



TEST REPORT

Report No: MR-300523-188

Client / Establishment : Al Bariz Computer Tr.
403, Saad tower, sheikh Zayed road, Dubai

Sample ID : MS-300523-198
Sample Receiving Date : 30/05/2023
Reporting Date : 06/06/2023
Date of Analysis : 30/05/2023-06/06/2023
Tested by : SH
Issue No : 01 (Re-Issue Date: NA)

Sample Information:

Sample Description : Smart Voltage Optimizer
Manufactured : Feigin Electric Energy Technology
Series No : ES-ML-110-160
Batch No : ECOD-ML-55-100, ECOD-ML-85-130, ECOD-ML-110-160, ECOD-ML-135-200,
ECOD-ML-165-250

Brief Evaluation of the Results

	Test	Compliance
MS-300523-198	Chemical Parameters RoHS	Pass#

#Based on the test result meets the specification limit RoHS 3 (EU 2015/863) of 31st march 2015
The corresponding test results are furnished in following page

Prepared by

Chemist
Advance Science Division (ASD)
Employee Code: METS AJ EC 190

Verified by

Assistant Laboratory Manager
Employee Code: METS AJ EC 103





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Testing Method (s)

1. Sample prepared with reference to IEC 62321-2:2021 Determination of certain substances in electro technical products- Part 2: Disassembly, disjunction and mechanical sample preparation.
2. Sample screening testing with reference to IEC 62321-3-1:2013 Determination of certain substances in electro technical products – part 3-1: Screening – Lead, Mercury, Cadmium, Total chromium and Total Bromine using X-ray florescence spectrometry.
3. Chemical Test Method
 - a. Determination of Mercury by ICP-AES with reference to **IEC 62321-4:2013+AMD 1:2017**
 - b. Determination of Lead, Cadmium by ICP-AES with reference to **IEC 62321-5:2013**
 - c. Determination of Hexavalent Chromium by UV-VIS colorimetric method with reference to **IEC 62321-7-1:2015 & IEC 62321-7-2: 2017**
 - d. Determination of Phthalates by GC-MS with reference to **IEC 62321-8:2017**
DEHP-Bis(2-ethylhexyl)phthalate, BBP-Benzylbutylphthtlate, DBP-Dibutylphthalate and DIBP-Diisobutylphthalate
 - e. Determination of PBBs and PBDEs by GC-MS with reference to **IEC 62321-6:2015**

Sr.No.	Polybrominated Biphenyls (PBBs)	Polybrominated Diphenyl Ethers (PBDEs)
1	Monobromo Biphenyl (MonoBB)	Monobromo Diphenyl Ether (Mono BDE)
2	Dibromo Biphenyl (DiBB)	Dibromo Diphenyl Ether (DiBDE)
3	Tribromo Biphenyl (TriBB)	Tribromo Diphenyl Ether (TriBDE)
4	Tetrabromo Biphenyl (TetraBB)	Tetrabromo Diphenyl Ether (TetraBDE)
5	Pentabromo Biphenyl (PentaBB)	Pentabromo Diphenyl Ether (PentaBDE)
6	Hexa bromo Biphenyl (hexaBB)	Hexabromo Diphenyl Ether (hexaBDE)
7	Heptabromo Biphenyl (HeptaBB)	Heptabromo Diphenyl Ether (HeptaBDE)
8	Octabromo Biphenyl (OctaBB)	Octabromo Diphenyl Ether (Octa BDE)
9	Nonabromo Biphenyl (NonaBB)	Nonabromo Diphenyl Ether (NonaBDE)
10	Decabromo Biphenyl (DecaBB)	Decabromo Diphenyl Ether (DecaBDE)





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Test Results:

Part No.	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
1	Metal Block	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	NR	PASS
		BBP		NR	PASS
		DBP		NR	PASS
		DIBP		NR	PASS
2	Metallic Bolt	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	NR	PASS
		BBP		NR	PASS
		DBP		NR	PASS
		DIBP		NR	PASS
3	Metallic Screws	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	NR	PASS
		BBP		NR	PASS
		DBP		NR	PASS
		DIBP		NR	PASS



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Test Results:

Part No.	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
4	Plastic Block	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	ND	PASS
		BBP		ND	PASS
		DBP		ND	PASS
		DIBP		ND	PASS
5	Metallic Sheets	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	NR	PASS
		BBP		NR	PASS
		DBP		NR	PASS
		DIBP		NR	PASS
6	Wire	Hg	ND	NR	PASS
		Cd	ND	NR	PASS
		Pb	ND	NR	PASS
		Cr(VI)	ND	NR	PASS
		PBBs	ND	NR	PASS
		PBDEs	ND	NR	PASS
		DEHP	NA	ND	PASS
		BBP		ND	PASS
		DBP		ND	PASS
		DIBP		ND	PASS



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Test Results:

No.	Part	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
7		Copper Wire	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS
8		Washer (Small)	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS
9		. Screws (Small)	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS



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Test Results:

No.	Part	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
10	Nuts	Hg		ND	NR	PASS
		Cd		ND	NR	PASS
		Pb		ND	NR	PASS
		Cr(VI)		ND	NR	PASS
		PBBs		ND	NR	PASS
		PBDEs		ND	NR	PASS
		DEHP		NA	NR	PASS
		BBP			NR	PASS
		DBP			NR	PASS
		DIBP			NR	PASS
11	Plastic Bushes	Hg		ND	NR	PASS
		Cd		ND	NR	PASS
		Pb		ND	NR	PASS
		Cr(VI)		ND	NR	PASS
		PBBs		ND	NR	PASS
		PBDEs		ND	NR	PASS
		DEHP		NA	ND	PASS
		BBP			ND	PASS
		DBP			ND	PASS
		DIBP			ND	PASS
12	Washer (Big)	Hg		ND	NR	PASS
		Cd		ND	NR	PASS
		Pb		ND	NR	PASS
		Cr(VI)		ND	NR	PASS
		PBBs		ND	NR	PASS
		PBDEs		ND	NR	PASS
		DEHP		NA	NR	PASS
		BBP			NR	PASS
		DBP			NR	PASS
		DIBP			NR	PASS



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Test Results:

No.	Part	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
13		Bolt (Big)	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS
14		Inside Core	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	ND	PASS
			BBP		ND	PASS
			DBP		ND	PASS
			DIBP		ND	PASS
15		Metallic Border	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS



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Test Results:

No.	Part	Part Name	Restricted Substance	Results of XRF(1)	Result of Chemical Testing(2)	Conclusion on RoHS
16		Plastic Cover	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	ND	PASS
			BBP		ND	PASS
			DBP		ND	PASS
			DIBP		ND	PASS
17		Copper strip Cover	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	ND	PASS
			BBP		ND	PASS
			DBP		ND	PASS
			DIBP		ND	PASS
18		Metallic Outer cover	Hg	ND	NR	PASS
			Cd	ND	NR	PASS
			Pb	ND	NR	PASS
			Cr(VI)	ND	NR	PASS
			PBBs	ND	NR	PASS
			PBDEs	ND	NR	PASS
			DEHP	NA	NR	PASS
			BBP		NR	PASS
			DBP		NR	PASS
			DIBP		NR	PASS



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Note:

(1)

- (a) It is the results on total Br while test item on restricted substances is PBBs/PBDEs. It is the results on total Cr while test item on restricted substances is Cr (VI).
- (b) Results are obtained by XRF for primary screening, and further chemical testing by ICP-AES (for Cd, Pb, Hg), UV_VIS (for Cr-VI) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321:2008 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$LOD < X < (150+3\sigma) \leq OL$
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$
Br	$BL \leq (300-3\sigma) < X$	---	$BL \leq (250-3\sigma) < X$
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$

(c) BL = Below Limit, OL = Over Limit, LOD = Limit of Detection, IN= Inconclusive, NA= Not Applicable.

(d) The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non- uniformity composition.

(2) (a) Unit: mg/kg, MDL- Method Detection Limit, ND= Not Detected (<MDL), NR = Not Required

(b) Unit and Detection Limit (DL) in chemical test

Test Items	Pb	Cd	Hg	PBBs & PBDEs	Cr (VI)	Phthalates
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
DL	2	2	3	40	25	20

(3) RoHS Specification limit:

Restricted substances	Cd	Pb	Hg	Cr-VI	PBBs	PBDEs	Phthalates
Unit	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
RoHS limit	100	1000	1000	1000	1000	1000	1000

Note: Sample Image and Images of tested parts are given as appendix.

Remarks: The report was revised for added brand name & model name as per client request.

The above test results are only applicable to the sample (s) referred above. This report shall not be reproduced except in full, without the written approval of METS laboratory.





For further clarification of reports, please contact qc@metslab.com

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Test process:

1. Lead (Pb), Cadmium (Cd), Mercury (Hg) (Acid digestion)

Sample preparation → Weigh sample into digestion vessel → Acid digestion (Microwave) → Totally dissolved → Filtration → Analysis by ICP

2. Hexavalent Chromium Cr-VI (Alkaline extraction for soluble polymers)

Sample preparation → Add Digestion Solution and heating at 150 ~ 160°C → pH Adjustment → Add Diphenylcarbazide for colour development → Analysis by UV-VIS Spectrophotometer (540nm)

3. Hexavalent Chromium Cr-VI (Boiling water extraction for other Materials)

Sample preparation → Extraction with Boiling water → Filter and remove the sample → pH Adjustment → Add Diphenylcarbazide for colour development → Analysis by UV-VIS Spectrophotometer (540nm)

4. PBBs / PBDEs (Solvent extraction / Thermal desorption)

Sample preparation into extraction thimble → Extraction with organic solvent → Concentration the extract → Analysis by pGCMS (with appropriate dilution)

5. Phthalate (DEHP, BBP, DBP, DIBP) (Thermal desorption Py-GCMS)

Sample preparation → Place the sample into Pyrolizer and heat upto 340°C → Analysis by Py-GCMS



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Appendix



Sample



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1. Metal Block



2. Metallic Bolt



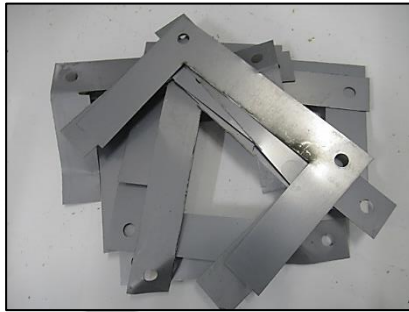
3. Metallic Screws



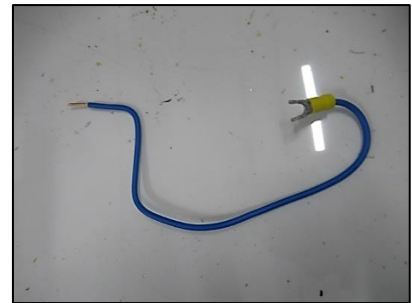
4. Plastic Block



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5.Metallic Sheets



6. Wire



7.Copper Wire



8. Washer (Small)



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9. Screws (Small)



10. Nuts



11. Plastic Bushes



12. Washer (Big)



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13. Bolt (Big)



14. Inside Core



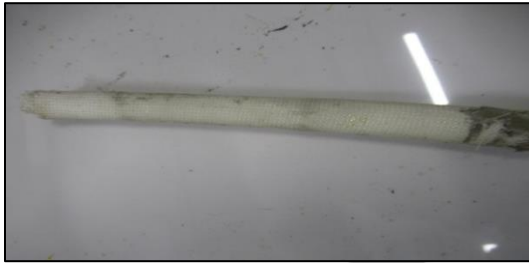
15. Metallic Border



16. Plastic Cover



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17. Copper strip Cover



18. Metallic Outer cover

