AB-0690-T
TR2182020
08-22

TEST REPORT

Job No./Report No TR2182020 Date: 29 August 2022

MEMC ELECTRONIC MATERIALS SPA
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To the attention of FUGGIRAI STEFANO

The following sample(s) was /were submitted and identified by/on behalf of the clients as:

Sample Submitted By	:	MEMC ELECTRONIC MATERIALS SPA
Sample Description	:	See the following page.
Country of Destination	:	TURKEY
Sample Receiving Date	:	24 August 2022
Testing Period	:	24 August 2022 ~ 29 August 2022
Test Requested	:	Selected test(s) as requested by client.
Test Method	:	Please refer to next page(s)
Test Result(s)	:	Please refer to next page(s)
Conclusion	:	Based on the performed tests on selected part of submitted samples, the results of Lead, Mercury, Cadmium, Hexavalent chromium, Polybrominated biphenyls (PBB), Polybrominated diphenyl ethers (PBDE), 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.

The test results relate to the tested items only.
Test reports without SGS seal and authorized signatures are invalid.

Issued in Istanbul
Signed for and on behalf of
SGS Supervise Gözetme Etüd
Kontrol Servisleri A.Ş.

Mert Kurtuluş Hardline, C&H Customer Services Team Leader	Bora Şirinbilek Hardline & CPCH Testing Services Manager

Test Part Description:		**CONCLUSION**
1	**Wafer - GSGYA02M - P24DFA202 – 240DFMN3030CBG0 – BORON**	
1.1	Silver Other Material Main	**PASS**
2	**Wafer - FKSYYEAK - P93F4BB – 93F4B148MN.003A0H1 – ARSENIC**	
2.1	Silver Other Material Main	**PASS**
3	**Wafer - GLOYY65B - P12ZNHA202 - MN0DWYSN1 – ANTIMONY**	
3.1	Silver Other Material Main	**PASS**
4	**Wafer - GBSYYE2B - P382RHA202 – 382RH016MN2.00F0D6 - PHOSPHOROUS**	
4.1	Silver Other Material Main	**PASS**
5	**Wafer - SILYY14E - P96K0CA – 96K0C1I6MN.001F0E5 – RED PHOSPHOROUS**	
5.1	Silver Other Material Main	**PASS**
6	**Wafer - GSGYA02M - P165EAA/C9R – 165EAMN30308YB0 – EPI**	
6.1	Silver Other Material Main	**PASS**
7	**Wafer Carrier**	
7.1	Transparent Plastic Box	**PASS**

Test Item(s):	***RESULTS***		
	1.1	***2.1***	***3.1***
Cadmium (Cd)	ND	ND	ND
Lead (Pb)	ND	ND	ND
Mercury (Hg)	ND	ND	ND
Hexavalent Chromium (Cr(VI)) (ppm) (for non metal)	ND	ND	ND
Hexavalent Chromium (Cr(VI)) (µg/cm²) (for metal)	NA	NA	NA
Flame Retardants			
Sum of PBBs	**ND**	**ND**	**ND**
Monobromobiphenyl	ND	ND	ND
Dibromobiphenyl	ND	ND	ND
Tribromobiphenyl	ND	ND	ND
Tetrabromobiphenyl	ND	ND	ND
Pentabromobiphenyl	ND	ND	ND
Hexabromobiphenyl	ND	ND	ND
Heptabromobiphenyl	ND	ND	ND
Octabromobiphenyl	ND	ND	ND
Nonabromobiphenyl	ND	ND	ND
Decabromobiphenyl	ND	ND	ND
Sum of PBDEs	**ND**	**ND**	**ND**
Monobromodiphenyl ether	ND	ND	ND
Dibromodiphenyl ether	ND	ND	ND
Tribromodiphenyl ether	ND	ND	ND
Tetrabromodiphenyl ether	ND	ND	ND
Pentabromodiphenyl ether	ND	ND	ND
Hexabromodiphenyl ether	ND	ND	ND
Heptabromodiphenyl ether	ND	ND	ND
Octabromodiphenyl ether	ND	ND	ND
Nonabromodiphenyl ether	ND	ND	ND
Decabromodiphenyl ether	ND	ND	ND
Phthalates			
Dibutyl phthalate (DBP)	ND	ND	ND
Butyl benzyl phthalate (BBP)	ND	ND	ND
Bis (2-ethylhexyl) phthalate (DEHP)	ND	ND	ND
Diisobutyl Phthalates (DIBP)	ND	ND	ND

Remarks :	ppm = Parts per million based on dry weight of sample (1 mg/kg = 0.0001%)		
	µg/cm² = Microgram per square centimeter		
	mg/kg with 50 cm² = Milligram per kilogram with 50 square centimetre		
	ND = Not detected (<MDL)	NA = Not applicable	NR = Not requested
	MDL = Method Detection Limit		

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Test Item(s):	***RESULTS***		
	4.1	***5.1***	***6.1***
Cadmium (Cd)	ND	ND	ND
Lead (Pb)	ND	ND	ND
Mercury (Hg)	ND	ND	ND
Hexavalent Chromium (Cr(VI)) (ppm) (for non metal)	ND	ND	ND
Hexavalent Chromium (Cr(VI)) (µg/cm²) (for metal)	NA	NA	NA
Flame Retardants			
Sum of PBBs	**ND**	**ND**	**ND**
Monobromobiphenyl	ND	ND	ND
Dibromobiphenyl	ND	ND	ND
Tribromobiphenyl	ND	ND	ND
Tetrabromobiphenyl	ND	ND	ND
Pentabromobiphenyl	ND	ND	ND
Hexabromobiphenyl	ND	ND	ND
Heptabromobiphenyl	ND	ND	ND
Octabromobiphenyl	ND	ND	ND
Nonabromobiphenyl	ND	ND	ND
Decabromobiphenyl	ND	ND	ND
Sum of PBDEs	**ND**	**ND**	**ND**
Monobromodiphenyl ether	ND	ND	ND
Dibromodiphenyl ether	ND	ND	ND
Tribromodiphenyl ether	ND	ND	ND
Tetrabromodiphenyl ether	ND	ND	ND
Pentabromodiphenyl ether	ND	ND	ND
Hexabromodiphenyl ether	ND	ND	ND
Heptabromodiphenyl ether	ND	ND	ND
Octabromodiphenyl ether	ND	ND	ND
Nonabromodiphenyl ether	ND	ND	ND
Decabromodiphenyl ether	ND	ND	ND
Phthalates			
Dibutyl phthalate (DBP)	ND	ND	ND
Butyl benzyl phthalate (BBP)	ND	ND	ND
Bis (2-ethylhexyl) phthalate (DEHP)	ND	ND	ND
Diisobutyl Phthalates (DIBP)	ND	ND	ND

Remarks :	ppm = Parts per million based on dry weight of sample (1 mg/kg = 0.0001%)		
	µg/cm² = Microgram per square centimeter		
	mg/kg with 50 cm² = Milligram per kilogram with 50 square centimetre		
	ND = Not detected (<MDL)	NA = Not applicable	NR = Not requested
	MDL = Method Detection Limit		

Test Item(s):	***RESULTS***
	7.1
Cadmium (Cd)	ND
Lead (Pb)	ND
Mercury (Hg)	ND
Hexavalent Chromium (Cr(VI)) (ppm) (for non metal)	ND
Hexavalent Chromium (Cr(VI)) (µg/cm²) (for metal)	NA
Flame Retardants	
Sum of PBBs	**ND**
Monobromobiphenyl	ND
Dibromobiphenyl	ND
Tribromobiphenyl	ND
Tetrabromobiphenyl	ND
Pentabromobiphenyl	ND
Hexabromobiphenyl	ND
Heptabromobiphenyl	ND
Octabromobiphenyl	ND
Nonabromobiphenyl	ND
Decabromobiphenyl	ND
Sum of PBDEs	**ND**
Monobromodiphenyl ether	ND
Dibromodiphenyl ether	ND
Tribromodiphenyl ether	ND
Tetrabromodiphenyl ether	ND
Pentabromodiphenyl ether	ND
Hexabromodiphenyl ether	ND
Heptabromodiphenyl ether	ND
Octabromodiphenyl ether	ND
Nonabromodiphenyl ether	ND
Decabromodiphenyl ether	ND
Phthalates	
Dibutyl phthalate (DBP)	ND
Butyl benzyl phthalate (BBP)	ND
Bis (2-ethylhexyl) phthalate (DEHP)	ND
Diisobutyl Phthalates (DIBP)	ND

Remarks :	ppm = Parts per million based on dry weight of sample (1 mg/kg = 0.0001%)		
	µg/cm² = Microgram per square centimeter		
	mg/kg with 50 cm² = Milligram per kilogram with 50 square centimetre		
	ND = Not detected (<MDL)	NA = Not applicable	NR = Not requested
	MDL = Method Detection Limit		

SUBSTANCE	LIMITS
Cadmium (Cd)Content	0.01 % (100 ppm)
Chromium VI (Cr+6)Content(ppm)(for non metal)	0.1 % (1000 ppm)
Chromium VI (Cr+6)Content(μg/cm²)for metal)	Colorimetric result — Qualitative Result < 0.10 μg/cm² — Negative ≥ 0.10 μg/cm² and ≤ 0.13 μg/cm² — Inconclusive > 0.13 μg/cm² — Positive
Lead (Pb) Content	0.1 % (1000 ppm)
Mercury (Hg) Content	0.1 % (1000 ppm)
PBB	0.1 % (1000 ppm)
PBBDE	0.1 % (1000 ppm)
Dibutyl Phthalate (DBP)	0.1 % (1000 ppm)
Diethyl Hexyl Phthalate (DEHP)	0.1 % (1000 ppm)
Benzyl Butyl Phthalate (BBP)	0.1 % (1000 ppm)
Diisobutyl Phthalate (DIBP)	0.1 % (1000 ppm)

Testing Item	Testing Method	MDL
Cadmium (Cd)Content	With reference to IEC 62321-5:2013, determination of Cadmium by ICP-OES.	2 ppm
Lead (Pb)Content	With reference to IEC 62321-5:2013, determination of Lead by ICP-OES.	2 ppm
Mercury (Hg)Content	With reference to IEC 62321-4:2013+A1:2017, determination of Mercury by ICP-OES.	2 ppm
Chromium VI (Cr6+) (For non-metal)	With reference to IEC 62321-7-2:2017, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.	8 ppm
Chromium VI (Cr6+) (For metal)	With reference to IEC 62321-7-1:2015, determination of Hexavalent Chromium by Colorimetric Method using UV-Vis.	0.1 μg/cm² with 50 cm² (IN TESTING SOLUTION)
PBBs/PBDEs	With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS.	5 ppm
Phthalates	With reference to IEC 62321-8:2017, determination of phthalates by GC-MS.	50 ppm

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Notes:

(1) The maximum permissible limit is quoted from RoHS Directive (EU) 2015/863.
IEC 62321 series is equivalent to EN 62321 series
http://www.cenelec.eu/dyn/www/f?p=104:30:1742232870351101::::FSP_ORG_ID,FSP_LANG_ID:1258637,25

(2) On 4 June 2015, Commission Directive (EU) 2015/863 was published in the Official Journal of the European Union (OJEU) to include the phthalates BBP, DBP, DEHP and DIBP into ANNEX II of the Rohs Recast Directive. The new law restricts each phthalate to no more than 0.1% in each homogeneous material of an electrical product.

(3) The restriction of DEHP, BBP, DBP and DIBP shall apply to medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, from 22 July 2021.

(4) The restriction of DEHP, BBP, DBP and DIBP shall not apply to cables or spare parts for the repair, the reuse, the updating of functionalities or upgrading of capacity of EEE placed on the market before 22 July 2019, and of medical devices, including in vitro medical devices, and monitoring and control instruments, including industrial monitoring and control instruments, placed on the market before 22 July 2021.

(5) The restriction of DEHP, BBP and DBP shall not apply to toys which are already subject to the restriction of DEHP, BBP and DBP through entry 51 of Annex XVII to Regulation (EC) No 1907/2006.

* * * End of Test Report * * *