

Test Report

No. 6592648-02

Date: 30/MAY/2023

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Globalfoundries Dresden
 Module One LLC & Co. KG
 Ms. Hermanns
 Wilschdorfer Landstrasse 101
 01109 Dresden
 GERMANY



The following samples were submitted and identified by/on behalf of the client as

SGS Job file : 6592648
 Order date : 26/APR/2023
 Order number : 813003908740 from 09/JAN/2023
 Sample receiving date : 02/MAY/2023
 Sampling : by client or by a third party acting at the client's direction
 Condition of the samples : appropriate for testing
 Testing period : 02/MAY/2023 – 30/MAY/2023
 Analytical scope : according to client's requirements

Sample No.	Sample designation	Sample material
230438044	Fab 1 300mm die patterned wafer, Tech Node 40nm	Wafer

Test requested : In accordance with the RoHS Directive 2011/65/EU and subsequent amendments

Test Method(s) : (1) Determination of Cadmium by ICP-OES, acc. IEC 62321-5:2013-06
 (2) Determination of Lead by ICP-OES, acc. IEC 62321-5:2013-06
 (3) Determination of Mercury by CV-AAS, acc. IEC 62321-4:2013-06
 (4) Determination of Chromium by ICP-OES, acc. IEC 62321-5:2013-06
 (5) Determination of Chromium (VI) acc. IEC 62321:
 A) (metal samples) Determination after extraction with hot water and derivatization with 1,5-diphenyl-carbazide based on IEC 62321-7-1:2015-09 (metal samples), ion chromatography
 B) (non-metallic samples) Testing acc. IEC 62321-7-2:2017-03,
 deviation: measurement via ion chromatography acc. DIN EN ISO 10304-1:2009-07
Remark: Due to its highly reactive nature the concentration of Cr(VI) in a corrosion-protection changes drastically with time and storage conditions. The results obtained by IEC 62321-7-1:2015 can therefore only give an indication of the presence/absence of Cr(VI) within the limitations of the method at the time of testing.
 (6) Determination of PBB/PBDE by GC/MS, acc. IEC 62321-6:2015-06
Remark: Please note that acc. to IEC the testing of metals for PBB/PBDE is gratuitous
 (7) Determination of Phthalates by GC/MS acc. IEC 62321-8:2017-03
 GC-MS after extraction with THF (Tetrahydrofurane)

Test Result(s) : Please refer to next page(s)

https://Sgs.Sharepoint.Com/Sites/De-Cp-Hamfiles/G/Globalfoundries_10074122/2023/6592648/6592648-02_ROHS_Gener.Doc

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Alle Dienstleistungen werden auf Grundlage der anwendbaren Allgemeinen Geschäftsbedingungen der SGS, die auf Anfrage zur Verfügung gestellt werden, erbracht. Die Veröffentlichung und Vervielfältigung unserer Prüfberichte und Gutachten zu Werbezwecken sowie deren auszugsweise Verwendung in sonstigen Fällen bedürfen unserer schriftlichen Genehmigung.

Geschäftsführer: Wim van Loon, Aufsichtsratsvorsitzender: Olivier Merkt, Sitz der Gesellschaft: Taunusstein, HRB 21543 Amtsgericht Wiesbaden

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Conclusion : Based on the performed tests on submitted sample(s), the test results of Lead, Mercury, Cadmium, hexavalent Chromium, Polybrominated Biphenyls (PBB) and Polybrominated Diphenyl Ethers (PBDE) **comply with** the limits as set by RoHS Directive 2011/65/EU, Annex 2 and subsequent amendments.

Based on the performed tests on submitted sample(s), the test results of Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl phthalate (BBP), Dibutyl phthalate (DBP), and Diisobutyl phthalate (DIBP) **comply with** the limits as set by Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.

Signed for and on behalf of

SGS INSTITUT FRESENIUS GmbH

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Test results by chemical method (Unit: mg/kg)

Sample No.		230438044		
Test Item(s):	Method (refer to)		RL	RoHS Limit
Cadmium (Cd)	(1)	n.d.	1	100
Lead (Pb)	(2)	n.d.	10	1000
Mercury (Hg)	(3)	n.d.	0,5	1000
Chromium, total (Cr)	(4)	n.d.	10	1000 (Limit for Cr(VI))
Chromium, hexavalent (Cr(VI))	(5 B)	n.d.	1	1000
Sum of PBDEs	(6)	-	-	1000 (Sum of polybrominated diphenylethers)
Monobromodiphenyl ether		n.d.	50	
Dibromodiphenyl ether		n.d.	50	
Tribromodiphenyl ether		n.d.	50	
Tetrabromodiphenyl ether		n.d.	50	
Pentabromodiphenyl ether		n.d.	50	
Hexabromodiphenyl ether		n.d.	50	
Heptabromodiphenyl ether		n.d.	50	
Octabromodiphenyl ether		n.d.	50	
Nonabromodiphenyl ether		n.d.	50	
Decabromodiphenyl ether		n.d.	50	
Sum of PBBs		-	-	
Monobromobiphenyl		n.d.	50	
Dibromobiphenyl		n.d.	50	
Tribromobiphenyl		n.d.	50	
Tetrabromobiphenyl		n.d.	50	
Hexabromobiphenyl		n.d.	50	
Pentabromobiphenyl		n.d.	50	
Heptabromobiphenyl		n.d.	50	
Octabromobiphenyl		n.d.	50	
Nonabromobiphenyl		n.d.	50	
Decabromobiphenyl		n.d.	50	
Phthalates	(7)			
Bis(2-ethylhexyl) phthalate (DEHP) (117-81-7)		n.d.	100	1000 [#]
Butyl benzyl phthalate (BBP) (85-68-7)		n.d.	100	1000 [#]
Dibutyl phthalate (DBP) (84-74-2)		n.d.	100	1000 [#]
Diisobutyl phthalate (DIBP) (84-69-5)		n.d.	100	1000 [#]

Note : mg/kg = ppm

n.d.= not detected

RL = Report Limit

n.a.= not analyzed

** = elevated reporting limit due to matrix interferences

[#] = limit acc. dir. 2015/863 (EU), valid from 22/JUL/2019

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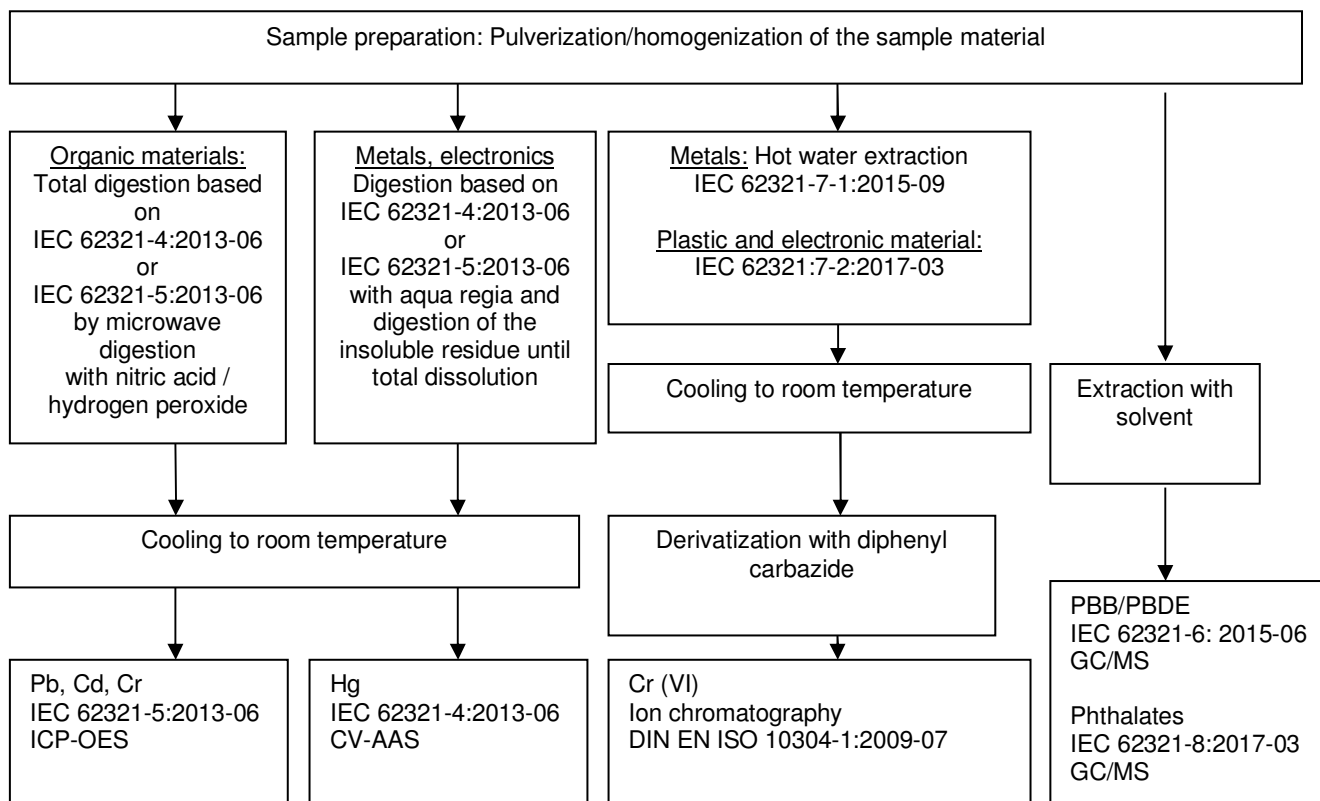
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Flow Chart for the working flow of the performed analysis



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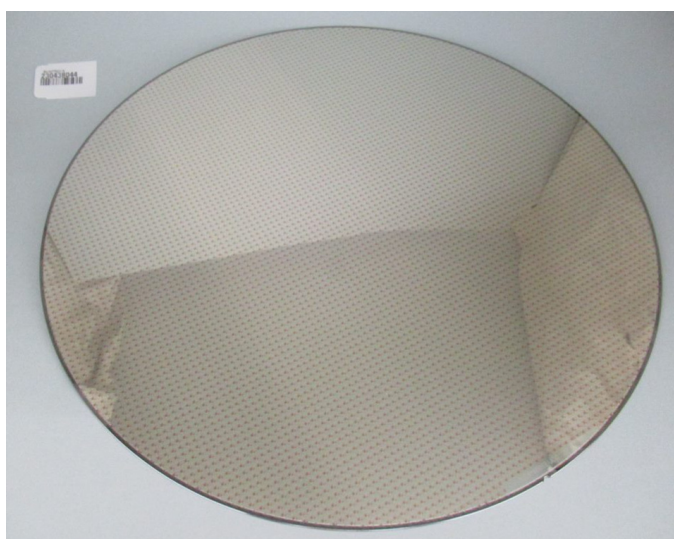
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Sample Photo(s)



End of Report

The test results refer exclusively to the examined test items and the date of the test under the test specifications. Written acknowledgement for publication and duplication of our analytical reports for promotional purpose, as well as fractional use for other purposes are mandatory. Numbers following „<“ represent limits of quantification. Determination of parameters marked with * was performed with a cooperation partner.

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We would like to point out that measurement uncertainties are not taken into account for conclusions. On request, we can provide measurement uncertainties and take them into account for conclusions upon consultation.