



# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 1 of 12

Applicant : Ropla Elektronik Sp. z o. o.  
 Address : ul. Wrocławska 1C, 52-200 Suchy Dwór

Manufacturer : Ropla Elektronik Sp. z o. o.  
 Address : ul. Wrocławska 1C, 52-200 Suchy Dwór

Sample Name : Film Capacitors  
 Sample Model : AC & Pulse, AC filtering, DC-link, PFC, RC Snubber, RC X2, Motor Run, Snubber, Standard, Switching, X1, X1/Y2, X2, X2 (series connection), Y2.

Series Models : All Akyga passive film capacitors  
 Receiving Date : Sep 12, 2023  
 Testing Period : Sep 12, 2023 to Sep 18, 2023

Test Requested : 1. According to the requirement of the applicant, Lead (Pb), Cadmium (Cd), Mercury (Hg), Chromium (Cr) and Bromine (Br) in submitted sample were screened by XRF.  
 2. According to the requirement of the applicant, when the screening results exceed the XRF screening limit of IEC 62321-3-1:2013, Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent chromium [Cr(VI)], Polybrominated biphenyls (PBBs) and Polybrominated diphenyl ethers (PBDEs) in the submitted sample are further tested by chemical methods according to IEC 62321-4:2013/AMD 1:2017, IEC 62321-5:2013, IEC 62321-6:2015, IEC 62321-7-1:2015, IEC 62321-7-2:2017.  
 3. According to the requirement of the applicant, Diisobutyl phthalate (DIBP), Dibutyl Phthalate (DBP), Benzyl butyl phthalate (BBP) and Bis(2-ethylhexyl) phthalate (DEHP) in the submitted sample are tested by chemical method according to IEC 62321-8:2017.  
 4. The test points selected in this report are designated by the applicant.

Test Methods : Please refer to next page(s)  
 Test Results : Please refer to next page(s)

Conclusion :	The limits as set by RoHS Directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU.	PASS
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Edited by: Python Zeng Reviewed by: Camile Li Approved by: Terry Cao

## Dongguan ZRLK Testing Technology Co., Ltd.

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 2 of 12

## Test Methods

### a) XRF scanning testing

Test method: IEC 62321-3-1:2013.

Element	Screening limits in mg/kg for regulated elements in various matrices			MDL (mg/kg)	
	Polymers	Metals	Composite material	Polymers	Other materials
Pb	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	10	50
Cd	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq (70-3\sigma) < X < (130+3\sigma) \leq OL$	$BL \leq LOD < X < (150+3\sigma) \leq OL$	10	50
Hg	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (700-3\sigma) < X < (1300+3\sigma) \leq OL$	$BL \leq (500-3\sigma) < X < (1500+3\sigma) \leq OL$	10	50
Cr	$BL \leq (700-3\sigma) < X$	$BL \leq (700-3\sigma) < X$	$BL \leq (500-3\sigma) < X$	10	50
Br	$BL \leq (300-3\sigma) < X$	---	$BL \leq (250-3\sigma) < X$	10	50

Remark: 1. BL — Below limit, 2. OL — Over limit, need to chemical test,  
3. X — Inconclusive, need to chemical test, 4.  $3\sigma$  — The repeatability of the XRF,  
5. MDL — Method detection limit, 6. LOD = MDL.

### b) Chemical testing

Test items	Test methods	Instruments	MDL	Limit
Pb	IEC 62321-5:2013	ICP-OES	2 mg/kg	1000 mg/kg
Cd	IEC 62321-5:2013	ICP-OES	2 mg/kg	100 mg/kg
Hg	IEC 62321-4:2013/AMD 1:2017	ICP-OES	2 mg/kg	1000 mg/kg
Cr(VI)	IEC 62321-7-1:2015	UV-Vis	0.10 $\mu$ g/cm <sup>2</sup>	1000 mg/kg
	IEC 62321-7-2:2017	UV-Vis	8 mg/kg	1000 mg/kg
PBBs	IEC 62321-6:2015	GC-MS	30 mg/kg	1000 mg/kg
PBDEs	IEC 62321-6:2015	GC-MS	30 mg/kg	1000 mg/kg
DIBP	IEC 62321-8:2017	GC-MS	30 mg/kg	1000 mg/kg
DBP	IEC 62321-8:2017	GC-MS	30 mg/kg	1000 mg/kg
BBP	IEC 62321-8:2017	GC-MS	30 mg/kg	1000 mg/kg
DEHP	IEC 62321-8:2017	GC-MS	30 mg/kg	1000 mg/kg

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 3 of 12

## Test Results

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
1	Silvery metal pin	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		DEHP	---	---	
2	Grey material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		DEHP	---	ND	
3	Black material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		DEHP	---	ND	
4	Transparent plastic (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	BL	---	
		DIBP	---	ND	
		DBP	---	ND	
		DEHP	---	ND	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 4 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
5	Aluminum foil (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
6	Silvery metal pin	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
7	Grey material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
8	Black material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 5 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
9	Transparent plastic (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	BL	---	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
10	Aluminum foil (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
11	Silvery metal pin	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
12	Black material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 6 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
13	Grey material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
14	Transparent plastic (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
15	Aluminum foil (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
16	Silvery metal pin	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 7 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
17	Grey material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
18	Black material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
19	Transparent plastic (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
20	Aluminum foil (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 8 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
21	Silvery metal pin	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
		DEHP	---	---	
22	Grey material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
23	Black material	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	X	ND	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	
24	Transparent plastic (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	BL	---	
		DIBP	---	ND	
		DBP	---	ND	
		BBP	---	ND	
		DEHP	---	ND	

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# Test Report

Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 9 of 12

Part No.	Part description	Restricted substances	Results of XRF (mg/kg)	Results of chemical testing (mg/kg)	Conclusion
25	Aluminum foil (Capacitor)	Pb	BL	---	Pass
		Cd	BL	---	
		Hg	BL	---	
		Cr [Cr(VI)]	BL	---	
		Br (PBBs&PBDEs)	---	---	
		DIBP	---	---	
		DBP	---	---	
		BBP	---	---	
DEHP	---	---			

Remark:

1. There are the results on total Br while test items on restricted substances are PBBs and PBDEs. There is the result on total Cr while test item on restricted substances is Cr(VI).
2. Results are obtained by XRF for primary screening, and chemical testing by ICP-OES (for Pb, Cd, 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 62321-3-1:2013.
3. ND = Not detected (<MDL), mg/kg = ppm = 0.0001%.
4. “---” = Not conducted.
5. The sample is positive for Cr(VI) if the Cr(VI) concentration is greater than 0.13  $\mu\text{g}/\text{cm}^2$ , the sample coating is considered to contain Cr(VI). The sample is negative for Cr(VI) if the Cr(VI) concentration is less than 0.10  $\mu\text{g}/\text{cm}^2$ , the sample is considered a non-Cr(VI) based coating. The result between 0.10  $\mu\text{g}/\text{cm}^2$  and 0.13  $\mu\text{g}/\text{cm}^2$  is considered to be inconclusive, unavoidable coating variations may influence the determination.

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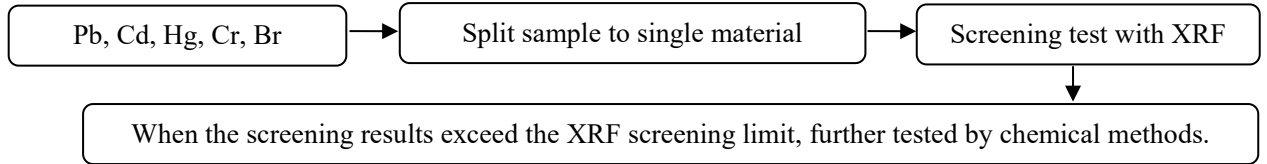
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Telephone: +86-0769-26621775-8002 Email: terry@zrlklab.com Website: www.zrlklab.com

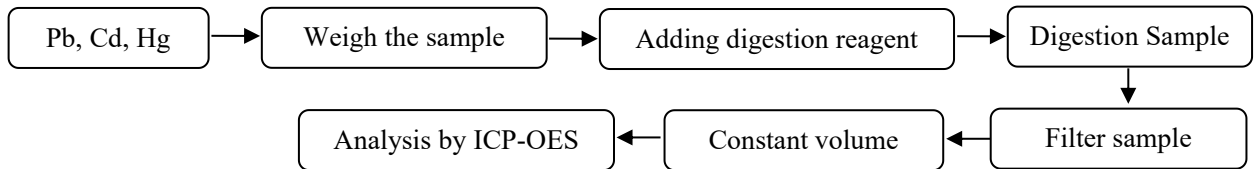


## Test Flow Chart

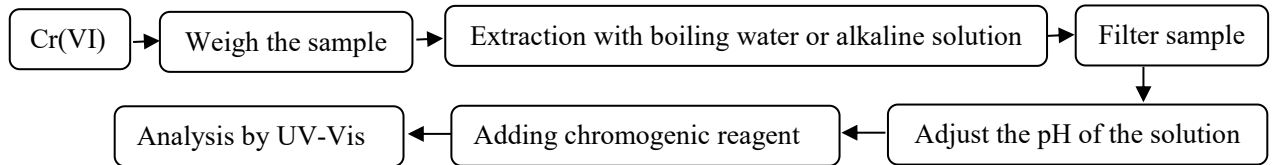
### 1. Pb, Cd, Hg, Cr, Br (XRF test method)



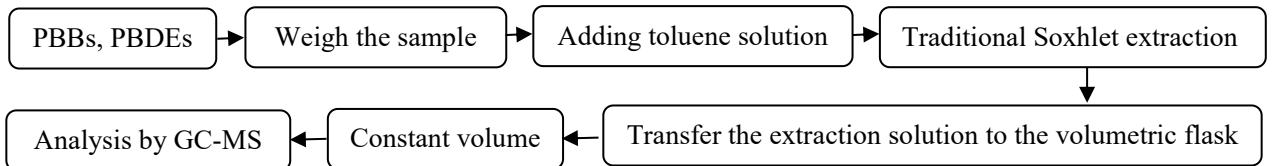
### 2. Pb, Cd, Hg (ICP-OES test method)



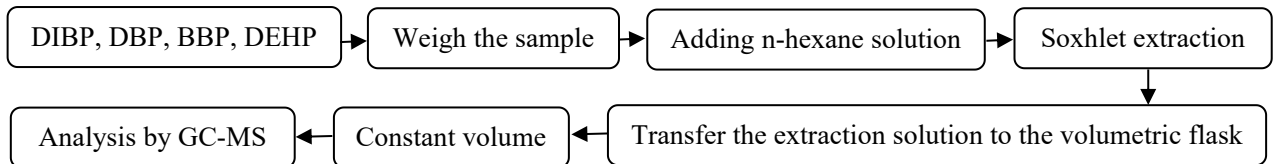
### 3. Cr(VI) (UV-Vis test method)



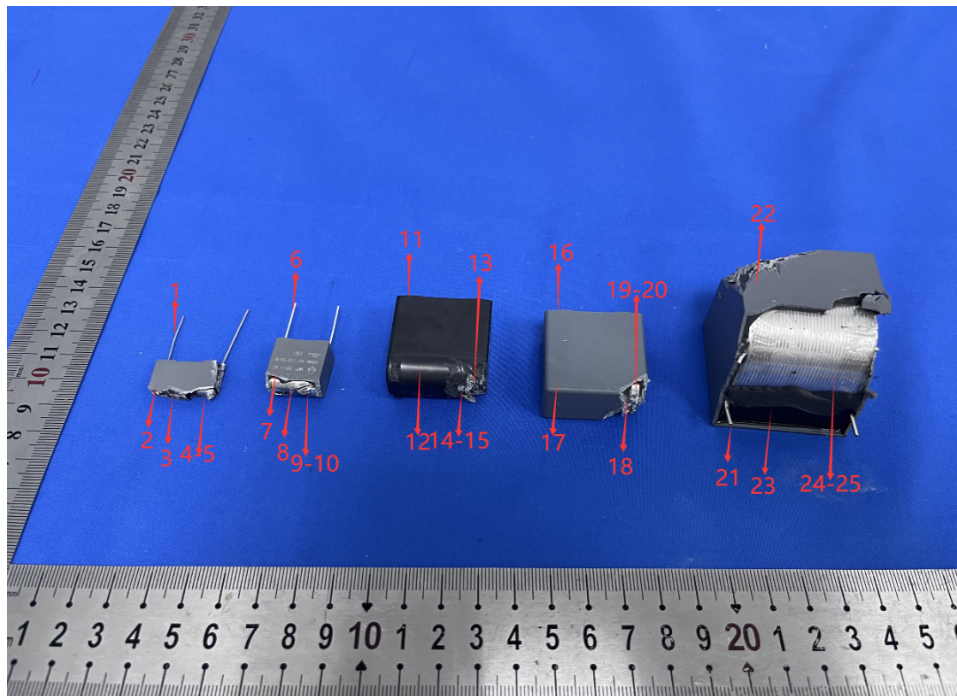
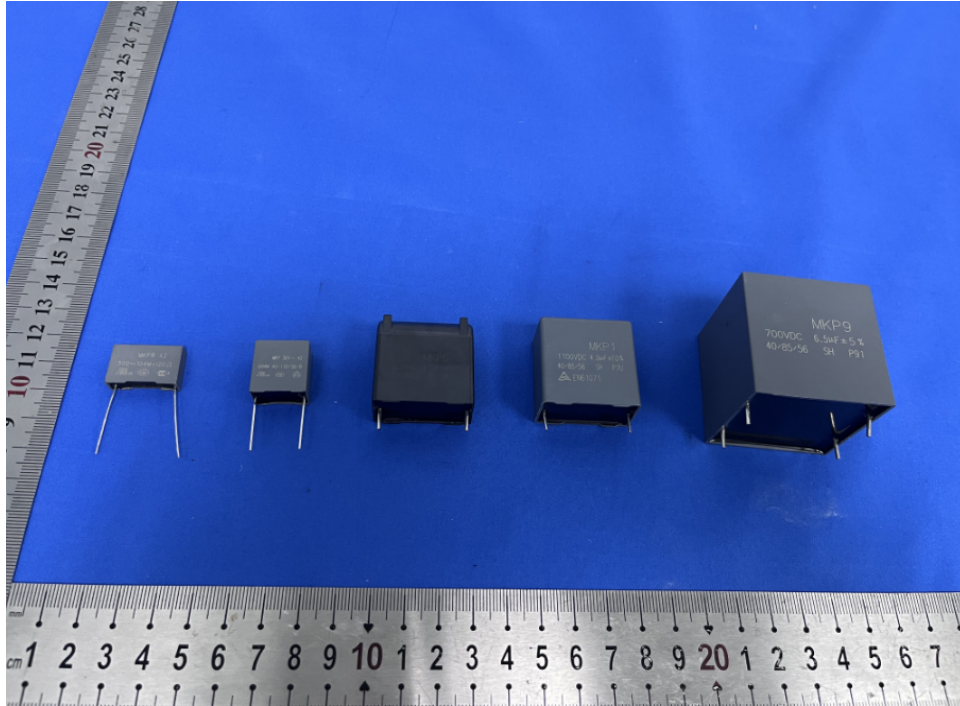
### 4. PBBs, PBDEs (GC-MS test method)



### 5. DIBP, DBP, BBP, DEHP (GC-MS test method)



## Sample Photo(s)



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Report No.: DSP23090336-1

Date: Sep 18, 2023

Page 12 of 12

### Statement

1. Report is invalid without the editor, the reviewer or the approver signature, or altered, or additions and deletions, or not stamped with a special seal.
2. This test report is only responsible for the sample of this acceptance.
3. If the applicant does not raise any objection within 15 working days after receiving the report, it shall be deemed to approve the report result.

\* \* \* End of report \* \* \*

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