中国认可
国际互认
检测
TESTING
CNAS L6478

TEST REPORT

Report No.	:	WTF20F12093495C
Applicant	:	Mid Ocean Brands B.V.
Address	:	7/F., Kings Tower, 111 King Lam Street, Cheung Sha Wan, Kowloon, Hong Kong
Sample Name	:	12 digit calculator w/ bamboo
Model No.	:	MO6216
Sample Receiving Date	:	2020-12-04
Testing Period	:	2020-12-04 to 2020-12-10
Date of Issue	:	2020-12-10
Test Result	:	Please refer to next page (s)

Remarks:
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Test Requested.....	:	In accordance with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863.
Test Method	:	1) With Reference to IEC 62321-2:2013, disassembly, disjunction and mechanical sample preparation 2) With Reference to IEC 62321-3-1:2013, screening - Lead, mercury, cadmium, total chromium and total bromine by X-ray fluorescence spectrometry 3) With reference to IEC 62321-4:2013+AMD1:2017 CSV, determination of Mercury by ICP-OES 4) With reference to IEC 62321-5:2013, determination of Lead and Cadmium by ICP-OES 5) With reference to IEC 62321-7-2: 2017 and IEC 62321-7-1: 2015, determination of Hexavalent Chromium by UV-Vis 6) With reference to IEC 62321-6:2015, determination of PBBs and PBDEs by GC-MS 7) With reference to IEC 62321-8:2017, determination of Phthalates content by GC-MS.
Test Conclusion.....	:	**Pass** (Based on the performed tests on the submitted samples, the results comply with the RoHS Directive 2011/65/EU and its amendment (EU) No. 2015/863)

Test Results:

1. Lead, Mercury, Cadmium, Hexavalent Chromium, PBBs and PBDEs

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
1	Beige wood shell	BL	BL	BL	BL	BL	NA
2	White plastic shell	BL	BL	BL	BL	BL	NA
3	White paper adhesive label with black printing	BL	BL	BL	BL	BL	NA
4	Transparent plastic adhesive label with black printing	BL	BL	BL	BL	BL	NA
5	Yellow plastic adhesive tape	BL	BL	BL	BL	BL	NA
6	Beige glue	BL	BL	BL	BL	BL	NA
7	White soft plastic button	BL	BL	BL	BL	BL	NA
8	Black soft plastic sheet	BL	BL	BL	BL	BL	NA
9	Red plastic wire covering	BL	BL	BL	BL	BL	NA
10	Black plastic wire covering	BL	BL	BL	BL	BL	NA
11	Coppery metal wire	BL	BL	BL	BL	BL	NA
12	Silvery metal sheet	BL	BL	BL	IN	BL	Cr^{6+} : Negative
13	Solder	BL	BL	BL	BL	BL	NA
14	Yellow FPC	BL	BL	BL	BL	BL	NA
15	Chip capacitor	BL	BL	BL	BL	BL	NA
16	Green PCB	BL	BL	BL	BL	BL	NA
17	Chip IC	BL	BL	BL	BL	BL	NA
18	Chip LED	BL	BL	BL	BL	BL	NA
19	Chip diode	BL	BL	BL	BL	IN	PBBs : ND PBDEs : ND

Part No.	Part Description	Result of XRF					Result of Wet Chemical Testing (mg/kg)
		Cd	Pb	Hg	Cr	Br	
20	Solder	BL	IN	BL	BL	BL	Pb :324
21	Silvery-white plastic film	BL	BL	BL	BL	BL	NA
22	Black transparent plastic sheet	BL	BL	BL	BL	BL	NA
23	Transparent glass sheet	BL	BL	BL	BL	BL	NA
24	Solder	BL	BL	BL	BL	BL	NA
25	Silvery glass sheet with brown plating	BL	BL	BL	BL	BL	NA
26	Silvery metal screw	BL	BL	BL	BL	BL	NA

Remark:

(1) Results are obtained by EDXRF for primary screening, and further chemical testing by ICP (for Cd, Pb, Hg), UV-VIS (for Cr^{6+}) and GC-MS (for PBBs, PBDEs) is recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1: 2013 (unit: mg/kg)

Element	Polymer	Metal	Composite Materials
Cd	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	BL ≤ (70-3σ) < IN < (130+3σ) ≤ OL	LOD < IN < (150+3σ) ≤ OL
Pb	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Hg	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (700-3σ) < IN < (1300+3σ) ≤ OL	BL ≤ (500-3σ) < IN < (1500+3σ) ≤ OL
Cr	BL ≤ (700-3σ) < IN	BL ≤ (700-3σ) <IN	BL ≤ (500-3σ) < IN
Br	BL ≤ (300-3σ) < IN	--	BL ≤ (250-3σ) < IN

BL= Below Limit OL= Over Limit LOD = Limit of Detection -- = Not Regulated

(2) "IN" expresses the inconclusive region, and further chemical testing to confirm whether it complies with the requirement of RoHS Directive.

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

(4) mg / kg =milligram per kilogram=ppm, $\mu g/cm^2$= Micrograms per square centimetre.

(5) ND = Not Detected or lower than limit of quantitation.

(6) NA = Not Applicable, as the XRF screening test result was below the limit or as the XRF screening directly determine that test result was over the limit, it was not need to conduct the wet chemical testing.

(7) LOQ = Limit of quantitation.

Test Items	Pb	Cd	Hg	Cr^{6+}		PBB	PBDE
Units	mg/kg	mg/kg	mg/kg	mg/kg	$\mu g/cm^2$	mg/kg	mg/kg
LOQ	2	2	2	8	0.1	5	5

The LOQ for single compound of PBBs and PBDEs is 5mg/kg, LOQ of Cr^{6+} for polymer and composite sample is 8mg/kg and LOQ of Cr^{6+} for metal sample is 0.1$\mu g/cm^2$.

(8) RoHS Requirement

Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr^{6+})	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)

(9) According to IEC 62321-7-1:2015, determined of Cr^{6+} on metal sample by boiling water extraction test method, and result is shown as Positive/Negative.
Boiling water extraction:
Negative = Absence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is less than 0.10ug/cm^2.
Positive = Presence of Cr^{6+} coating, the detected concentration in boiling water extraction solution is greater than 0.13ug/cm^2.
Information on storage conditions and production date of the tested sample is unavailable and thus Cr^{6+} results represent status of the sample at the time of testing.

(10) Abbreviation:
"Pb" denotes Lead, "Cd" denotes Cadmium, "Hg" denotes Mercury, "Cr" denotes Chromium, "Cr (VI)" denotes Hexavalent Chromium, "Br" denotes Bromine, "PBBs" denotes Total Polybrominated Biphenyls, "PBDEs" denotes Total Polybrominated Diphenyl Ethers.

2. Phthalates:

Serial No.	Part No.	Result (mg/kg)			
		DBP	BBP	DEHP	DIBP
T01	1	<50	<50	<50	<50
T02	2				
T03	3	257	<50	118	146
T04	4	76	<50	151	<50
T05	5	<50	<50	<50	<50
T06	6	79	<50	<50	<50
T07	7	<50	<50	<50	<50
T08	8	<50	<50	<50	<50
T09	9	155	<50	<50	<50
T10	10	<50	<50	<50	<50
T11	14+15+16+17+18△	<50	<50	<50	<50
T12	19+23+25△	<50	<50	<50	<50
T13	21	<50	<50	<50	<50
T14	22	<50	<50	<50	<50

Note:
(1) "<" = less than
(2) mg/kg = milligram per kilogram= ppm

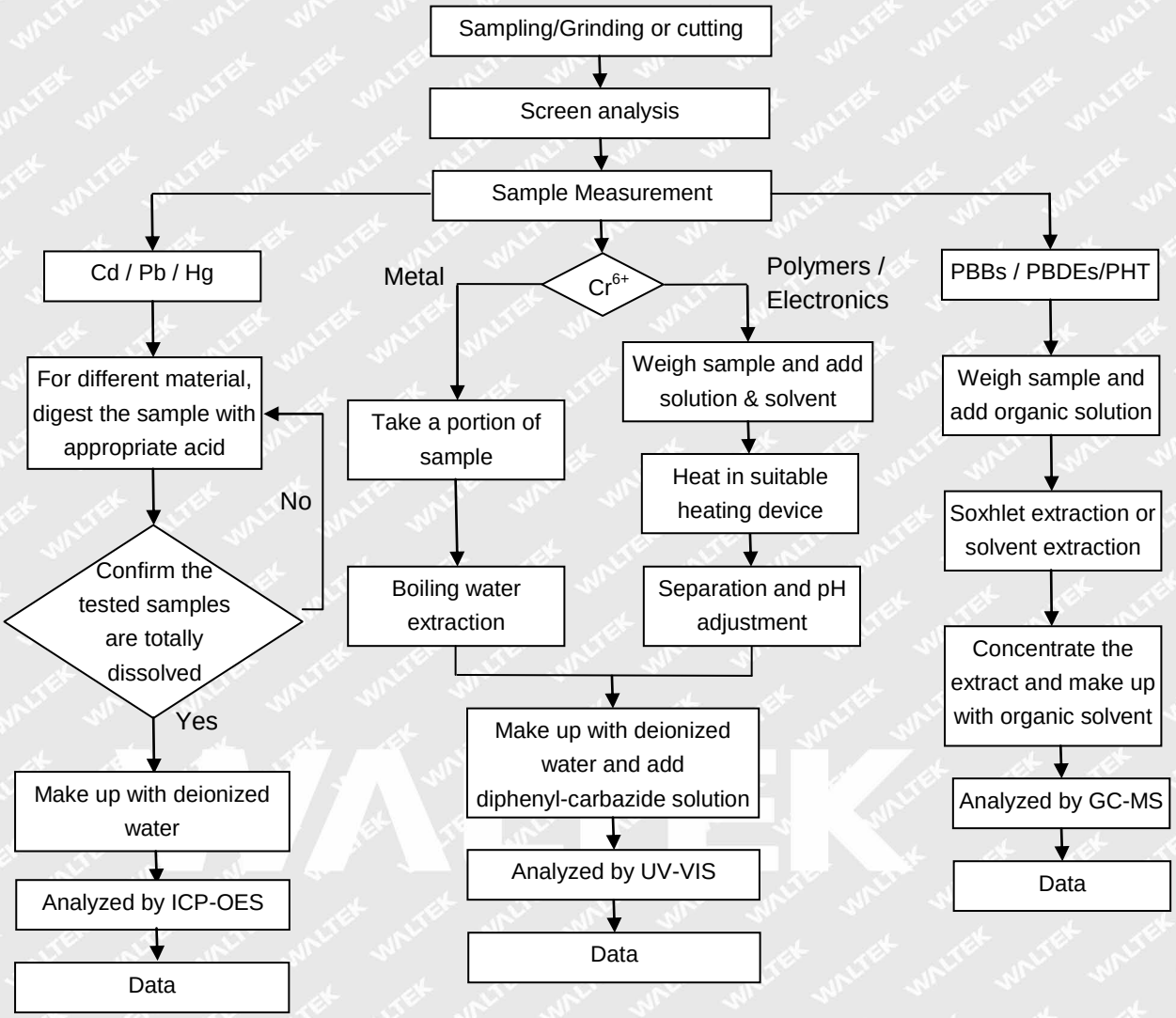
(3) Abbreviation:
"DBP" denotes Dibutyl phthalate, "BBP" denotes Benzyl butyl phthalate (BBP), "DEHP" denotes Bis(2-ethylhexyl)-phthalate, "DIBP" denotes Diisobutyl phthalate, "PHT" denotes Phthalates.

(4) RoHS requirement

Restricted Substances	Limits
Dibutyl phthalate (DBP)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1% (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1% (1000 mg/kg)
Di-iso-butyl phthalate (DIBP)	0.1% (1000 mg/kg)

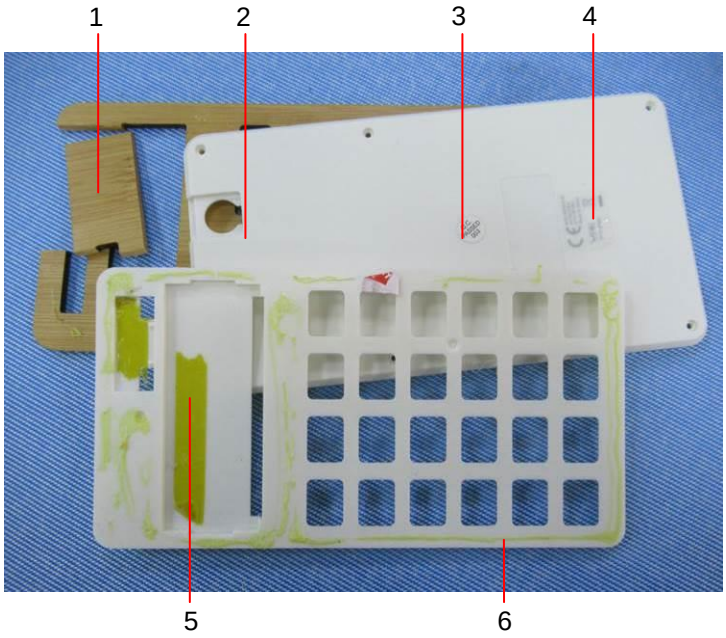
(5) "△"= As client's requirement, the testing was conducted based on mixed components. Results are calculated by the minimum weight of mixed components.

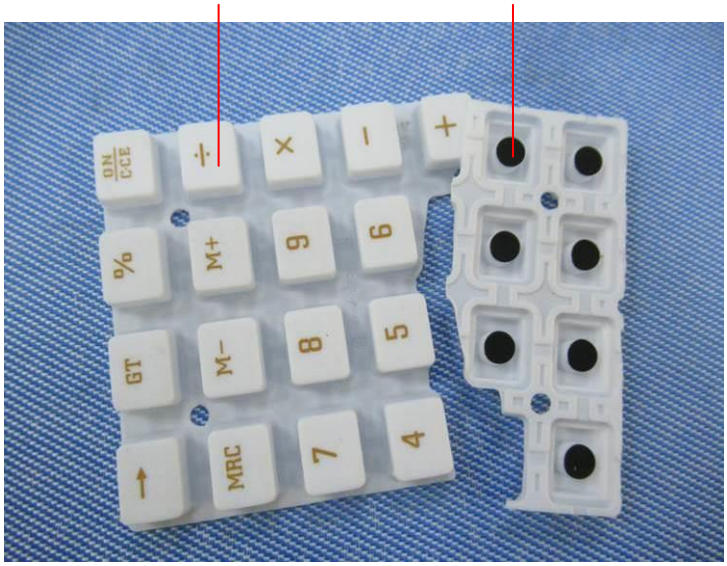
Measurement Flowchart:

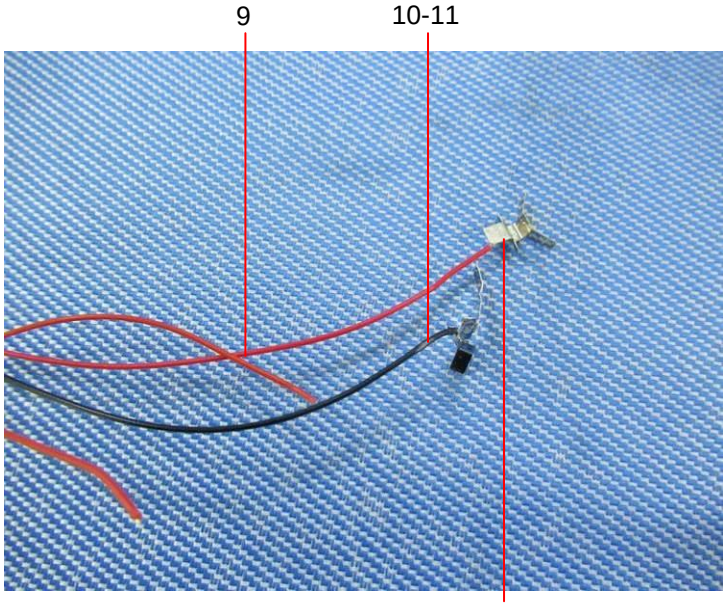


Sample Photo:

Photograph(s) of parts tested:



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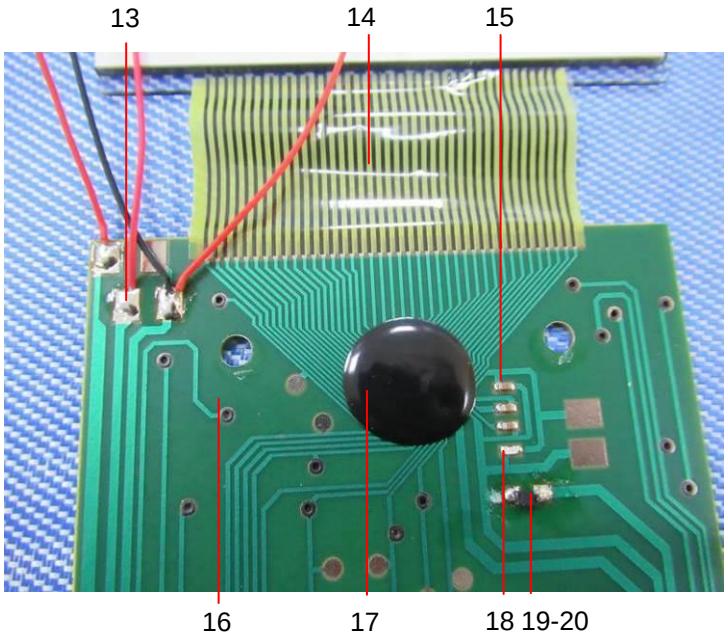
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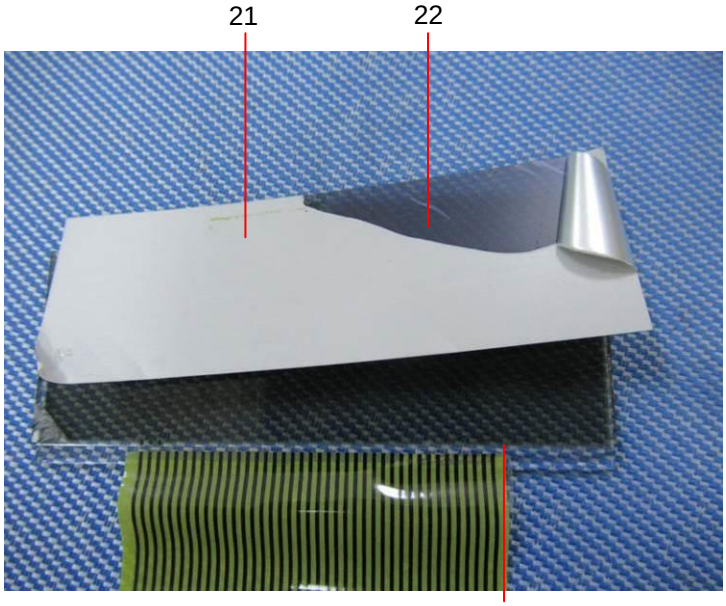
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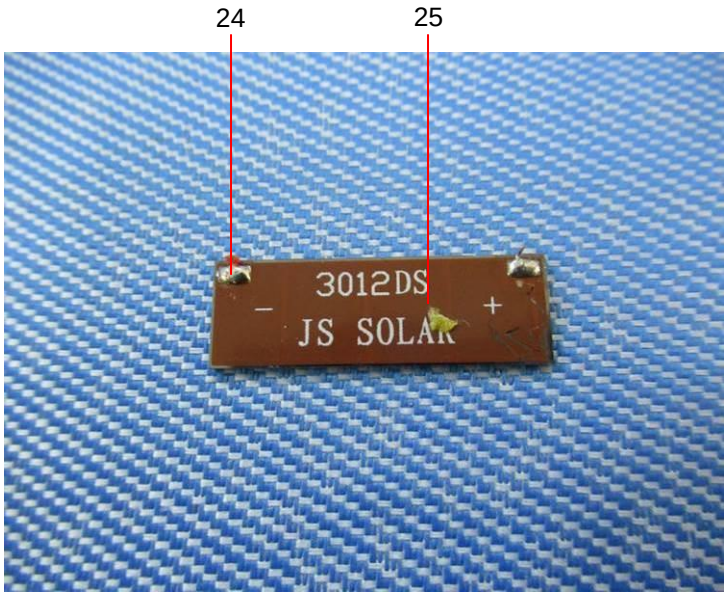
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