

Test Report

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TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

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

Sample Submitted By : TOWERJAZZ SEMICONDUCTOR
Sample Description : SILICON WAFERS
Style/Item No. : 0.18 μ 8INCH TOWERJAZZ MH FAB3 (CA18, CS18)
Buyer/Order No. : 4500288549
Sample Receiving Date : 2019/12/26
Testing Period : 2019/12/26 to 2020/01/07

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) Please refer to next pages for the 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 Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.


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



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Test Result(s)

PART NAME No.1 : SILICON WAFERS

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-OES.	2	n.d.	100
Lead (Pb)	mg/kg	With reference to IEC 62321-5 (2013) and performed by ICP-OES.	2	n.d.	1000
Mercury (Hg)	mg/kg	With reference to IEC 62321-4:2013+AMD1:2017 and performed by ICP-OES.	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.	-	

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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 Terphenyls (PCTs)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.5	n.d.	-
Polychlorinated Naphthalene (PCNs)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	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.	-
Asbestos					
Chrysotile (CAS No.: 12001-29-5)	%	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	-
Amosite (CAS No.: 12172-73-5)	%		-	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	-
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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
Arsenic (As)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	-
Diarsenic trioxide (As ₂ O ₃) (CAS No.: 1327-53-3)	mg/kg	Calculated from the result of Arsenic.	2 (▲)	n.d.	-
Diarsenic pentaoxide (As ₂ O ₅)	mg/kg	Calculated from the result of Arsenic.	2 (▲)	n.d.	-
Formaldehyde (CAS No.: 50-00-0)	mg/kg	With reference to ISO 17226-1 (2018). 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.	-
Perchlorate (CAS No.: 14797-73-0)	µg/g	Analysis was performed by IC.	0.1	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.	-
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.	-
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
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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
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
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
Tributyl Tin (TBT)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.	0.03	n.d.	-
Diphenyltin	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.	0.03	n.d.	-
Bis(tributyltin)oxide (TBTO) (CAS No.: 56-35-9)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD. Calculated from the result of Tributyl Tin (TBT).	0.03 (▲)	n.d.	-
Dibutyl Tin (DBT)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.	0.03	n.d.	-
Diocetyl Tin (DOT)	mg/kg	With reference to ISO 17353 (2004). Analysis was performed by GC/FPD.	0.03	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.	-
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.	-
Cobalt dichloride (CAS No.: 7646-79-9)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.	50	n.d.	-
Cobalt (Co)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	26.7	-
Hexavalent Chromium Cr(VI)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-Vis.	50	n.d.	-
Strontium chromate*** (CAS No.: 7789-06-2)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS.***	-	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
Potassium hydroxyoctaoxidizincatedi-chromate*** (CAS No.: 11103-86-9)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS.***	-	n.d.	-
Pentazinc chromate octahydroxide*** (CAS No.: 49663-84-5)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS.***	-	n.d.	-
Lead chromate*** (CAS No.: 7758-97-6) (※5)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS, ICP-OES.	-	n.d.	-
Lead chromate molybdate sulphate red (C.I. Pigment Red 104)*** (CAS No.: 12656-85-8) (※5)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS, ICP-OES.	-	n.d.	-
Lead sulfochromate yellow (C.I. Pigment Yellow 34)*** (CAS No.: 1344-37-2) (※5)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by UV-VIS, ICP-OES.	-	n.d.	-
Lead (Pb)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.	50	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.	-
Boron (B) (※2)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.	50	n.d.	-
Boric acid*** (CAS No.: 10043-35-3; 11113-50-1)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.***	-	n.d.	-
Disodium tetraborate, anhydrous*** (CAS No.: 1303-96-4, 1330-43-4, 12179-04-3)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.***	-	n.d.	-
Tetraboron disodium heptaoxide, hydrate (CAS No.: 12267-73-1) (* 2)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by ICP-OES.	-	n.d.	-
DIHP (1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich) (CAS No.: 71888-89-6)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
DHNUP (1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters) (CAS No.: 68515-42-4)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-
DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	mg/kg	With reference to IEC 62321-8 (2017). Analysis was performed by GC/MS.	50	n.d.	-
Bis(2-methoxyethyl) ether (CAS No.: 111-96-6)	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by GC/MS.	500	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.	-
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 GC/MS.	50	n.d.	-
Beryllium (Be)	mg/kg	With reference to US EPA 3052 (1996). Analysis was performed by ICP-OES.	2	n.d.	-
Hexabromobenzene	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	n.d.	-
Brominated styrene	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	5	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.	-
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.	-
Monomethyl dibromodiphenyl methane (DBBT) (CAS No.: 99688-47-8)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.5	n.d.	-
Monomethyl dichlorodiphenyl methane (Ugilec121) (CAS No.: 81161-70-8)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.5	n.d.	-
Monomethyl tetrachlorodiphenyl methane (Ugilec141)	mg/kg	With reference to US EPA 3550C (2007). Analysis was performed by GC/MS.	0.5	n.d.	-
Polyvinyl chloride (PVC)	**	Analysis was performed by FTIR and FLAME Test.	-	Negative	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Bromine (Br) (CAS No.: 10097-32-2)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Halogen-Iodine (I) (CAS No.: 14362-44-8)	mg/kg	With reference to BS EN 14582 (2016). Analysis was performed by IC.	50	n.d.	-
Aluminosilicate, Refractory Ceramic Fibres 【oxides of aluminium and silicon are the main components present (in the fibres) within variable concentration ranges】	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by gravimetric method, ICP-OES.	500	n.d.	-
Zirconia Aluminosilicate, Refractory Ceramic Fibres 【oxides of aluminium, silicon and zirconium are the main components present (in the fibres) within variable concentration ranges】	mg/kg	SGS In-House method-RSTS-EE-SVHC-007. Analyzed by gravimetric method, ICP-OES.	500	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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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-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.	-
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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
HBFCs (Hydrobromofluorocarbons)					
HBFC-21B2 (CHFBr 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 (CHF 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.	-

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Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
HBFC-31B1 (CH2FBr) (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 (C2HFBr4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-122B3 (C2HF2Br3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-123B2 (C2HF3Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-124B1 (C2HF4Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-131B3 (C2H2FBr3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-132B2 (C2H2F2Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-133B1 (C2H2F3Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-141B2 (C2H3FBr2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-142B1 (C2H3F2Br)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-151B1 (C2H4FBr)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-221B6 (C3HFBr6)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-222B5 (C3HF2Br5)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-223B4 (C3HF3Br4)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-224B3 (C3HF4Br3)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
HBFC-225B2 (C3HF5Br2)	mg/kg	With reference to US EPA 5021A (2014). Analysis was performed by GC/MS.	1	n.d.	-
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.	-

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				No.1	
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.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.	-

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TOWERJAZZ SEMICONDUCTOR

RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
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.	-

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TOWERJAZZ SEMICONDUCTOR

RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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.	-
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.	-
Dichloromethane, 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.	-
Bromochloromethane (CAS No.: 74-97-5)	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.	-
Red phosphorus	**	Analysis was performed by Pyrolyzer-GC/MS.	-	Negative	-

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TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Test Item(s)	Unit	Method	MDL	Result	Limit
				No.1	
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	With reference to US EPA 3052 (1996) & 6020B (2014). Analysis was performed by ICP-MS.	1	n.d.	-
Thorium (Th) (Radioactive element) (CAS No.: 7440-29-1)	mg/kg	With reference to US EPA 3052 (1996) & 6020B (2014). Analysis was performed by ICP-MS.	1	n.d.	-
Uranium (U) (Radioactive element) (CAS No.: 7440-61-1)	mg/kg	With reference to US EPA 3052 (1996) & 6020B (2014). Analysis was performed by ICP-MS.	1	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 MDL was evaluated for element / tested substance.
9. Parameter Conversion Table : http://twap.sgs.com/sgsrsts/chn/download-REACH_tw.asp
10. (※2): The extracted soluble Boron is detected by ICP-OES.
11. (※5): Regarding the compound containing Cr(VI) and lead, lead and Cr(VI) are tested and respectively used for the calculation of the independent concentration of the compound containing Cr(VI) and lead. The minimum value of the two independently calculated concentrations is used as the final concentration for the report.
12. (*2): Tetraboron disodium heptaoxide, hydrate: Only anhydrous form of disodium tetraborate is relevant and considered according to ECHA explanation (Ref no.: INC 000000032519).

PFOS Reference Information : POPs - (EU) 2019/1021

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.

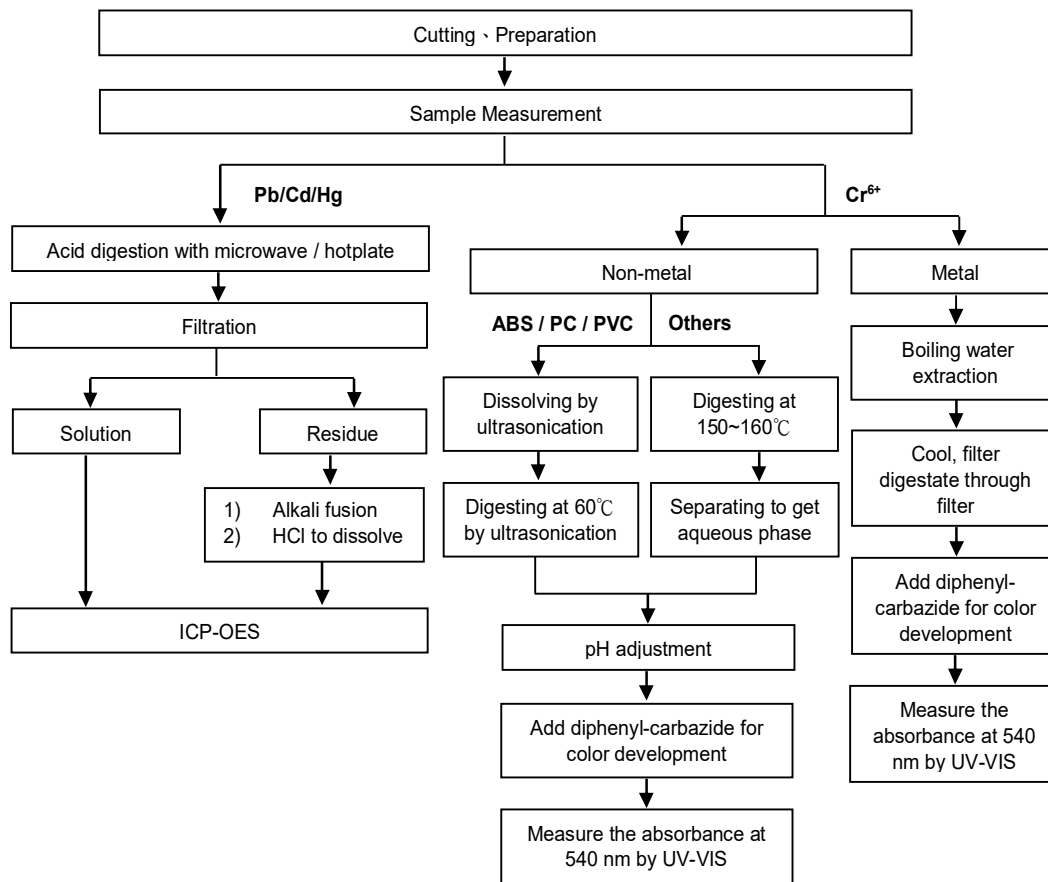
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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

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 : Rita Chen
- Supervisor: Troy Chang

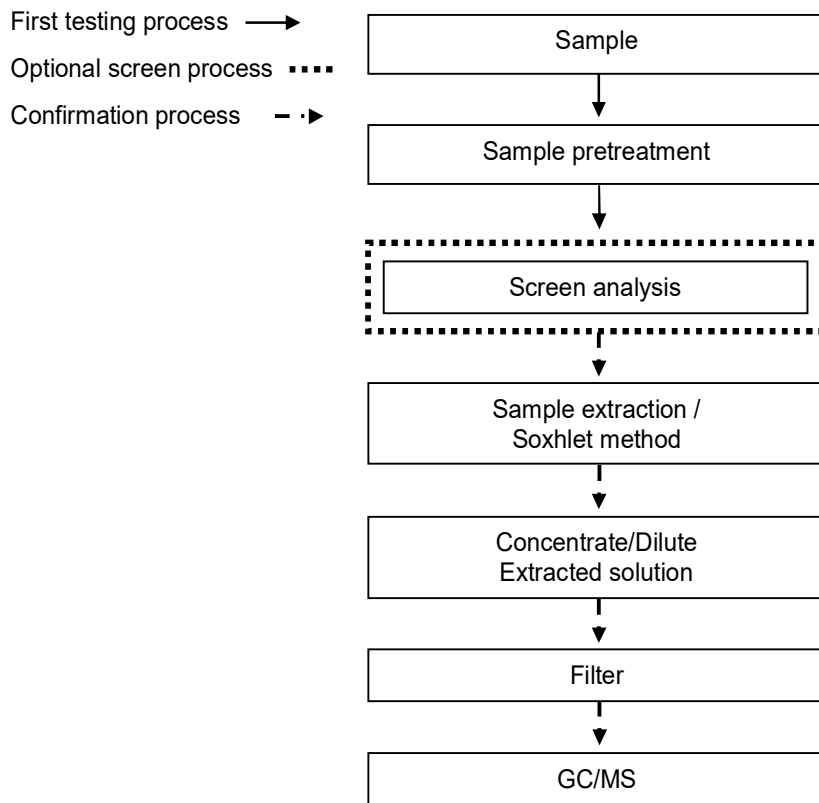


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart – PBB / PBDE

- Technician : Yaling Tu
- Supervisor: Troy Chang

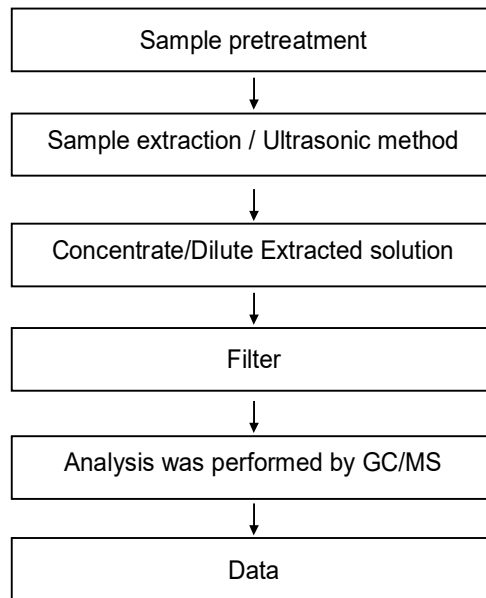


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - PCBs

- Technician: Yaling Tu
- Supervisor: Troy Chang

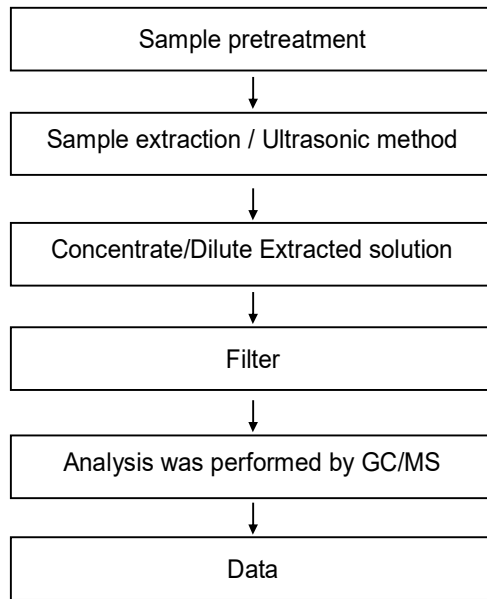


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - PCTs

- Technician: Yaling Tu
- Supervisor: Troy Chang

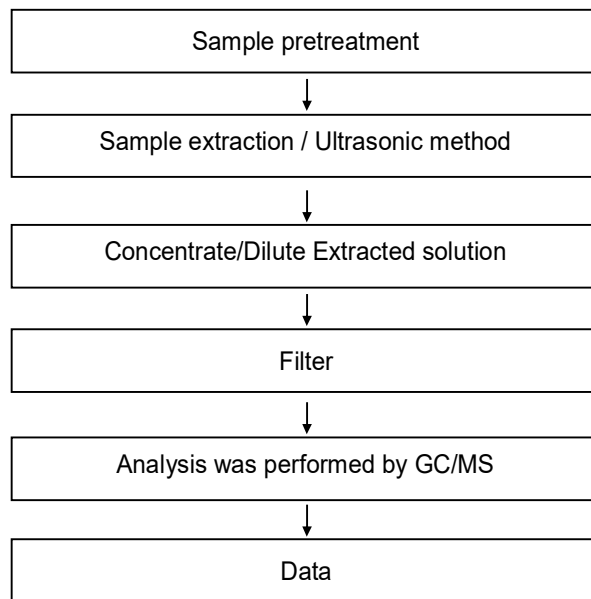


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - PCNs

- Technician: Yaling Tu
- Supervisor: Troy Chang

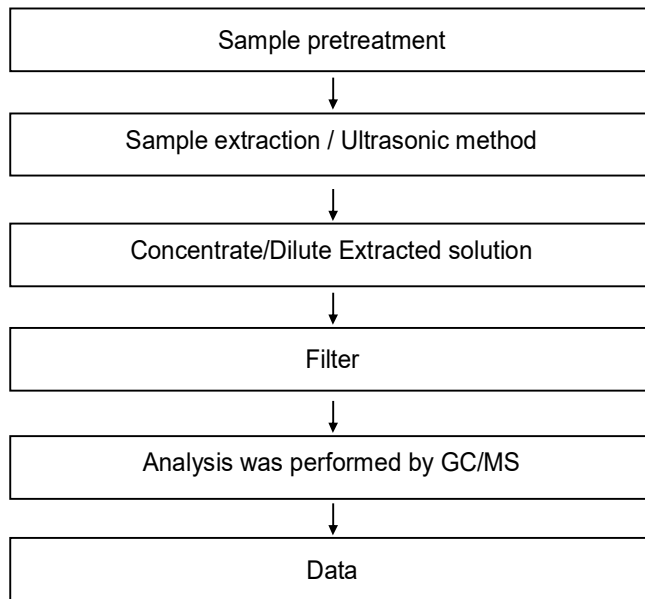


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Chlorinated Paraffins

- Technician: Yaling Tu
- Supervisor: Troy Chang



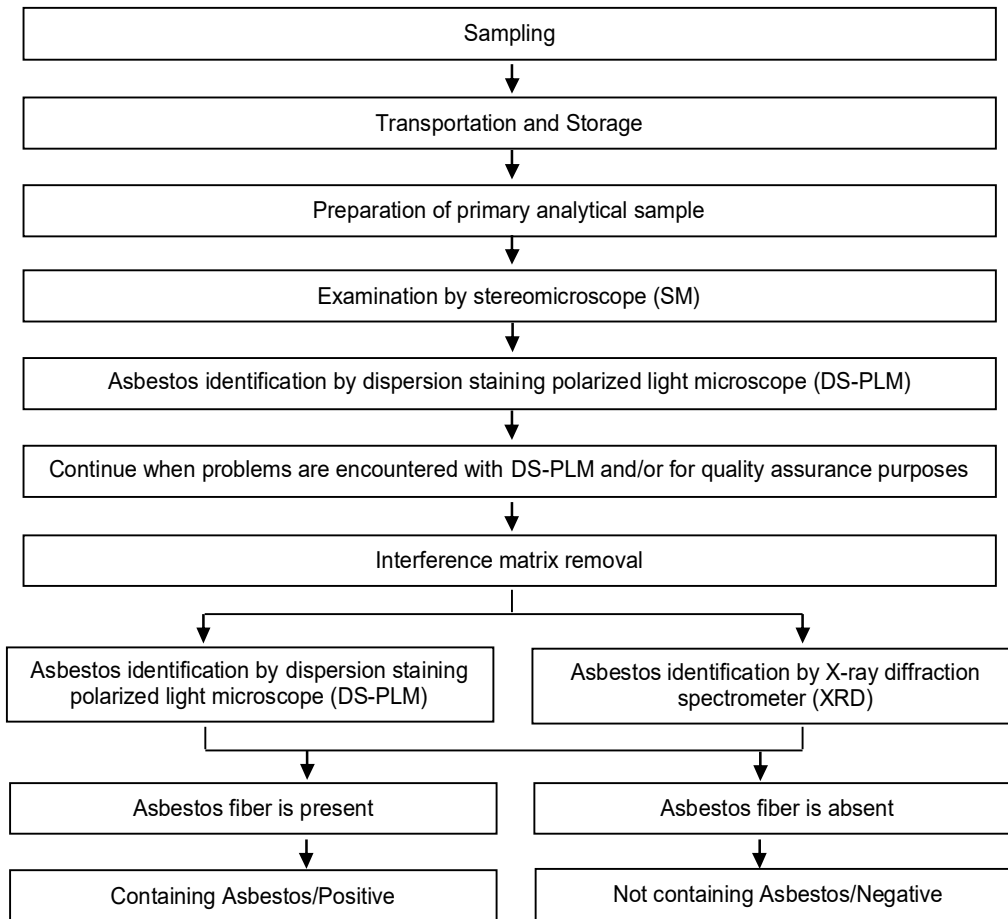
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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analysis flow chart for determination of Asbestos

- Technician: David Lee
- Supervisor: Rachel Yang

【 Reference method: EPA 600/R-93/116 】



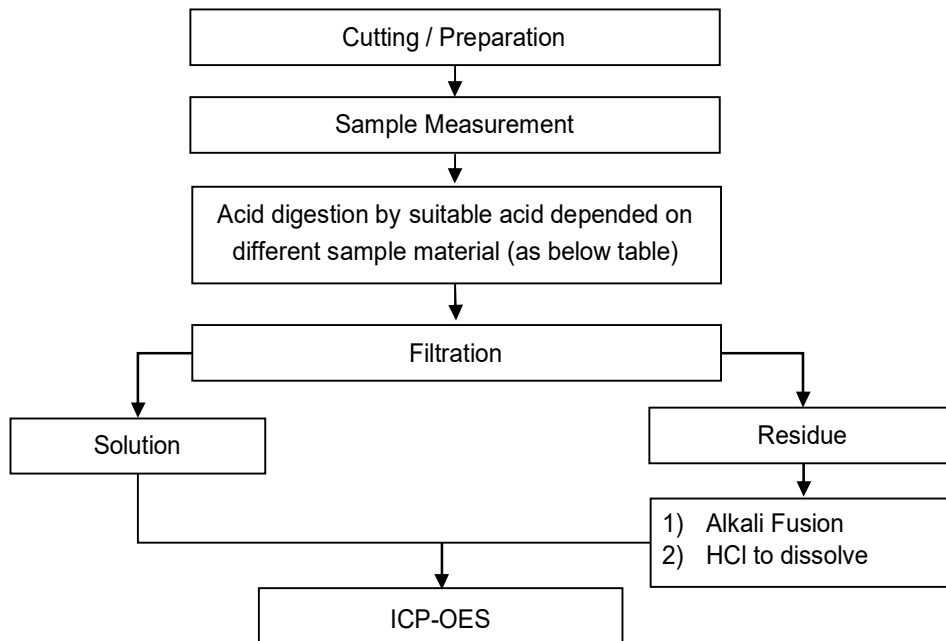
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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

These samples were dissolved totally by pre-conditioning method according to below flow chart.

- Technician: Rita Chen
- Supervisor: Troy Chang

Flow Chart of digestion for the elements analysis performed by ICP-OES

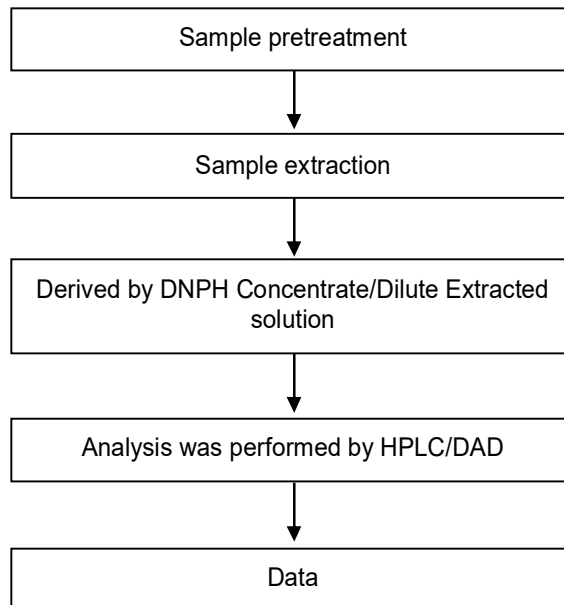


Steel, copper, aluminum, solder	Aqua regia, HNO ₃ , HCl, HF, H ₂ O ₂
Glass	HNO ₃ /HF
Gold, platinum, palladium, ceramic	Aqua regia
Silver	HNO ₃
Plastic	H ₂ SO ₄ , H ₂ O ₂ , HNO ₃ , HCl
Others	Added appropriate reagent to total digestion

TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Formaldehyde

- Technician: Yaling Tu
- Supervisor: Troy Chang

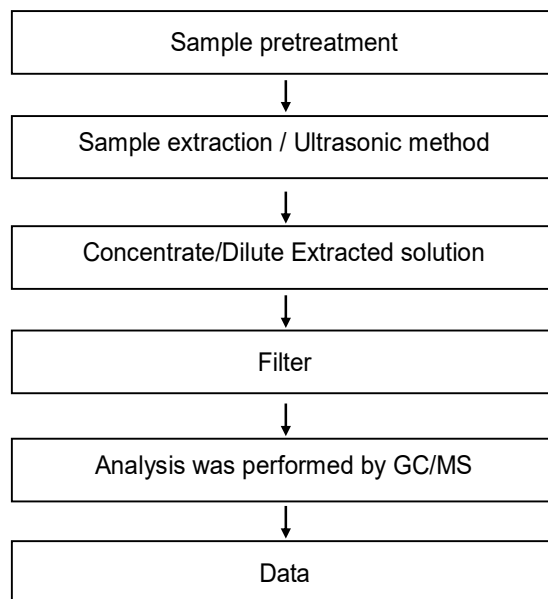


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - HBCDD

- Technician: Yaling Tu
- Supervisor: Troy Chang

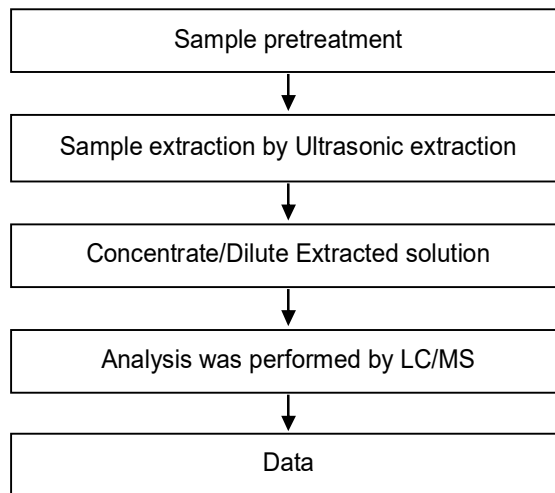


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - PFOA/PFOS

- Technician: Yaling Tu
- Supervisor: Troy Chang



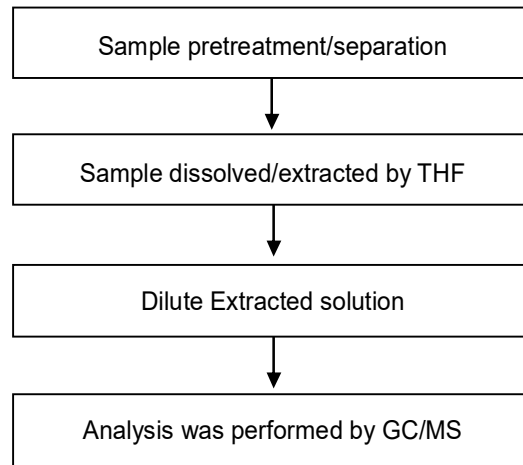
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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Phthalate

- Technician: Yaling Tu
- Supervisor: Troy Chang

【Test method: IEC 62321-8】

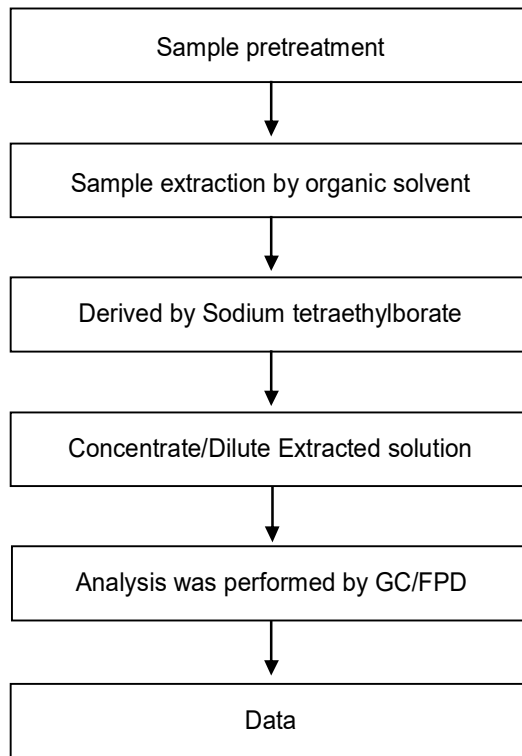


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Organic-Tin

- Technician: Yaling Tu
- Supervisor: Troy Chang

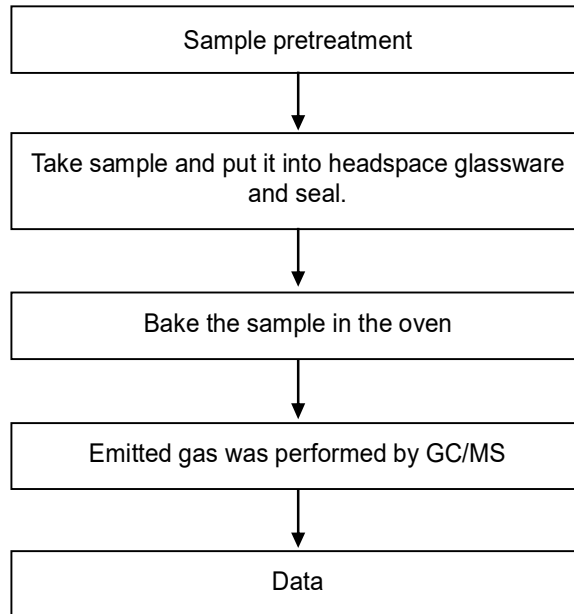


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - volatile organic compounds (VOCs)

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

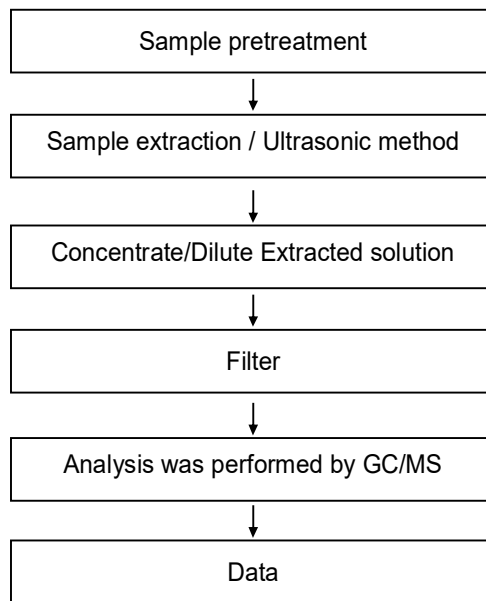


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Dimethyl Fumarate

- Technician: Yaling Tu
- Supervisor: Troy Chang

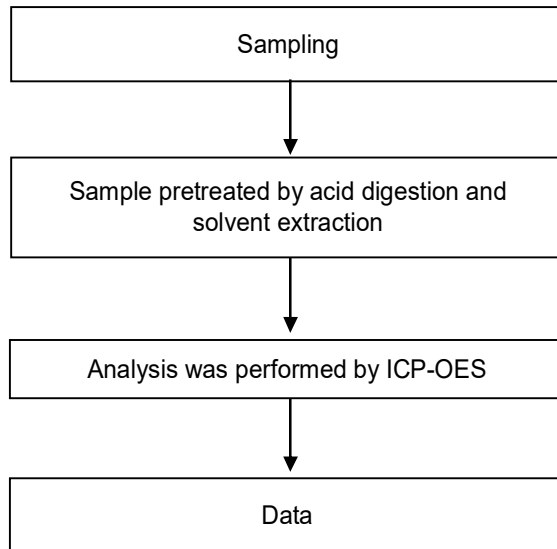


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Cobalt dichloride

- Technician: Rita Chen
- Supervisor: Troy Chang

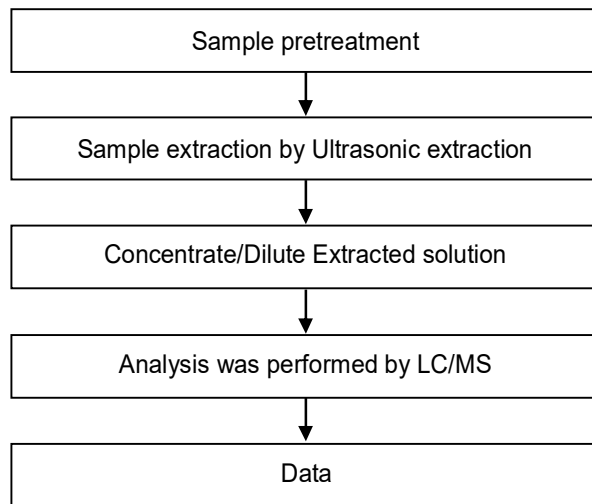


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - TBBP-A

- Technician: Yaling Tu
- Supervisor: Troy Chang



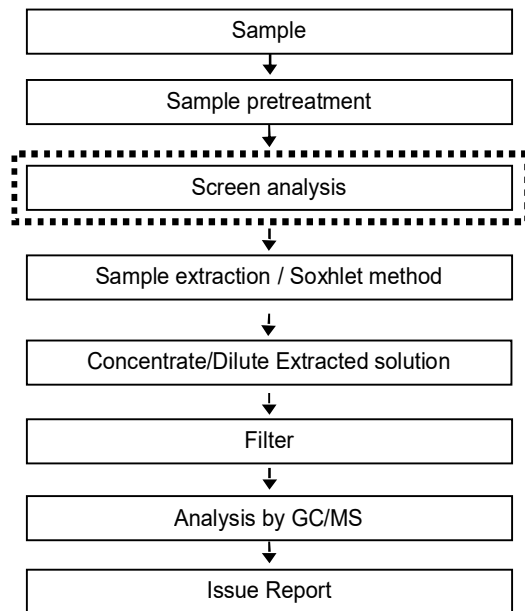
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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - TBBP-A-bis

- Technician: Yaling Tu
- Supervisor: Troy Chang

First testing process \longrightarrow
 Optional screen process $\cdots\cdots\cdots$
 Confirmation process $- - - \longrightarrow$

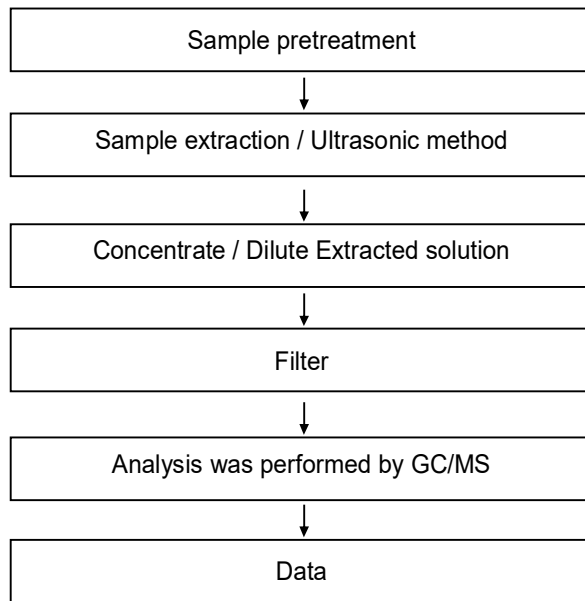


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TOWERJAZZ SEMICONDUCTOR
 RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - DBBT

- Technician: Yaling Tu
- Supervisor: Troy Chang

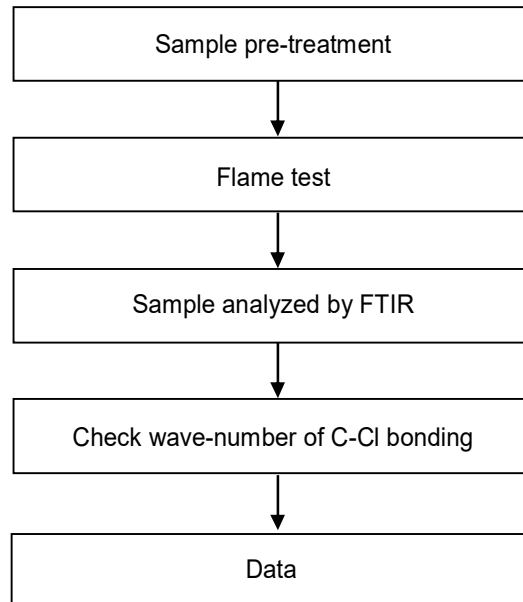


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TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analysis flow chart - PVC

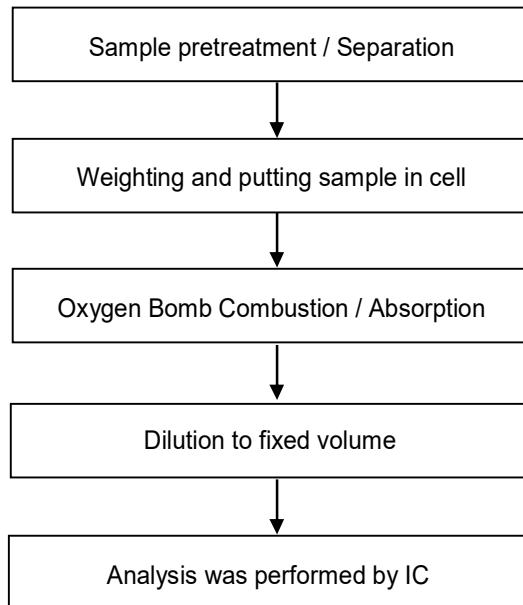
- Technician: Yaling Tu
- Supervisor: Troy Chang



TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Halogen

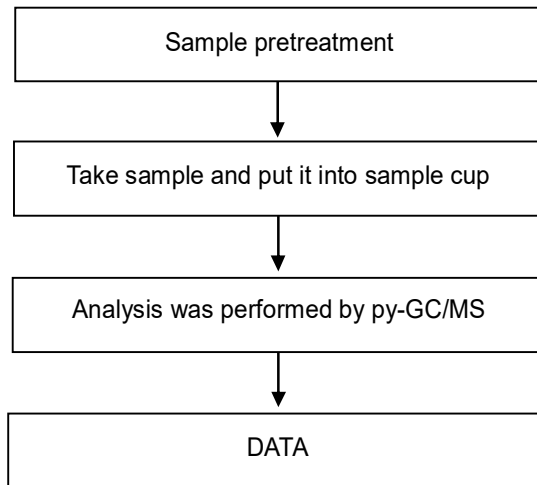
- Technician: Rita Chen
- Supervisor: Troy Chang



TOWERJAZZ SEMICONDUCTOR
RAMAT GAVRIEL INDUSTRIAL AREA MIGDAL HAEMEK ISRAEL 23105

Analytical flow chart - Red phosphorus

- Technician: Yaling Tu
- Supervisor: Troy Chang



Test Report

No. : CE/2019/C4971

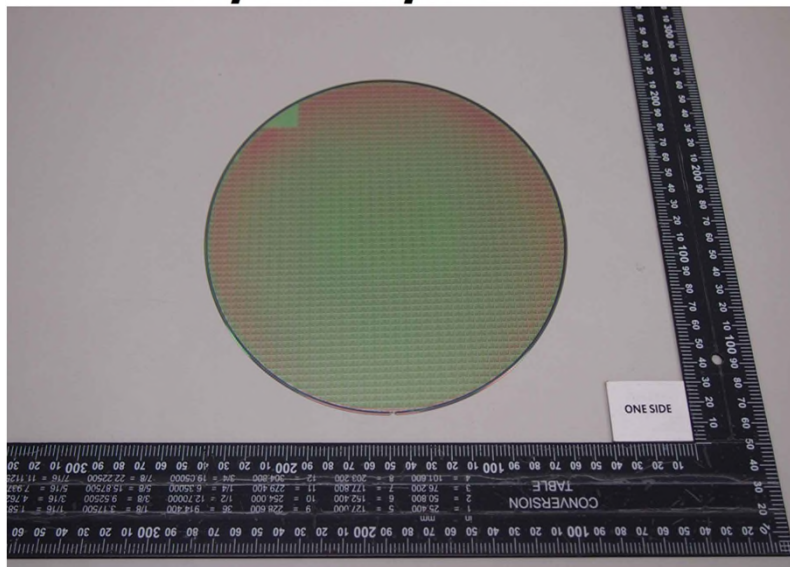
Date : 2020/01/07

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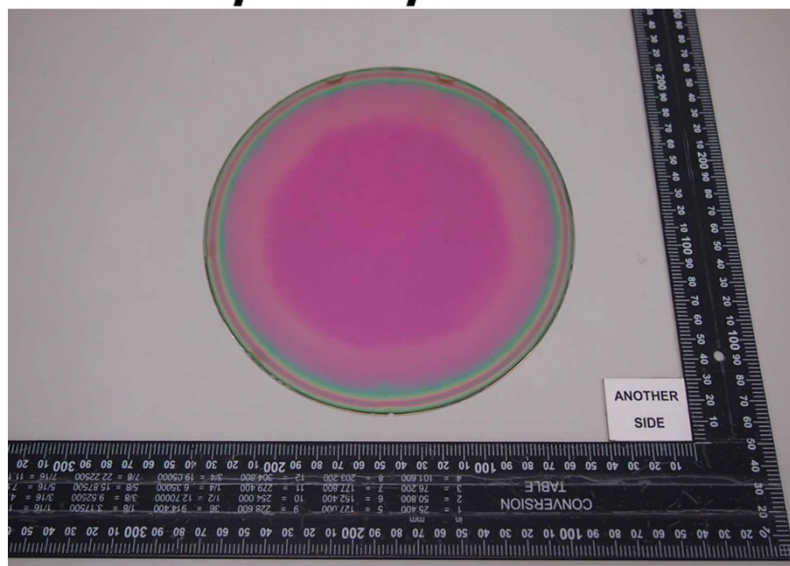
TOWERJAZZ SEMICONDUCTOR
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

CE/2019/C4971



CE/2019/C4971



** End of Report **

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