

The following sample(s) was/were submitted and identified by the applicant as:

Sample Name : SWITCHING TRANSISTOR

Order No. : 120533-2

Sample Receiving Date : 06-May-2024


Testing Period : 06-May-2024 to 13-May-2024

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 Halogen-Fluorine, Chlorine, Bromine, Iodine in the submitted sample.

Test Results : 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 / Department Manager
Signed for and on behalf of
SGS TAIWAN LTD.
Chemical Laboratory - Taipei



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Test Part Description

No.1 : WAFER

Test Result(s)

Test Item(s)	Method	Unit	MDL	Result	Limit	
				No.1		
Cadmium (Cd)	With reference to IEC 62321-5: 2013, analysis was performed by ICP-OES.	mg/kg	2	n.d.	100	
Lead (Pb)		mg/kg	2	n.d.	1000	
Mercury (Hg)	With reference to IEC 62321-4: 2013+ AMD1: 2017, analysis was performed by ICP-OES.	mg/kg	2	n.d.	1000	
Hexavalent Chromium Cr(VI)	With reference to IEC 62321-7-2: 2017, analysis was performed by UV-VIS.	mg/kg	8	n.d.	1000	
Monobromobiphenyl	With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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 PBBs		mg/kg	-	n.d.	1000	
Monobromodiphenyl ether		With reference to IEC 62321-6: 2015, analysis was performed by GC/MS.	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.	-	
Sum of PBDEs	mg/kg		-	n.d.	1000	

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Test Item(s)	Method	Unit	MDL	Result	Limit
				No.1	
Butyl benzyl phthalate (BBP)	With reference to IEC 62321-8: 2017, analysis was performed by GC/MS.	mg/kg	50	n.d.	1000
Dibutyl phthalate (DBP)		mg/kg	50	n.d.	1000
Diisobutyl phthalate (DIBP)		mg/kg	50	n.d.	1000
Di-(2-ethylhexyl) phthalate (DEHP)		mg/kg	50	n.d.	1000
Fluorine (F) (CAS No.: 14762-94-8)	With reference to BS EN 14582: 2016, analysis was performed by IC.	mg/kg	50	n.d.	-
Chlorine (Cl) (CAS No.: 22537-15-1)		mg/kg	50	n.d.	-
Bromine (Br) (CAS No.: 10097-32-2)		mg/kg	50	n.d.	-
Iodine (I) (CAS No.: 14362-44-8)		mg/kg	50	n.d.	-

Note :

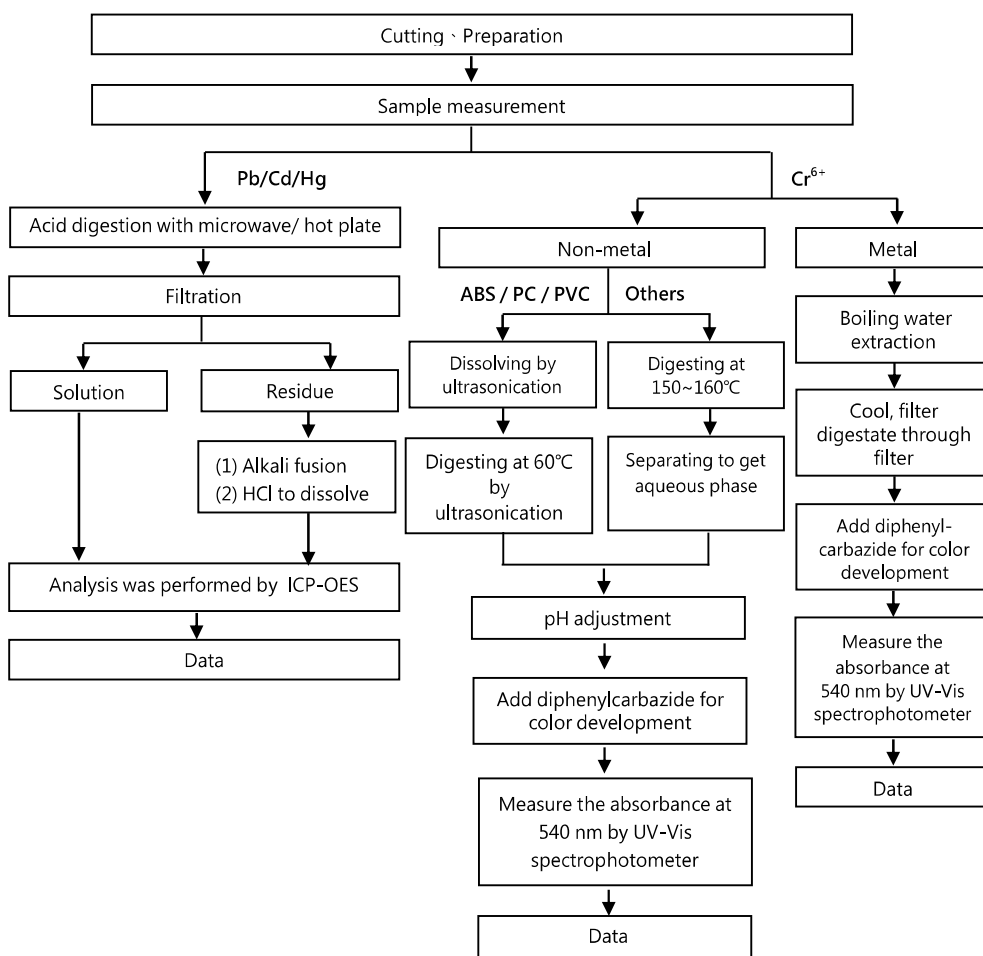
1. mg/kg = ppm ; 0.1wt% = 0.1% = 1000ppm
2. MDL = Method Detection Limit
3. n.d. = Not Detected (Less than MDL)
4. "-" = Not Regulated
5. Unless otherwise stated , the decision rule for conformity reporting is based on Binary Statement for Simple Acceptance Rule (w=0) stated in ILAC-G8:09/2019. According to this rule, the judgement of conformity is based on the comparing test results with limits.

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Analytical flow chart of heavy metal

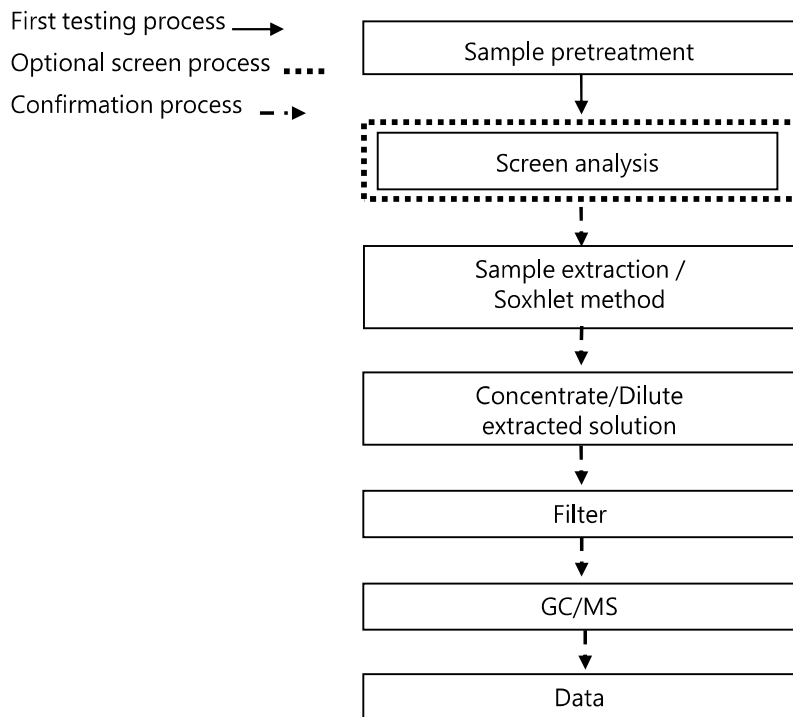
These samples were dissolved totally by pre-conditioning method according to below flow chart.

(Cr⁶⁺ test method excluded)



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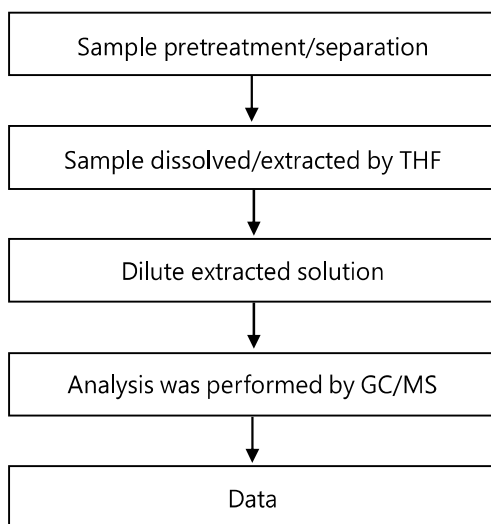
Analytical flow chart – PBBs / PBDEs



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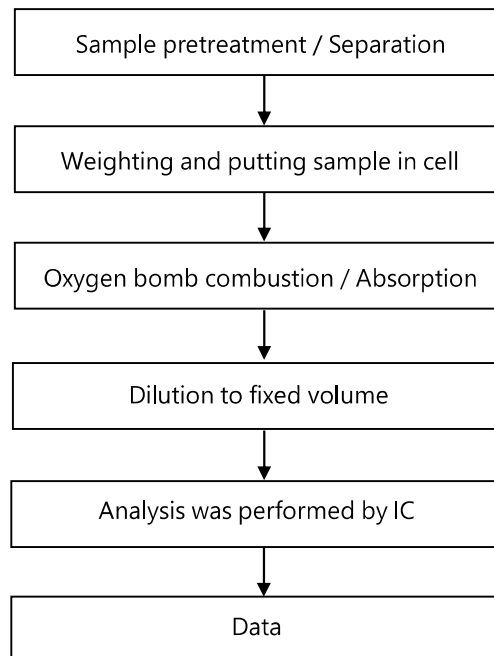
Analytical flow chart - Phthalate

【Test method: IEC 62321-8】



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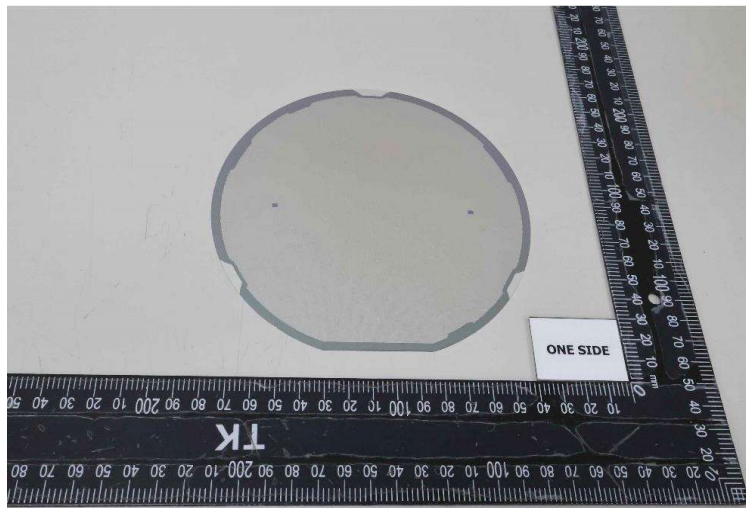
Analytical flow chart - Halogen



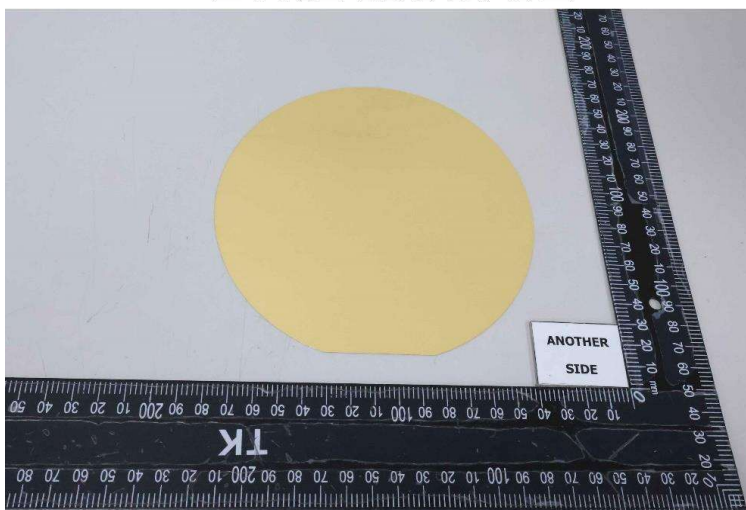
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* The tested sample / part is marked by an arrow if it's shown on the photo. *

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** End of Report **

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