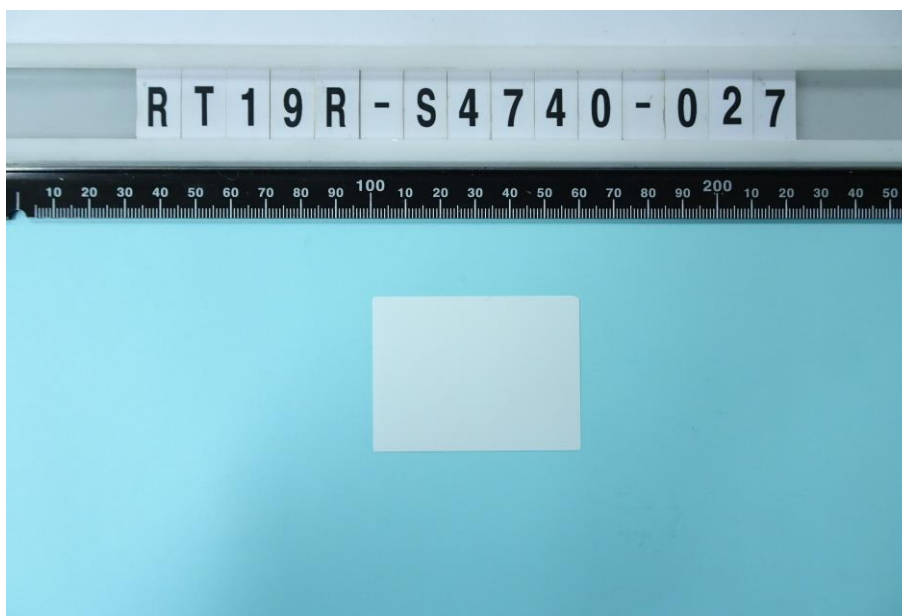
测试项目 (TEST ITEM)	CAS 数 (CAS NO.)	单位 (UNIT)	测试方法 (TEST METHOD)	报告限量值 (MDL)	结果 (RESULT)
1,2-邻苯二酸二(C7-11 支鏈與直鏈)烷酯 (1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters, DHNUP)	68515-42-4	mg/kg	参考 IEC 62321-8 Edition 1.0 : 2017, 溶剂萃取法, 气相色谱/质谱联用仪 测试定量	50	N.D.
邻苯二甲酸二甲氧乙酯 (Di(2-methoxyethyl) phthalate, DMEP)	117-82-8	mg/kg		50	N.D.
邻苯二甲酸二异戊酯 (Diisopentylphthalate, DIPP)	605-50-5	mg/kg		50	N.D.
邻苯二甲酸正戊基异戊基酯 (N-pentyl-isopentylphthalate, NPIP)	776297-69-9	mg/kg		50	N.D.

Tested by : Miseon Lee

注释 (Notes) : mg/kg = ppm = 百万分之一 (parts per million)
 <= 小于 (Less than)
 N.D.= 未检出 (Not detected (<MDL))
 MDL = 报告限量值 (Method detection limit)

* 样品相片;-

(View of sample as received;-)



第 7 页 共 17 页

Intertek Testing Services Korea Ltd.

Seoul Office: Tel : 02-6090-9550 Fax : 02-3409-0025 Web Site : intertek.co.kr

Seoul Lab. Address : 7, Ahasan-ro 5-gil, Seongdong-gu, Seoul, 04793 Korea

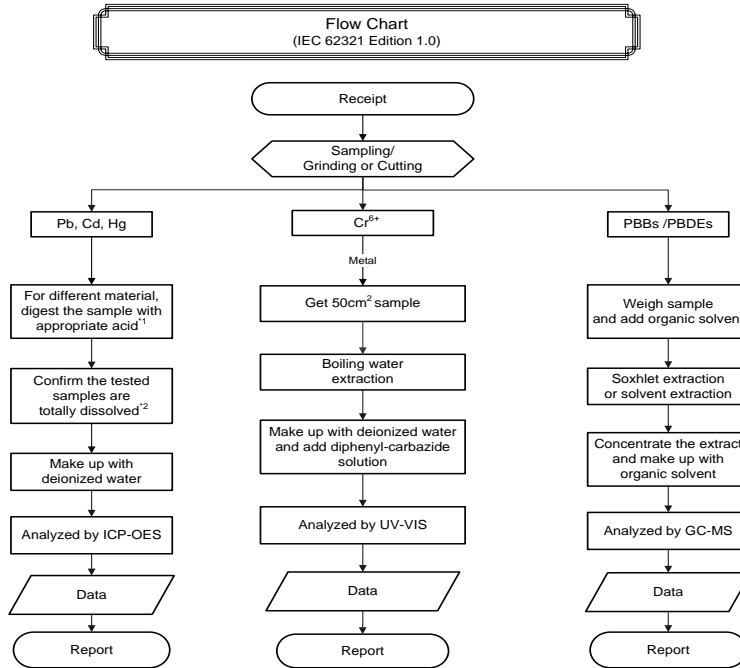
Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea



※ You can verify the forgery and authenticity by the barcode at the end of this document.

TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
 样品编号(SAMPLE ID NO.) : RT19R-S4740-027
 样品名称(SAMPLE DESCRIPTION) : Alumina Substrate



Remarks :
*1 : List of appropriate acid :

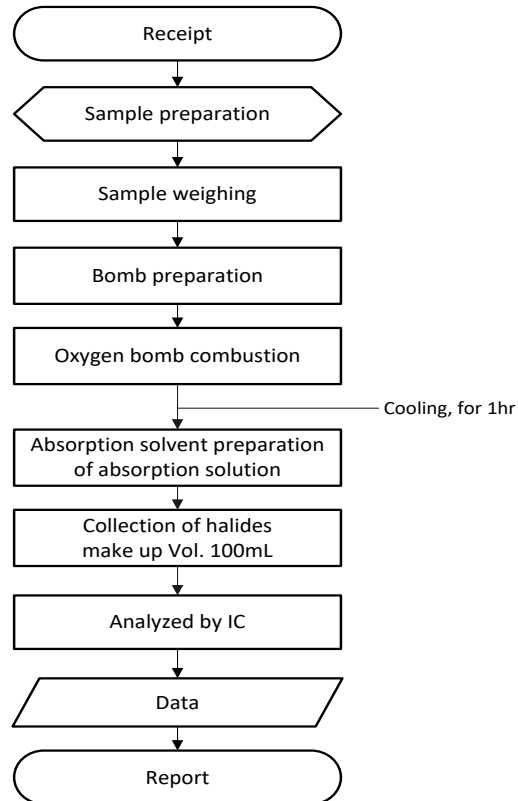
Material	Acid added for digestion
Polymers	HNO ₃ , HCl, HF, H ₂ O ₂ , H ₃ BO ₃
Metals	HNO ₃ , HCl, HF
Electronics	HNO ₃ , HCl, H ₂ O ₂ , HBF ₄



TEST REPORT (测试报告件)

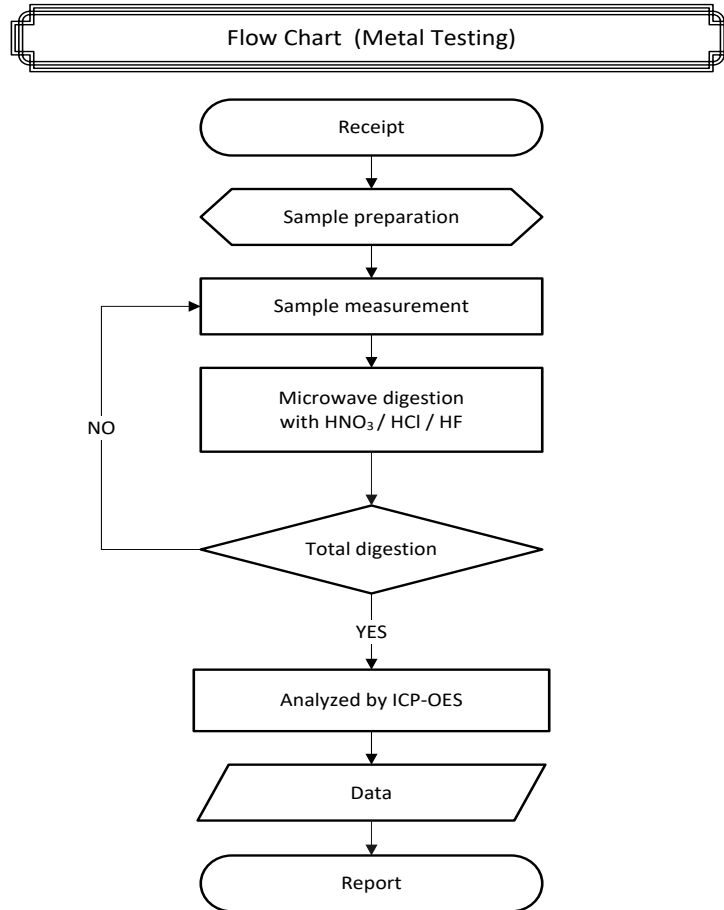
报告号(REPORT NO.) : RT19R-S4740-027-C 日期(DATE) : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

Flow Chart (EN14582)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期(DATE) : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate



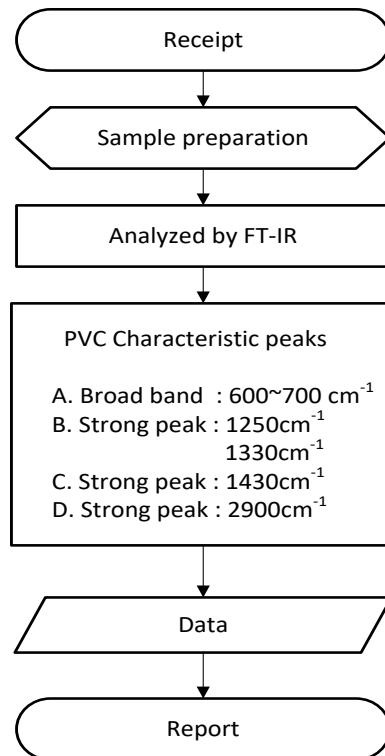
** Remarks : The samples were dissolved totally by pre-conditioning method according to above flow chart.



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

Flow Chart (PVC)



TEST REPORT (测试报告件)

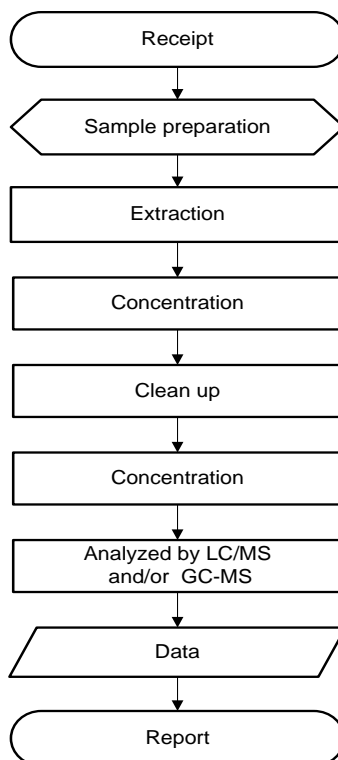
报告号(REPORT NO.) : RT19R-S4740-027-C

日期(DATE) : 2019 年 11 月 06 日

样品编号(SAMPLE ID NO.) : RT19R-S4740-027

样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

Flow Chart (HBCDD)



Intertek Testing Services Korea Ltd.

Seoul Office: Tel : 02-6090-9550 Fax : 02-3409-0025 Web Site : intertek.co.kr

Seoul Lab. Address : 7, Ahasan-ro 5-gil, Seongdong-gu, Seoul, 04793 Korea

Ulsan Lab. Address : 34, Yongam-gil, Chongryang-myeon, Ulju-gun, Ulsan 44989 Korea

第 12 页 共 17 页

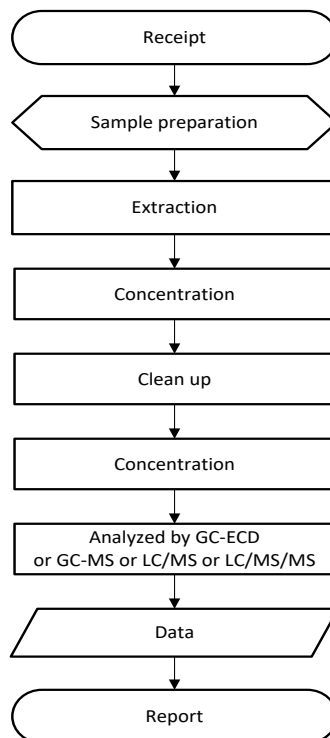


※ You can verify the forgery and authenticity by the barcode at the end of this document.

TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE) : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

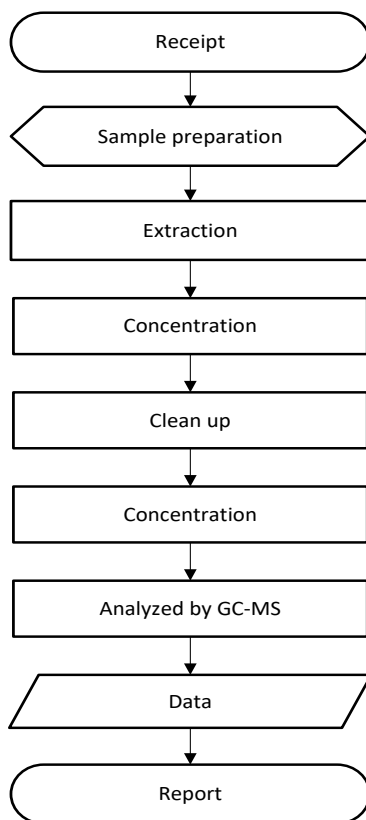
Flow Chart (EPA 3540C)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期(DATE) : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

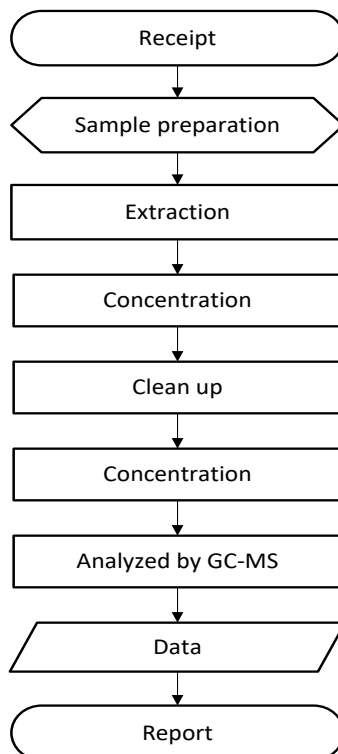
Flow Chart (PCB, PCT, PCN)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期(DATE) : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

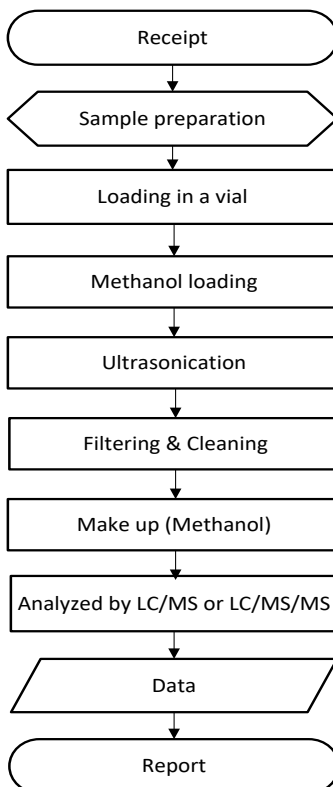
Flow Chart (PCP)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

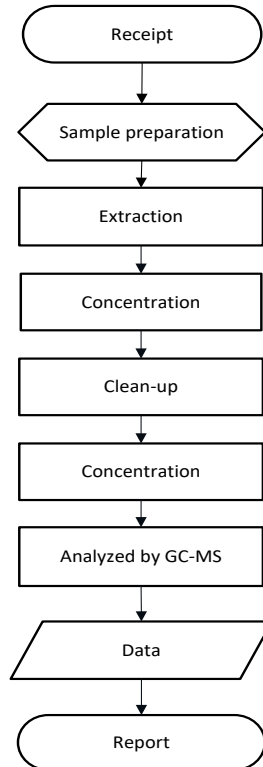
Flow Chart (PFOS, PFOA)



TEST REPORT (测试报告件)

报告号(REPORT NO.) : RT19R-S4740-027-C 日期 DATE : 2019 年 11 月 06 日
样品编号(SAMPLE ID NO.) : RT19R-S4740-027
样品名称(SAMPLE DESCRIPTION) : Alumina Substrate

Flow Chart (Phthalates)



***** 报告结束 *****

Except where explicitly agreed in writing, all work and services performed by Intertek is subject to our standard Terms and Conditions which can be obtained at our website: <http://www.intertek.com/terms/>. Intertek's responsibility and liability are limited to the terms and conditions of the agreement.

This report is made solely on the basis of your instructions and / or information and materials supplied by you and provide no warranty on the tested sample(s) be truly representative of the sample source. The report is not intended to be a recommendation for any particular course of action, you are responsible for acting as you see fit on the basis of the report results. Intertek is under no obligation to refer to or report upon any facts or circumstances which are outside the specific instructions received and accepts no responsibility to any parties whatsoever, following the issue of the report, for any matters arising outside the agreed scope of the works. This report does not discharge or release you from your legal obligations and duties to any other person. You are the only one authorized to permit copying or distribution of this report (and then only in its entirety). Any such third parties to whom this report may be circulated rely on the content of the report solely at their own risk.

This report shall not be reproduced, except in full.



※ You can verify the forgery and authenticity by the barcode at the end of this document.