

Test Report

No. : CE/2018/23813

Date : 2018/03/05

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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION
NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



The following samples was/were submitted and identified by/on behalf of the applicant as :

Sample Submitted By : VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION
Sample Description : 2018 VIS FINISHED WAFER
Style/Item No. : FAB1 FINISHED WAFER
Sample Receiving Date : 2018/02/14
Testing Period : 2018/02/14 TO 2018/03/05

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Test Requested :

- (1) As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample(s).
- (2) As specified by client, to test PAHs and other item(s).

Test Result(s) : Please refer to following pages.

Conclusion :
(1) Based on the performed tests on submitted sample(s), the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS and amending Directive (EU) 2015/863.
(2) Based upon the performed tests on the submitted sample(s), the test results of PAHs (18 items) comply with the limits of PAHs requirement (Category 3) 「Other products under ProdSG」 as set by German Committee on Product Safety (AfPS) GS PAHs.


Troy Chang, Manager - Tech
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



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Test Result(s)

PART NAME No.1 : WAFER

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Cadmium (Cd)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-AES.	2	n.d.	100
Lead (Pb)	mg/kg		2	n.d.	1000
Mercury (Hg)	mg/kg		2	n.d.	1000
Hexavalent Chromium Cr(VI)	mg/kg	With reference to IEC 62321-7-2 (2017) and performed by UV-VIS.	8	n.d.	1000
Sum of PBBs	mg/kg	With reference to IEC 62321-6 (2015) and performed by GC/MS.	-	n.d.	1000
Monobromobiphenyl	mg/kg		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.	-
Sum of PBDEs	mg/kg		-	n.d.	1000
Monobromodiphenyl ether	mg/kg		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.	-	
Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins) (CAS No.: 85535-84-8)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	100	n.d.	-
Tetrabromobisphenol A (TBBP-A) (CAS No.: 79-94-7)	mg/kg	With reference to Global SOP RSTS-E&E-121 (2012). Analysis was performed by LC/MS.	10	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Polychlorinated Biphenyls (PCBs) (CAS No.: 1336-36-3)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.5	n.d.	-
Polychlorinated Naphthalene (PCNs)	mg/kg		5	n.d.	-
Polychlorinated Terphenyls (PCTs)	mg/kg		0.5	n.d.	-
PVC	**	Analysis was performed by FTIR and FLAME Test.	-	Negative	-
AZO					
1): 4-AMINODIPHENYL (CAS No.: 92-67-1)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
2): BENZIDINE (CAS No.: 92-87-5)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
3): 4-CHLORO-O-TOLUIDINE (CAS No.: 95-69-2)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
4): 2-NAPHTHYLAMINE (CAS No.: 91-59-8)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
5): O-AMINOAZOTOLUENE (CAS No.: 97-56-3)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
6): 2-AMINO-4-NITROTOLUENE (CAS No.: 99-55-8)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
7): P-CHLOROANILINE (CAS No.: 106-47-8)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
8): 2,4-DIAMINOANISOLE (CAS No.: 615-05-4)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
9): 4,4'-DIAMINODIPHENYLMETHANE (CAS No.: 101-77-9)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
10): 3,3'-DICHLOROBENZIDINE (CAS No.: 91-94-1)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
11): 3,3'-DIMETHOXYBENZIDINE (CAS No.: 119-90-4)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
12): 3,3'-DIMETHYLBENZIDINE (CAS No.: 119-93-7)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
13): 3,3'-DIMETHYL-4,4'-DIAMINODIPHENYLMETHANE (CAS No.: 838-88-0)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
14): P-CRESIDINE (2-METHOXY-5-METHYLANILINE) (CAS No.: 120-71-8)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
15): 4,4'-METHYLENE-BIS- (2-CHLOROANILINE) (CAS No.: 101-14-4)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
16): 4,4'-OXYDIANILINE (CAS No.: 101-80-4)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
17): 4,4'-THIODIANILINE (CAS No.: 139-65-1)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
18): O-TOLUIDINE (CAS No.: 95-53-4)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
19): 2,4-TOLUYLENEDIAMINE (CAS No.: 95-80-7)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
20): 2,4,5-TRIMETHYLANILINE (CAS No.: 137-17-7)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
21): O-ANISIDINE (CAS No.: 90-04-0)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
22): 4-AMINOAZOBENZENE (CAS No.: 60-09-3)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
23): 2,4-XYLIDINE (CAS No.: 95-68-1)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
24): 2,6-XYLIDINE (CAS No.: 87-62-7)	mg/kg	With reference to LFGB 82.02-2 (2013). Analysis was performed by GC/MS.	3	n.d.	-
Asbestos					
Chrysotile (CAS No.: 12001-29-5)	%		-	Negative	-
Amosite (CAS No.: 12172-73-5)	%	With reference to EPA 600/R-93/116 (1993). Analysis was performed by Stereo Microscope (SM), Dispersion Staining Polarized Light Microscope (DS-PLM) and X-ray Diffraction Spectrometer (XRD).	-	Negative	-
Crocidolite (CAS No.: 12001-28-4)	%		-	Negative	-
Anthophyllite (CAS No.: 77536-67-5)	%		-	Negative	-
Tremolite (CAS No.: 77536-68-6)	%		-	Negative	-
Actinolite (CAS No.: 77536-66-4)	%		-	Negative	-
Formaldehyde (CAS No.: 50-00-0)	mg/kg	With reference to ISO 17226-1(2008). Analysis was performed by HPLC/DAD.	3	n.d.	-
Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α -HBCDD, β - HBCDD, γ - HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	With reference to IEC 62321 (2008). Analysis was performed by GC/MS.	5	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Silver (Ag)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP-MS.	1	n.d.	-
Platinum (Pt)	mg/kg		1	n.d.	-
Arsenic (As)	mg/kg		1	n.d.	-
Nickel (Ni)	mg/kg		1	n.d.	-
Antimony (Sb)	mg/kg		1	n.d.	-
Beryllium (Be)	mg/kg		1	n.d.	-
Indium (In)	mg/kg		1	n.d.	-
Phosphorus (P)	mg/kg	With reference to US EPA 3052. Analysis was performed by ICP-OES.	1	4.18	-
Caesium (Cs) (Radioactive element) (CAS No.: 7440-46-2)	mg/kg	With reference to US EPA 3052 (1996) & 6020B (2014). Analysis was performed by ICP-MS.	1	n.d.	-
Strontium (Sr) (Radioactive element) (CAS No.: 7440-24-6)	mg/kg		1	n.d.	-
Thorium (Th) (Radioactive element) (CAS No.: 7440-29-1)	mg/kg		1	n.d.	-
Uranium (U) (Radioactive element) (CAS No.: 7440-61-1)	mg/kg		1	n.d.	-
Halogen					
Halogen-Fluorine (F) (CAS No.: 14762-94-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Chlorine (Cl) (CAS No.: 22537-15-1)	mg/kg		50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg		50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg		50	n.d.	-
Dibutyl Tin (DBT)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.	0.03	n.d.	-
Tributyl Tin (TBT)	mg/kg		0.03	n.d.	-
Triphenyl Tin (TphT)	mg/kg		0.03	n.d.	-
Diocetyl Tin (DOT)	mg/kg		0.03	n.d.	-
Monobutyl Tin (MBT)	mg/kg		0.03	n.d.	-
Tetrabutyltin (TeBT)	mg/kg		0.03	n.d.	-
MonoocetylTin (MOT)	mg/kg		0.03	n.d.	-
Bis(tributyltin)oxide (TBTO)*** (CAS No.: 56-35-9)	mg/kg		-	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Polycyclic Aromatic Hydrocarbons (PAHs)					
Acenaphthene (CAS No.: 83-32-9)	mg/kg	With reference to AfPS GS 2014:01 PAK. Analysis was performed by GC/MS.	0.2	n.d.	-
Acenaphthylene (CAS No.: 208-96-8)	mg/kg		0.2	n.d.	-
Anthracene (CAS No.: 120-12-7)	mg/kg		0.2	n.d.	-
Benzo[a]anthracene (CAS No.: 56-55-3)	mg/kg		0.2	n.d.	-
Benzo[a]pyrene (CAS No.: 50-32-8)	mg/kg		0.2	n.d.	-
Benzo[b]fluoranthene (CAS No.: 205-99-2)	mg/kg		0.2	n.d.	-
Benzo[g,h,i]perylene (CAS No.: 191-24-2)	mg/kg		0.2	n.d.	-
Benzo[k]fluoranthene (CAS No.: 207-08-9)	mg/kg		0.2	n.d.	-
Chrysene (CAS No.: 218-01-9)	mg/kg		0.2	n.d.	-
Dibenzo[a,h]anthracene (CAS No.: 53-70-3)	mg/kg		0.2	n.d.	-
Fluoranthene (CAS No.: 206-44-0)	mg/kg		0.2	n.d.	-
Fluorene (CAS No.: 86-73-7)	mg/kg		0.2	n.d.	-
Indeno[1,2,3-c,d] pyrene (CAS No.: 193-39-5)	mg/kg		0.2	n.d.	-
Naphthalene (CAS No.: 91-20-3)	mg/kg		0.2	n.d.	-
Phenanthrene (CAS No.: 85-01-8)	mg/kg		0.2	n.d.	-
Pyrene (CAS No.: 129-00-0)	mg/kg		0.2	n.d.	-
Benzo[j]fluoranthene (CAS No.: 205-82-3)	mg/kg		0.2	n.d.	-
Benzo[e]pyrene (CAS No.: 192-97-2)	mg/kg		0.2	n.d.	-
Sum of 18 PAHs	mg/kg	-	n.d.	Δ	
Medium-Chained Chlorinated Paraffins (C14-C17) (MCCP) (CAS No.: 85535-85-9)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	100	n.d.	-
Perfluorooctane sulfonates (PFOS-Acid, Metal Salt, Amide)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
PFOA (CAS No.: 335-67-1)	mg/kg		10	n.d.	-
Dimethyl Fumarate (CAS No.: 624-49-7)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.1	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
2- (3,5-di-tert-butyl-2-hydroxyphenyl)-2H-benzotriazole (CAS No.: 3846-71-7)	mg/kg	With reference to US EPA 3540C (1996). Analysis was performed by GC/MS.	5	n.d.	-
CFC's (Chlorofluorocarbons)					
Group I					
Chlorofluorocarbon-11 (CAS No.: 75-69-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-12 (CAS No.: 75-71-8)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-113 (CAS No.: 76-13-1)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-114 (CAS No.: 76-14-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-115 (CAS No.: 76-15-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Group III					
Chlorofluorocarbon-13 (CAS No.: 75-72-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-111 (CAS No.: 354-56-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-112 (CAS No.: 76-12-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-211 (CAS No.: 422-78-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-212 (CAS No.: 3182-26-1)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-213 (CAS No.: 2354-06-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-214 (CAS No.: 29255-31-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-215 (CAS No.: 4259-43-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-216 (CAS No.: 661-97-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chlorofluorocarbon-217 (CAS No.: 422-86-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HCFCs (Hydrochlorofluorocarbons)					
HCFC-21 (CAS No.: 75-43-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-22 (CAS No.: 75-45-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-31 (CAS No.: 593-70-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-121 (CAS No.: 354-14-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-122 (CAS No.: 354-21-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-123 (CAS No.: 306-83-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-124 (CAS No.: 2837-89-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-131 (CAS No.: 359-28-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-132b (CAS No.: 1649-08-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-133a (CAS No.: 75-88-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-141b (CAS No.: 1717-00-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-142b (CAS No.: 75-68-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-221 (CAS No.: 422-26-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-222 (CAS No.: 422-49-1)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-223 (CAS No.: 422-52-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-224 (CAS No.: 422-54-8)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-225ca (CAS No.: 422-56-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-225cb (CAS No.: 507-55-1)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-226 (CAS No.: 431-87-8)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HCFC-231 (CAS No.: 421-94-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-232 (CAS No.: 460-89-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-233 (CAS No.: 7125-84-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-234 (CAS No.: 425-94-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-235 (CAS No.: 460-92-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-241 (CAS No.: 666-27-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-242 (CAS No.: 460-63-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-243 (CAS No.: 460-69-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-244	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-251 (CAS No.: 421-41-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-252 (CAS No.: 819-00-1)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-253 (CAS No.: 460-35-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-261 (CAS No.: 420-97-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-262 (CAS No.: 421-02-03)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HCFC-271 (CAS No.: 430-55-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Halons					
Halon-1211 (CAS No.: 353-59-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Halon-1301 (CAS No.: 75-63-8)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Halon-2402 (CAS No.: 124-73-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Bromomethane (CAS No.: 74-83-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HBFCs (Hydrobromofluorocarbons)					
HBFC-21B2 (CH ₂ FBr ₂) (CAS No.: 1868-53-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-22B1 (CH ₂ F ₂ Br) (CAS No.: 1511-62-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-31B1 (CH ₂ F ₂ Br) (CAS No.: 373-52-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-121B4 (C ₂ H ₂ F ₄ Br ₂)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-122B3 (C ₂ H ₂ F ₂ Br ₃)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-123B2 (C ₂ H ₂ F ₃ Br ₂)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-124B1 (C ₂ H ₂ F ₄ Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-131B3 (C ₂ H ₂ F ₂ Br ₃)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-132B2 (C ₂ H ₂ F ₂ Br ₂)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-133B1 (C ₂ H ₂ F ₃ Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-141B2 (C ₂ H ₃ F ₂ Br ₂)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-142B1 (C ₂ H ₃ F ₂ Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-151B1 (C ₂ H ₄ F ₂ Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-221B6 (C ₃ H ₂ F ₆ Br ₆)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-222B5 (C ₃ H ₂ F ₂ Br ₅)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-223B4 (C ₃ H ₂ F ₃ Br ₄)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-224B3 (C ₃ H ₂ F ₄ Br ₃)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-225B2 (C ₃ H ₂ F ₅ Br ₂)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HBFC-226B1 (C3HF6Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-231B5 (C3H2FBr5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-232B4 (C3H2F2Br4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-233B3 (C3H2F3Br3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-234B2 (C3H2F4Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-235B1 (C3H2F5Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-241B4 (C3H3FBr4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-242B3 (C3H3F2Br3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-243B2 (C3H3F3Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-244B1 (C3H3F4Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-251B3 (C3H4FBr3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-252B2 (C3H4F2Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-253B1 (C3H4F3Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-261B2 (C3H5FBr2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-262B1 (C3H5F2Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-271B1 (C3H6FBr)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFCs (Hydrofluorocarbon)					
HFC-23 (CHF3) (CAS No.: 75-46-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-32 (CH2F2) (CAS No.: 75-10-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-41 (CH3F) (CAS No.: 593-53-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HFC-43-10mee (C5H2F10)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-125 (C2HF5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-134 (C2H2F4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-134a (CH2FCF3) (CAS No.: 811-97-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-143 (CH3F3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-143a (CH3F3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-152a (C2H4F2) (CAS No.: 75-37-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-227ea (C3HF7) (CAS No.: 431-89-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-236fa (C3H2F6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-236ea (C3H2F6) (CAS No.: 431-63-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-245ca (C3H3F5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-245fa (C3H3F5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HFC-365mfc (C4H5F5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
PFCs (Perfluorocarbon)					
F14 (CAS No.: 75-73-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Fluorocarbon 116 (CAS No.: 76-16-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Freon 218 (CAS No.: 76-19-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Decafluorobutane (CAS No.: 355-25-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Freon C318 (CAS No.: 115-25-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Perfluor-1-butene (CAS No.: 357-26-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
perfluorisobutene (CAS No.: 382-21-8)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,4-dihydrooctafluorobutane (CAS No.: 377-36-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Nonafluor-2- (trifluoromethyl) butane (CAS No.: 594-91-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Perfluoro-n-pentane (CAS No.: 678-26-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
2-perfluoromethylpentane (CAS No.: 355-04-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Perfluorohexane (CAS No.: 355-42-0)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
CHCs (Chlorinate hydrocarbon)					
1,1,1,2-Tetrachloroethane (CAS No.: 630-20-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1,1-Trichloroethane (CAS No.: 71-55-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1,2,2-Tetrachloroethane (CAS No.: 79-34-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1,2-Trichloroethane (CAS No.: 79-00-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1-Dichloroethane (CAS No.: 75-34-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1-Dichloroethene (CAS No.: 75-35-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,1-Dichloropropene (CAS No.: 563-58-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,2,3-Trichloropropane (CAS No.: 96-18-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,2-Dichloroethane (CAS No.: 107-06-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,2-Dichloropropane (CAS No.: 78-87-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
1,3-Dichloropropane (CAS No.: 142-28-9)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
2,2-Dichloropropane (CAS No.: 594-20-7)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Carbon tetrachloride (CAS No.: 56-23-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-

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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Chloroethane (CAS No.: 75-00-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chloroform (CAS No.: 67-66-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Chloromethane (CAS No.: 74-87-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
cis-1,2-Dichloroethene (CAS No.: 156-59-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
cis-1,3-Dichloropropene (CAS No.: 10061-01-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Hexachlorobutadiene (CAS No.: 87-68-3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Methylene Chloride (CAS No.: 75-09-2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Tetrachloroethene (CAS No.: 127-18-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
trans-1,2-Dichloroethene (CAS No.: 156-60-5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
trans-1,3-Dichloropropene (CAS No.: 10061-02-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Trichloroethylene (CAS No.: 79-01-6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Sulfur Hexafluoride (SF6) (CAS No.: 2551-62-4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
Ethylene glycol monoethyl ether acetate (CAS No.: 111-15-9)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
Ethylene glycol monomethyl ether acetate (CAS No.: 110-49-6)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
Ethylene glycol monomethyl ether (CAS No.: 109-86-4)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
Ethylene glycol monoethyl ether (CAS No.: 110-80-5)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
Diethylene glycol dimethyl ether (CAS No.: 111-96-6)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000

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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	1000
DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-
DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0; 68515-48-0)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-
DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0; 68515-49-1)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-
DIHP (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich) (CAS No.: 71888-89-6)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.01	n.d.	-
DHNUP (1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters) (CAS No.: 68515-42-4)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.01	n.d.	-
DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DNHP (Di-n-heptyl phthalate) (CAS No.: 3648-21-3)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DIPP (Di-iso-pentyl phthalate) (CAS No.: 605-50-5)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DPP (1,2-Benzenedicarboxylic acid, dipentylester, branched and linear) (CAS No.: 84777-06-0)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
NPIPP (N-pentyl iso-pentyl phthalate) (CAS No.: 776297-69-9)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DCHP (Di-cyclohexyl phthalate) (CAS No.: 84-61-7)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DEP (Di-ethyl phthalate) (CAS No.: 84-66-2)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DIOP (Di-isooctyl phthalate) (CAS No.: 27554-26-3)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.01	n.d.	-
DMP (Di-methyl phthalate) (CAS No.: 131-11-3)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DNNP (Di-n-nonyl phthalate) (DNP) (CAS No.: 84-76-4)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-

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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
DNPP (Di-n-pentyl phthalate) (CAS No.: 131-18-0)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DPrP (Di-propyl phthalate) (CAS No.: 131-16-8)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DEHA (Di-2-ethylhexyl adipate) (CAS No.: 103-23-1)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	%	With reference to EN 14372 (2004). Analysis was performed by GC/MS.	0.003	n.d.	-
Perchlorate (CAS No.: 14797-73-0)	mg/kg	Analysis was performed by IC.	0.1	n.d.	-
Nonylphenol (NP)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
Tris (2-chloroethyl) phosphate (TCEP) (CAS No.: 115-96-8)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
Tris(1-chloro-2-propyl) phosphate (TCPP) (CAS No.: 13674-84-5)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
Tris(1,3-dichloro-2-propyl)phosphate (TDCPP) (CAS No.: 13674-87-8)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
Trixylyl phosphate (TXP) (CAS No.: 25155-23-1)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	25	n.d.	-
4-(1,1,3,3-tetramethylbutyl) phenol, (4-tert-Octylphenol) (CAS No.: 140-66-9)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by LC/MS.	10	n.d.	-
N,N-dimethylacetamide (DMAC) (CAS No.: 127-19-5)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	10	n.d.	-
TBBP-A-bis (CAS No.: 21850-44-2)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST) (CAS No.: 68921-45-9)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	100	n.d.	-
2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320) (CAS No.: 3846-71-7)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328) (CAS No.: 25973-55-1)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-

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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION

NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Reaction mass of 2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate and 2-ethylhexyl 10-ethyl-4-[[2-[(2-ethylhexyl)oxy]-2-oxoethyl]thio]-4-octyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (reaction mass of DOTE and MOTE)***	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.***	-	n.d.	-
2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)*** (CAS No.: 15571-58-1)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.***	-	n.d.	-

Note :

1. mg/kg = ppm ; 0.1wt% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected = less than MDL
4. " - " = Not Regulated
5. ** = Qualitative analysis (No Unit)
6. Negative = Undetectable / Positive = Detectable
7. Testing range of asbestos qualitative analysis is from less than 0.1% to 100%. The judgment criterion: asbestos fibers being found is shown as "Positive"; asbestos fibers not being found is shown as "Negative".
8. ***: The substance was calculated by the test results of Tributyl Tin, Monooctyl Tin or Dioctyl Tin. The MDL was evaluated for Tributyl Tin, Monooctyl Tin or Dioctyl Tin.
9. Parameter Conversion Table : http://twap.sgs.com/sgsrsts/chn/download-REACH_tw.asp

PFOS Reference Information : POPs - (EU) 757/2010

Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1µg/m².

VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION

NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



Δ AfPS (German commission for Product Safety): GS PAHs requirements

Parameter	Category 1	Category 2		Category 3	
	Material intended to be put in the mouth or toys with intended skin contact (longer than 30 s).	Materials not falling under category 1 with foreseeable contact to skin for longer than 30 seconds (long-term skin or frequent contact).		Materials not falling under category 1 or 2 with foreseeable contact to skin for less than 30 seconds (short-term skin contact).	
		Toy under 2009/48/EC	Other products under ProdSG	Toy under 2009/48/EC	Other products under ProdSG
Naphthalene	< 1	< 2		< 10	
Acenaphthylene	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Acenaphthene					
Fluorene					
Phenanthrene					
Anthracene					
Fluoranthene					
Pyrene					
Benzo[a]anthracene					
Chrysene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[b]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[j]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[k]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[a]pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[e]pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno[1,2,3-c,d] pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo[a,h]anthracene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[g,h,i]perylene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Sum of 18 PAH	< 1	< 5	< 10	< 20	< 50

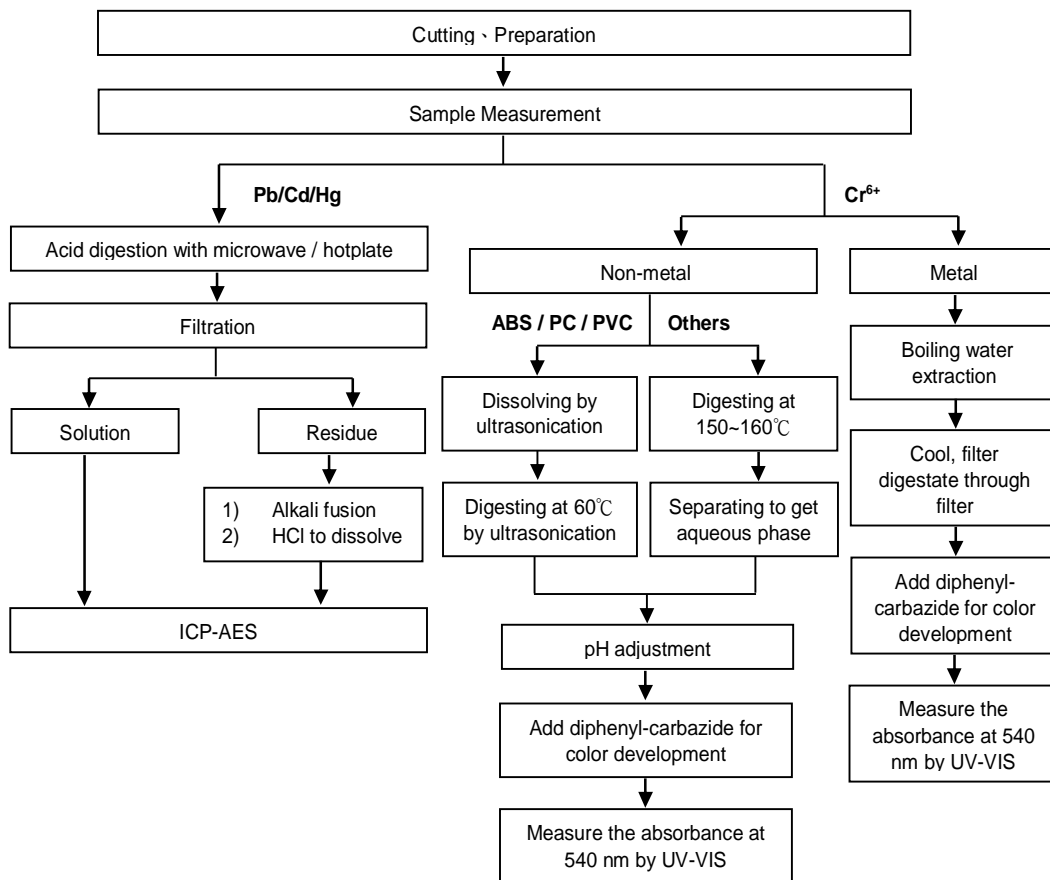
Unit: mg/kg



Analytical flow chart of Heavy Metal

These samples were dissolved totally by pre-conditioning method according to below flow chart. (Cr⁶⁺ test method excluded)

- Technician : JR Wang
- Supervisor: Troy Chang



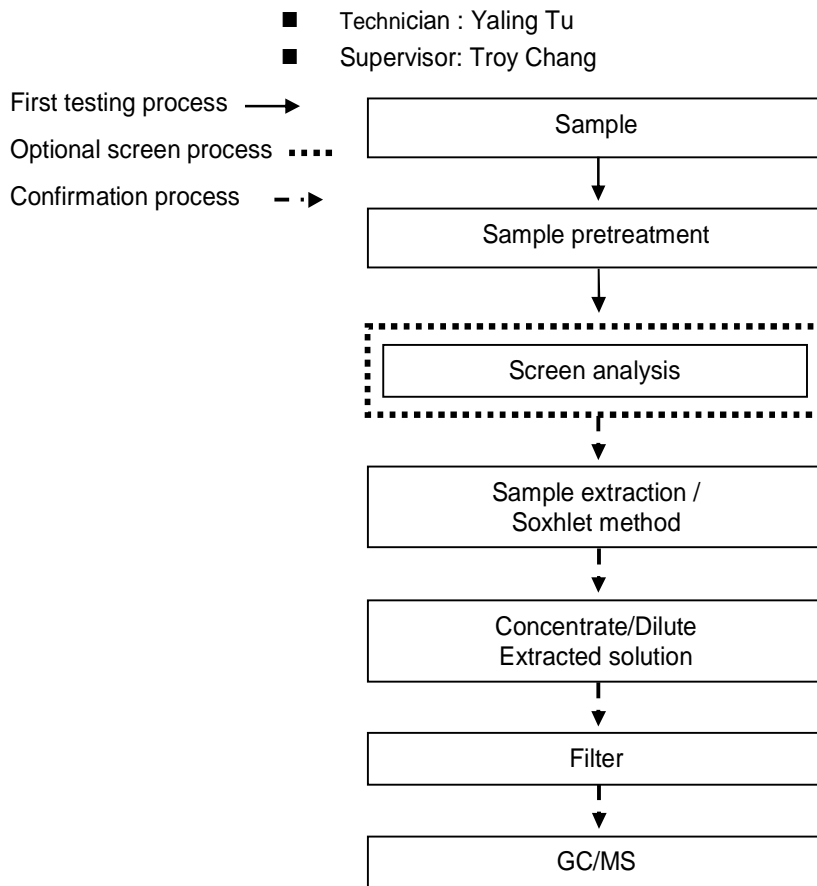
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VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart – PBB / PBDE



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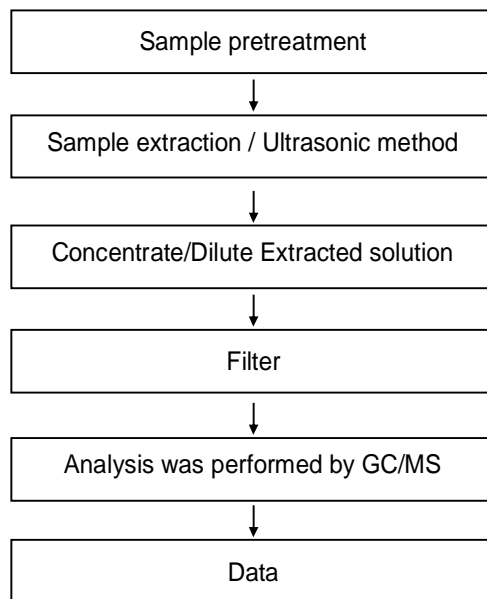
VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - PCBs

- Technician: Yaling Tu
- Supervisor: Troy Chang



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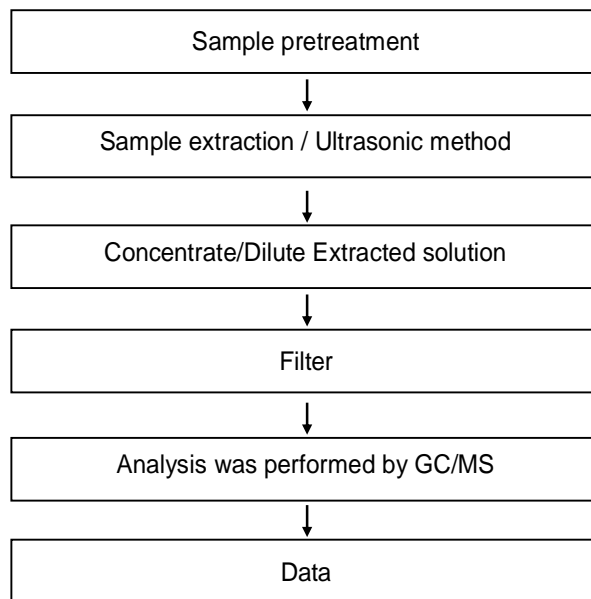
VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - PCNs

- Technician: Yaling Tu
- Supervisor: Troy Chang

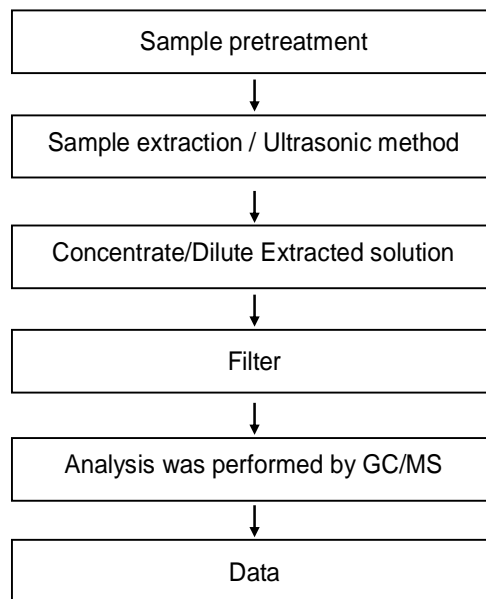


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Analytical flow chart - PCTs

- Technician: Barry Tseng
- Supervisor: Troy Chang



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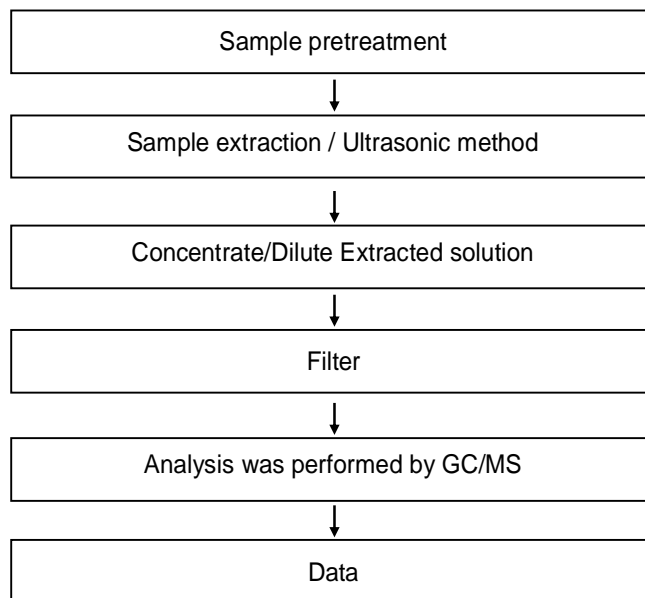
VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Chlorinated Paraffins

- Technician: Yaling Tu
- Supervisor: Troy Chang



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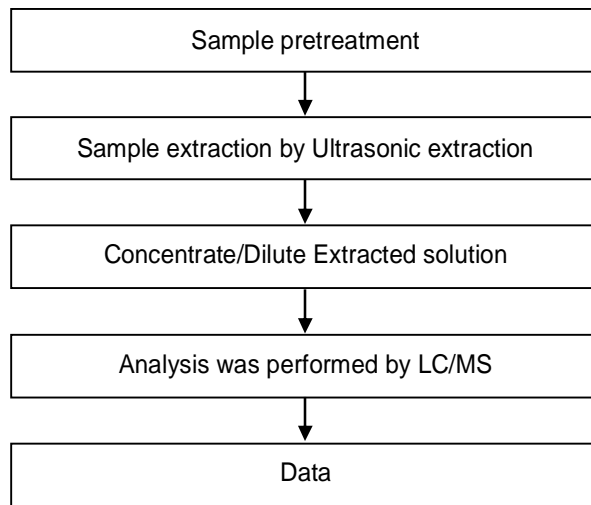
VANGUARD INTERNATIONAL SEMICONDUCTOR CORPORATION



NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - TBBP-A

- Technician: Yaling Tu
- Supervisor: Troy Chang



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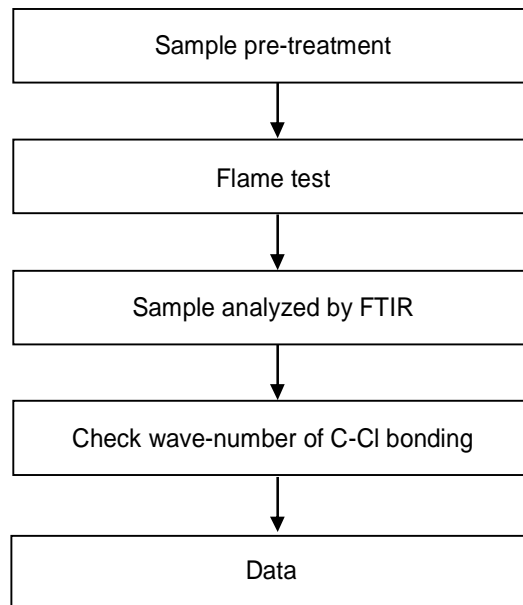
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



Analysis flow chart - PVC

- Technician: Yaling Tu
- Supervisor: Troy Chang



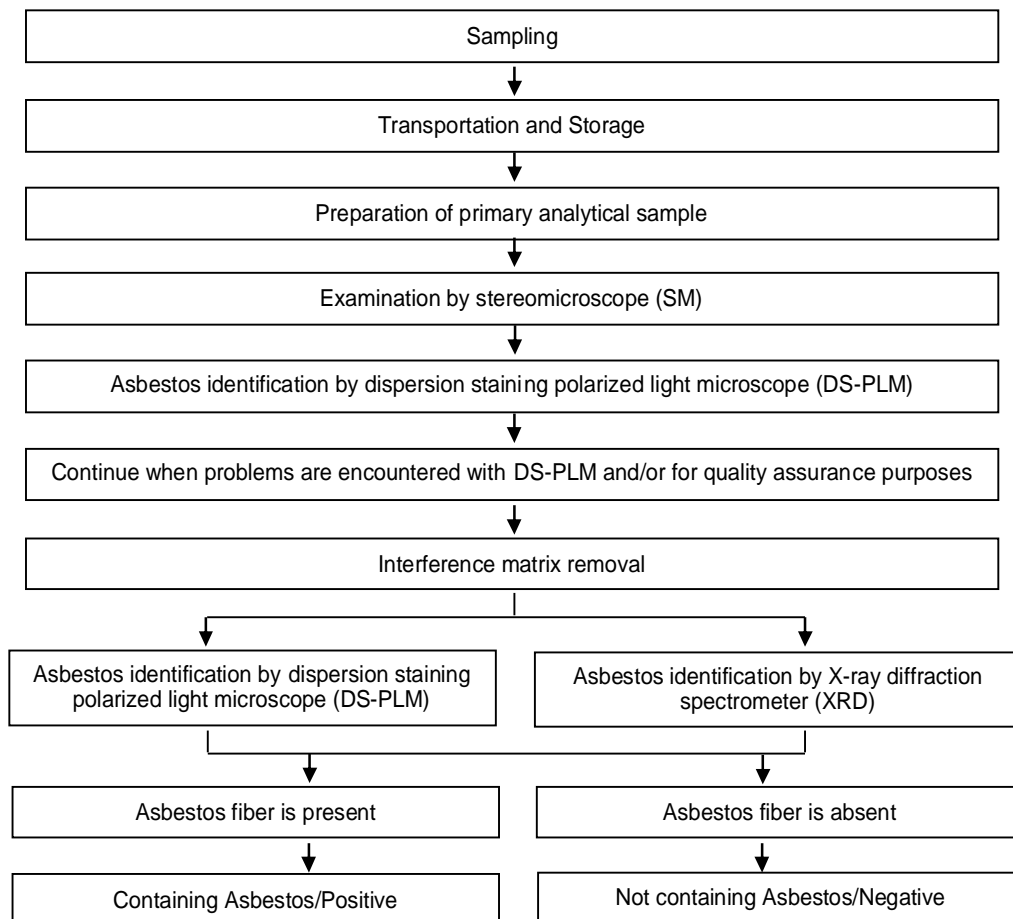
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Analysis flow chart for determination of Asbestos

- Technician: Victor Kao
- Supervisor: Wendy Wei

【Reference method: EPA 600/R-93/116】



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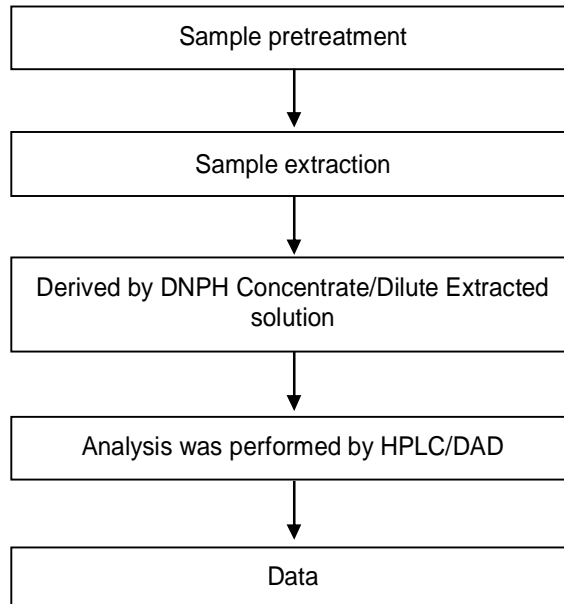
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Formaldehyde

- Technician: Yaling Tu
- Supervisor: Troy Chang



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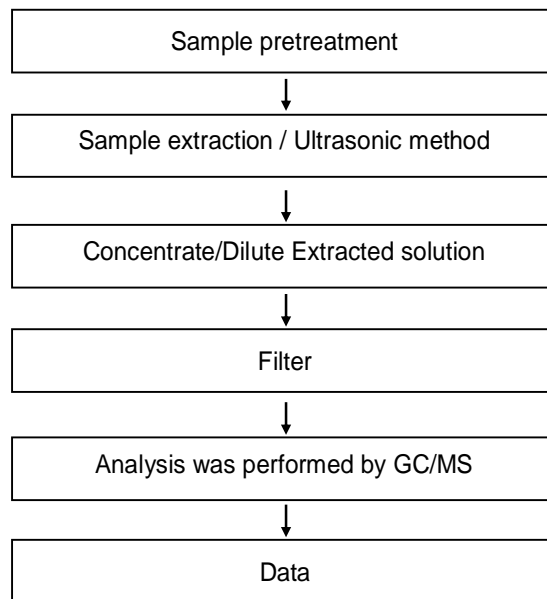
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - HBCDD

- Technician: Yaling Tu
- Supervisor: Troy Chang



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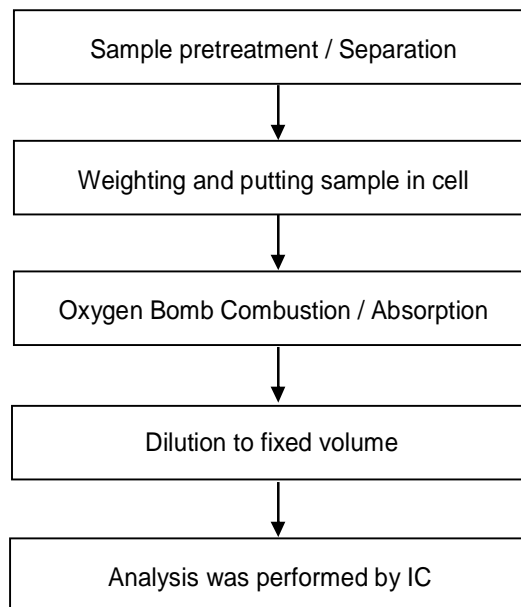
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Halogen

- Technician: Rita Chen
- Supervisor: Troy Chang



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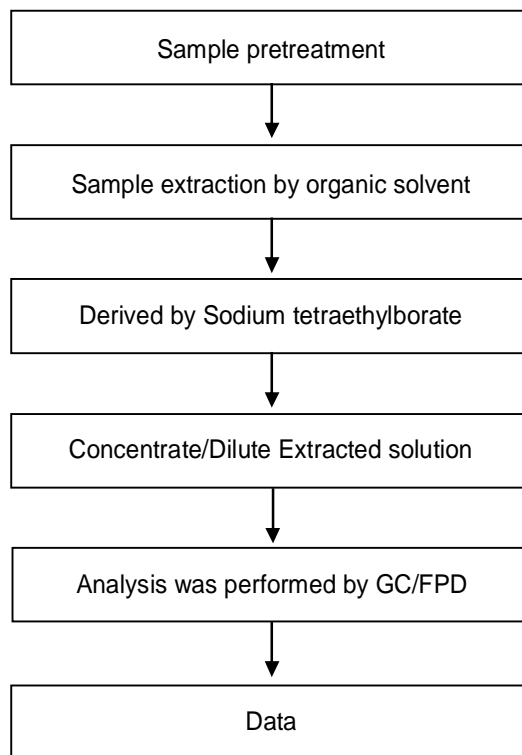
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Organic-Tin

- Technician: Yaling Tu
- Supervisor: Troy Chang



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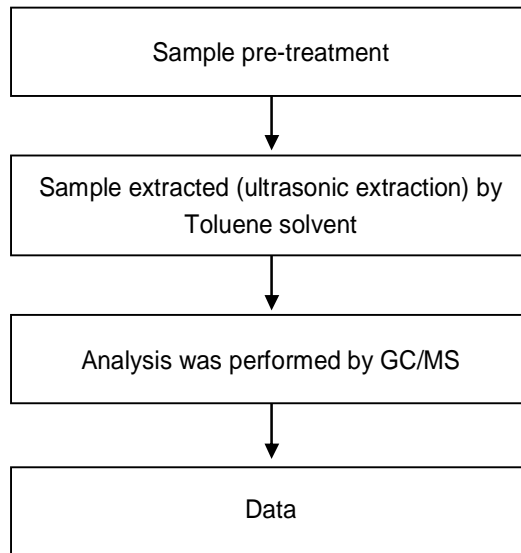
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - PAHs (Polycyclic Aromatic Hydrocarbons)

- Technician: Yaling Tu
- Supervisor: Troy Chang



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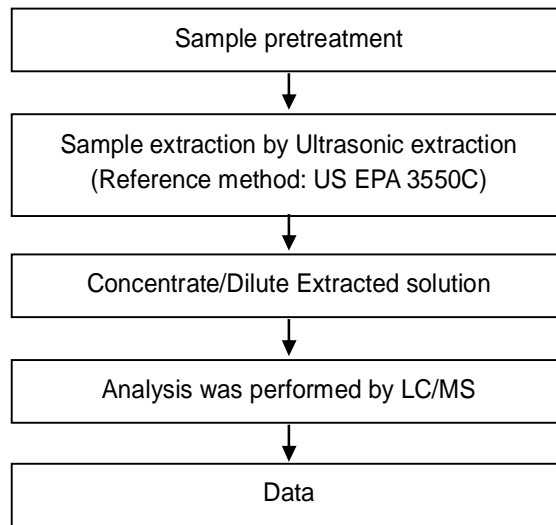
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



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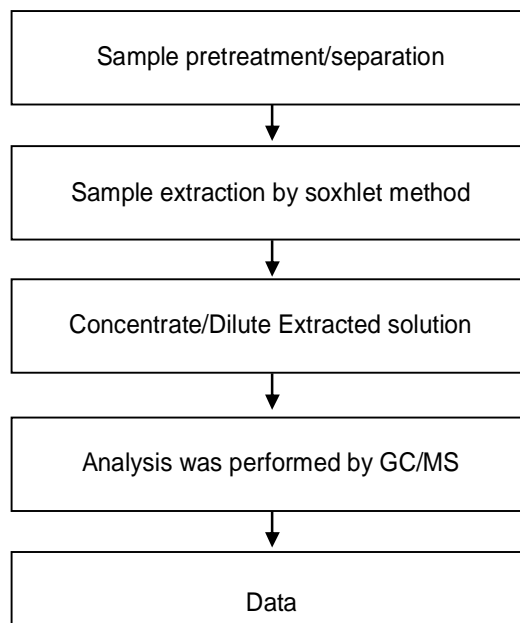
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.



Analytical flow chart - Benzotriazole

- Technician: Yaling Tu
- Supervisor: Troy Chang



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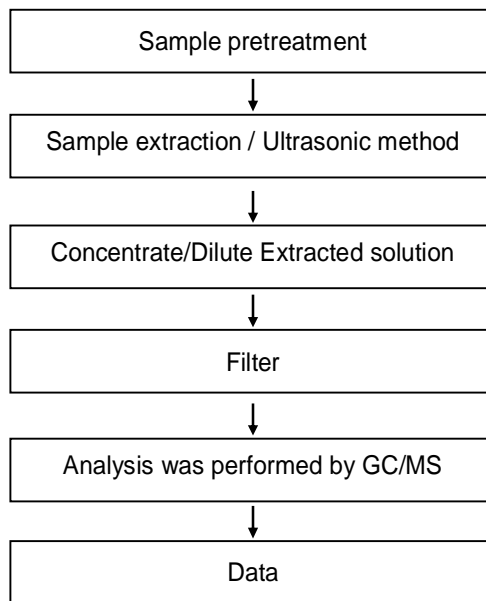
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Dimethyl Fumarate

- Technician: Yaling Tu
- Supervisor: Troy Chang

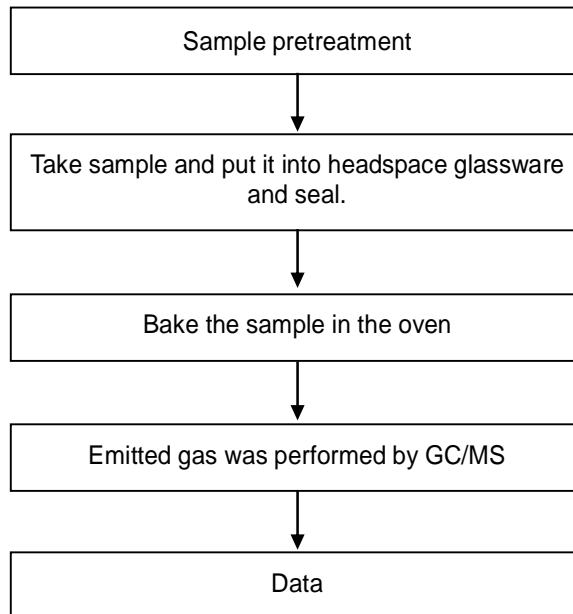


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Analytical flow chart - volatile organic compounds (VOCs)

- Technician : Chun Wu
- Supervisor : Shinjyh Chen
- 【 Reference method : US EPA 5021, 5021A 】



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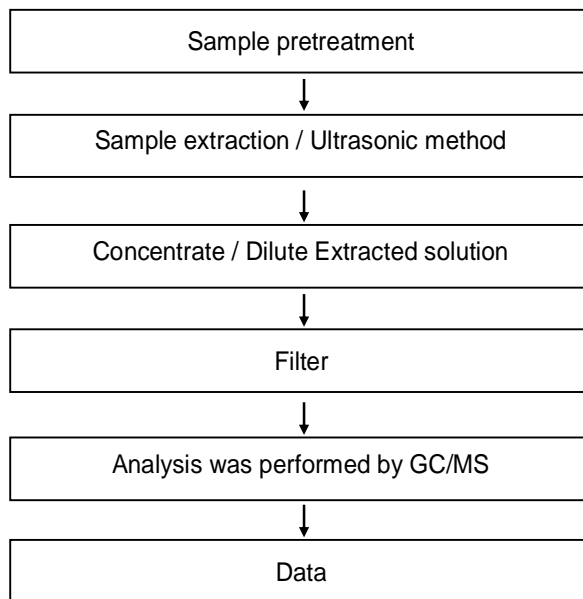
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Ethylene glycol ether

- Technician: Yaling Tu
- Supervisor: Troy Chang



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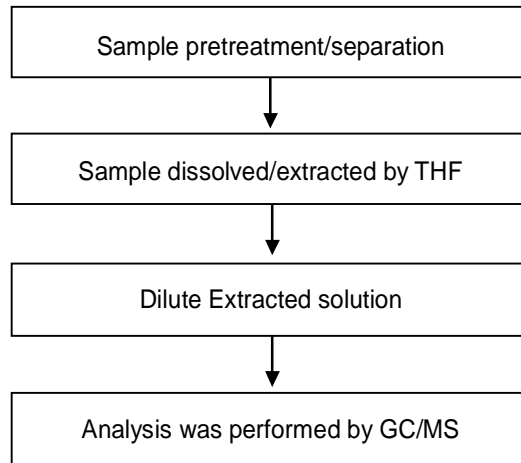


NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - Phthalate

- Technician: Andy Hsu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】



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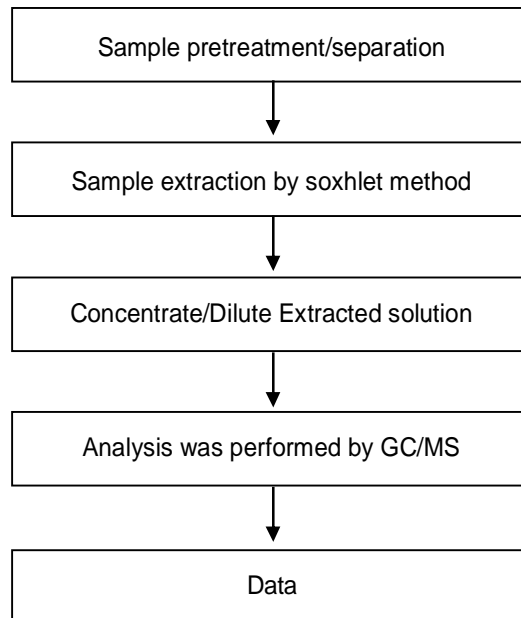
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Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang



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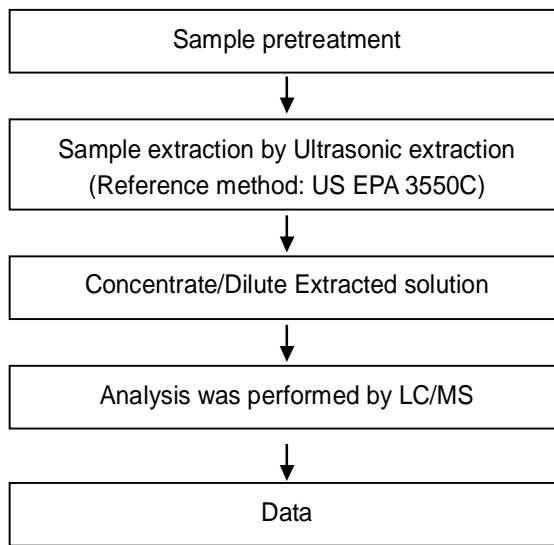
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - NP、OP

- Technician: Yaling Tu
- Supervisor: Troy Chang



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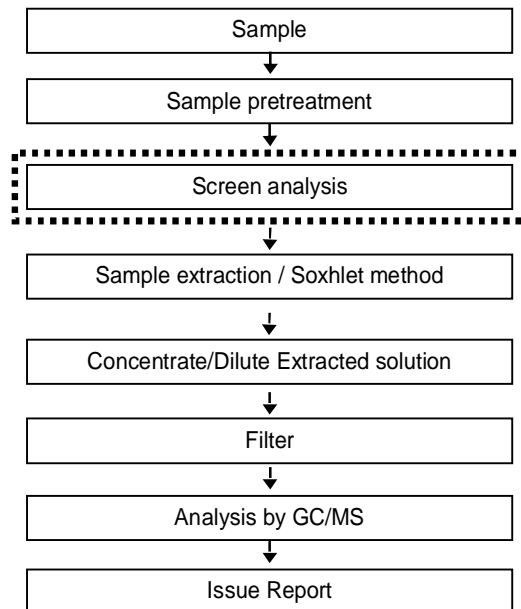
Analytical flow chart - TBBP-A-bis

- Technician: Yaling Tu
- Supervisor: Troy Chang

First testing process —————>

Optional screen process ······->

Confirmation process - · - ·->



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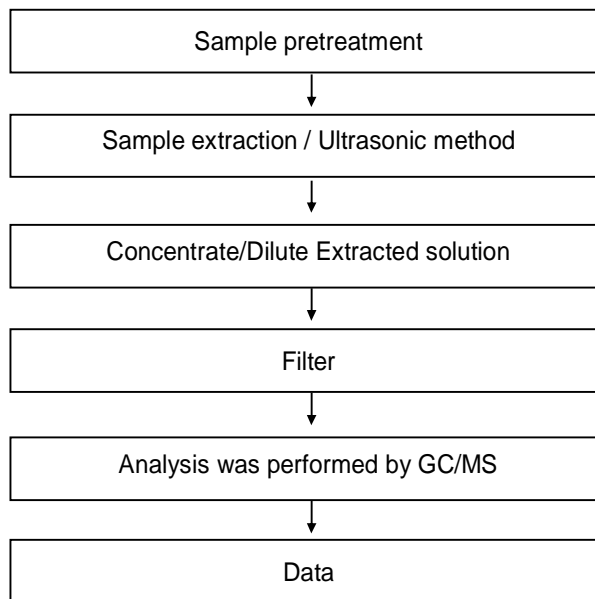
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NO. 123, PARK AVE-3RD., SCIENCE-BASED INDUSTRIAL PARK, HSINCHU, TAIWAN 30077, R. O. C.

Analytical flow chart - BNST

- Technician: Yaling Tu
- Supervisor: Troy Chang



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Date : 2018/03/05

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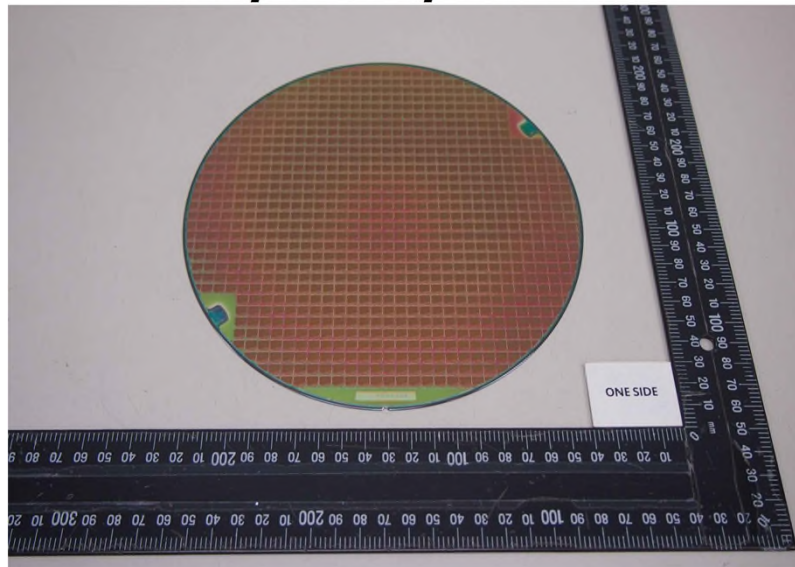
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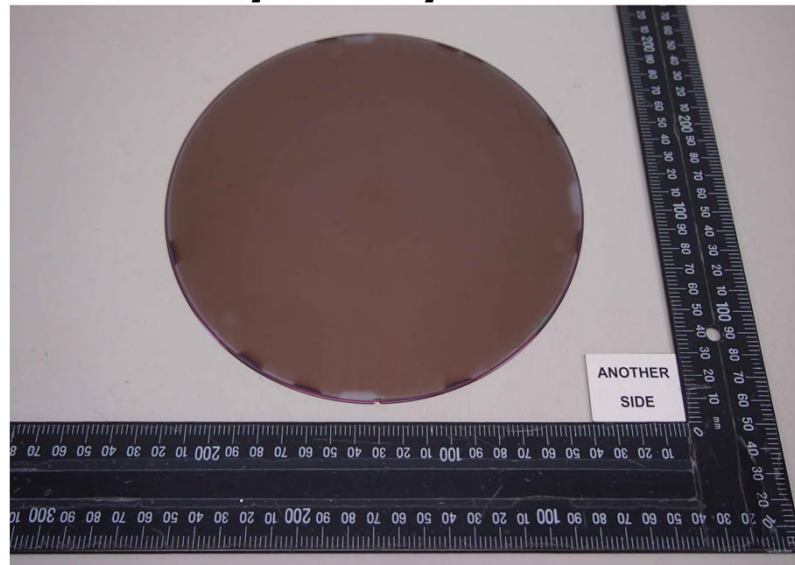


* The tested sample / part is marked by an arrow if it's shown on the photo. *

CE/2018/23813



CE/2018/23813



** End of Report **

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