

JACKCON *Electrolytic Capacitors*

DATE: 2021.08.25

CUSTOMER: JAMECO ELECTRONICS LTD.

DESCRIPTION: Electrolytic Capacitor

SPEC.: LHK Series 1000 uF 50V 105 °C 13x26

P/N: LHK102M50V1326

BUYER'S APPROVAL STAMP	APPROVED BY:	TESTED BY:
		
	2021.08.25	2021.08.25

HONJU TAIWAN CO., LTD

JACKCON CAPACITOR ELECTRONICS CO., LTD.

SUPPLIER : JACKCON CAPACITOR ELECTRONICS CO., LTD.
5F, NO.88, SHING DE ROAD, SAN CHUNG CITY,
TAIPEI COUNTY, TAIWAN

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FAX : 886-2-2278-2656 886-2-2278-2640

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JACKCON *Electrolytic Capacitors*

105°C *LHK* SERIES

- 規格書

Item	Performance Characteristics													
Operating Temperature Range(°C)	-40+105°C 6.3 to 100VDC							-25+105°C 160 to 450VDC						
Capacitance Tolerance (%)	±20%													
Rated Voltage Range(v)	6.3	10	16	25	35	50	63	100	160	200	250	350	400	450
Dissipation Factor(tan δ %)max.	23	20	16	15	12	10	10	10	15	15	16	20	20	20
	For Capacitance > 1000uF, add 2% per another 1000uF (+20°C, at 120Hz)													
Leakage Current (LC.) (μA /after 1 min.)max.	I ≤ 0.01 CV or 3(μA) After 1 minute whichever is greater measured With rated working voltage applied							I ≤ 0.03 CV or 3(μA) After 1 minute With rated working voltage applied						
Life Test :	ΔC/C		Within ±20% of the initial value											
Load Life Test :	Tan δ		≤ 200% of the initial specified value											
Shelf Life Test :	LC.		≤ The initial specified value											
Detail specifications	Conform to IEC 60384-4													

Spec. & RIPPLE CURRENT:

uF	WV	SIZE(DxL)	Maximum Ripple Current
1000	50	13X26	900mA,rms,120Hz at 105°C

Dimensions

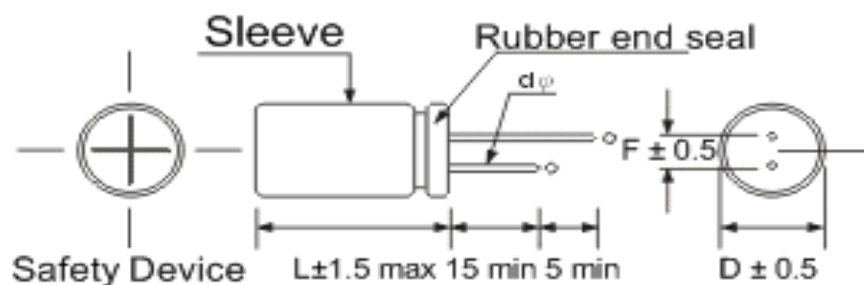
Unit : mm

φ D	5	6.3	8	10	13	16	18	22	25
F	2.0	2.5	3.5	5.0	5.0	7.5	7.5	10	12
φ d	0.5	0.5	0.5	0.6	0.6	0.8	0.8	0.8	1.0

Multiplier for Ripple Current VS, Frequency

Freq. (Hz)		60(50)	120	500	1K	10K ↑
Cap. (uF)	≤ 100	0.7	1	1.30	1.40	1.50
	10 < CAP ≤ 1000	0.75	1	1.20	1.30	1.35
	1000 <	0.8	1	1.10	1.12	1.15

Unit : mm

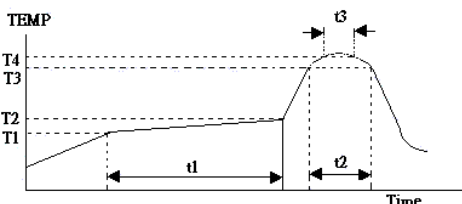


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Endurance characteristic

NO.	Item	Condition	Specification	
5	High temperature load life test	<ol style="list-style-type: none"> Capacitors shall be placed in oven with application of ripple current and rate voltage for 2000 ± 12hrs at 105°C The capacitors should be use within specified permissible ripple current in each standard products table(the sum of DC working voltage and AC peak voltage shall be equal to the rated DC working voltage The specified maximum permissible ripple current in defined at 105°C and 120 Hz Then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made. 	Capacitance change	Within $\pm 20\%$ of the initial value
			TAN δ	Less then 200% of specified value
			Leakage Current	Within specified value
			Physical	no broken and undamaged
6.	High temperature shelf life test	After 1000hrs test at 105°C without rated working voltage. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within $\pm 20\%$ of the initial value
			TAN δ	Less then 200% of specified value
			Leakage Current	Within specified value
			Physical	no broken and undamaged
7.	Rotational temperature test	Capacitor is place in a oven whose temperature follow specific regulation to change. The specific regulations is “ $+25^{\circ}\text{C}$ (1 hr) \rightarrow $+105^{\circ}\text{C}$ (2 hrs) \rightarrow $+25^{\circ}\text{C}$ (0.5 hr) \rightarrow -40°C (2 hrs) \rightarrow $+25^{\circ}\text{C}$ (0.5 hr)”, and it called a cycle. The test totals 10 cycles. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within $\pm 10\%$ of the initial value
			TAN δ	Within specified value
			Leakage Current	Within specified value
			Physical	no broken and undamaged
8.	Humidity test	Capacitors shall be exposed for 500 ± 8 hrs in an atmosphere of 90~95%R.H at 40°C . And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within $\pm 10\%$ of the initial value
			TAN δ	Less then 120% of specified value
			Leakage Current	Within specified value
			Physical	no broken and undamaged

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9.	Low temperature test	Capacitor are place at $-40 \pm 3^{\circ}\text{C}$ for 72 ± 4 hrs. And then the capacitor shall be subjected to standard atmospheric conditions for 16 hours, after witch measurements shall be made.	Capacitance change	Within $\pm 10\%$ of the initial value																		
			TAN δ	Within specified value																		
			Leakage Current	Within specified value																		
			Physical	no broken and undamaged																		
10.	Vibration test	<ol style="list-style-type: none"> Fix it at the point 4mm or less form body. For ones of 12.5mm or 25mm or more length, use separate fixture. Direction and during of vibration:3 orthogonal direction each for 2hrs total 6hrs. Mutually frequency: 10 to55Hz reciprocation for 1 min. Total amplitude:1.5mm 	Capacitance change	Within $\pm 10\%$ of the initial value																		
			TAN δ	Within specified value																		
			Leakage Current	Within specified value																		
			Physical	no broken and undamaged																		
11.	Reflow test	<ol style="list-style-type: none"> IR Reflow <div style="text-align: center;">  </div> <table border="1" style="margin-top: 10px;"> <tr> <td rowspan="2">Preheat</td> <td>Temp (T1~T2)</td> <td>100~150°C</td> </tr> <tr> <td>Time (t1) max</td> <td>40 sec</td> </tr> <tr> <td rowspan="2">Duration</td> <td>Temp(T3)</td> <td>260°C</td> </tr> <tr> <td>Time (t2) max</td> <td>10 sec</td> </tr> <tr> <td rowspan="2">Peck</td> <td>Temp(T4)</td> <td>270°C</td> </tr> <tr> <td>Time (t3) max</td> <td>5 sec</td> </tr> <tr> <td>Reflow cycle</td> <td colspan="2">Twice or less</td> </tr> </table> Solder bath method: Solder temperature:$260 \pm 3^{\circ}\text{C}$ Immersion time:$5+1/-0$ sec Thickness of heat shunt (Printed wiring board):1.6mm Soldering iron method: Bit temperature: $350 \pm 10^{\circ}\text{C}$ Application time of soldering Iron:$3+1/-0$ sec 	Preheat	Temp (T1~T2)	100~150°C	Time (t1) max	40 sec	Duration	Temp(T3)	260°C	Time (t2) max	10 sec	Peck	Temp(T4)	270°C	Time (t3) max	5 sec	Reflow cycle	Twice or less		Capacitance change	Within $\pm 10\%$ of the initial value
				Preheat	Temp (T1~T2)	100~150°C																
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Reflow cycle	Twice or less																					
TAN δ	Within specified value																					
Leakage Current	Within specified value																					
Physical	no broken and undamaged																					

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12.	Solderability test	After the lead wire fully immersed in the solder for 2 ± 0.1 sec at a temperature of $245 \pm 2^\circ\text{C}$, the solder coating must be more than 95%																
13.	Mechanical	<p>1. The test is about lead tabs strength.</p> <p>2. Tension test: The lead tabs shall not be broken or any malformed condition after fixing capacitor vertically and pressing the following weight on the lead tabs of capacitor for 10 ± 1 sec.</p> <table border="1" data-bbox="604 629 1240 763"> <thead> <tr> <th>Lead tabs diameter(mm)</th> <th>Weight(Kg)</th> </tr> </thead> <tbody> <tr> <td>≤ 0.5</td> <td>0.5</td> </tr> <tr> <td>0.6~0.8</td> <td>1.0</td> </tr> <tr> <td>>0.8</td> <td>2.5</td> </tr> </tbody> </table> <p>3. Bending test: The capacitor is held in vertical position. Attach a weight to the lead tabs, slowly rotate the capacitor 90° to a same way in the opposite direction. Repeat it again (5 secs per cycle). The lead tabs shall not be broken or cracked.</p> <table border="1" data-bbox="604 1010 1240 1144"> <thead> <tr> <th>Lead tabs diameter(mm)</th> <th>Weight(Kg)</th> </tr> </thead> <tbody> <tr> <td>≤ 0.5</td> <td>0.5</td> </tr> <tr> <td>0.6~0.8</td> <td>1.0</td> </tr> <tr> <td>>0.8</td> <td>2.5</td> </tr> </tbody> </table>	Lead tabs diameter(mm)	Weight(Kg)	≤ 0.5	0.5	0.6~0.8	1.0	>0.8	2.5	Lead tabs diameter(mm)	Weight(Kg)	≤ 0.5	0.5	0.6~0.8	1.0	>0.8	2.5
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≤ 0.5	0.5																	
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Lead tabs diameter(mm)	Weight(Kg)																	
≤ 0.5	0.5																	
0.6~0.8	1.0																	
>0.8	2.5																	
14.	Safety vent	<p>Condition: Apply a reverse voltage with current 1 amp.(DC reverse voltage test)</p> <p>Criteria: When the pressure relief vent operated, the capacitor shall not flame although gas generation or expulsion of a part of the inside element is allowable. If the vent does not operate with the voltage applied for 30 minutes, the test is Considered to be passed.</p>																
15.	Standards	Satisfies Characteristic W of IEC-60384-4,18																

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CODE CONSTRUCTION

LHK	102	M	50	V	13	26	----
<u>Series</u> (1)	<u>Capacitance</u> (2)	<u>Tol.</u> (3)	<u>Voltage</u> (4)	<u>Sleeve</u> (5)	<u>Dia.</u> (6)	<u>Length</u> (7)	<u>Forming</u> (8)

(1) Series:

LGK	LHK	LMK	LSM	LEK	LPS	LKP	LNP	LLK	LBP
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

(2) Capacitance (uF):

μF	0.1	1	10	100	1000	10000	1.5
Code	0R1	010	100	101	102	103	1R5
μF	0.22	2.2	22	220	2200	22000	15
Code	R22	2R2	220	221	222	223	150
μF	0.33	3.3	33	330	3300	33000	150
Code	R33	3R3	330	331	332	333	151
μF	0.47	4.7	47	470	4700	47000	1500
Code	R47	4R7	470	471	472	473	152

(3) Tolerance:

Code	J	K	M
Tolerance	$\pm 5\%$	$\pm 10\%$	$\pm 20\%$

(4) Working Voltage (V):

6.3	10	16	25	35	50	63
100	160	200	250	350	400	450

(5) Sleeve:

Code	V	E
Sleeve	PVC	PET

(6) Diameter (mm):

4	5	6	8	10	13	16	18
22	25	30	35	51	64	77	90

(7) Length (mm):

5	7	9	11	12	14	16	20	21	25
26	31	33	36	40	42	45	50	53	65
75	83	96	100	115	121	130	140	144	157

(8) Forming (optional):

Taping + pitch (mm)	Cutting + length (mm)	Kink + pitch (mm)
TB2	C3.3	K5
TB2.5	C3.5	
TB3.5	C5	
TB5	C7	

JACKCON *Electrolytic Capacitors*

L A B E L

FRONT

JACKCON	Electrolytic Capacitor	
Capacitance Range:	1 0 0 0	uF
Voltage Range:	5 0	V
Quantity:	<u>250</u>	pcs
Remark: 13*26	105°C	RoHS
MADE IN TAIWAN		COMPLIANT

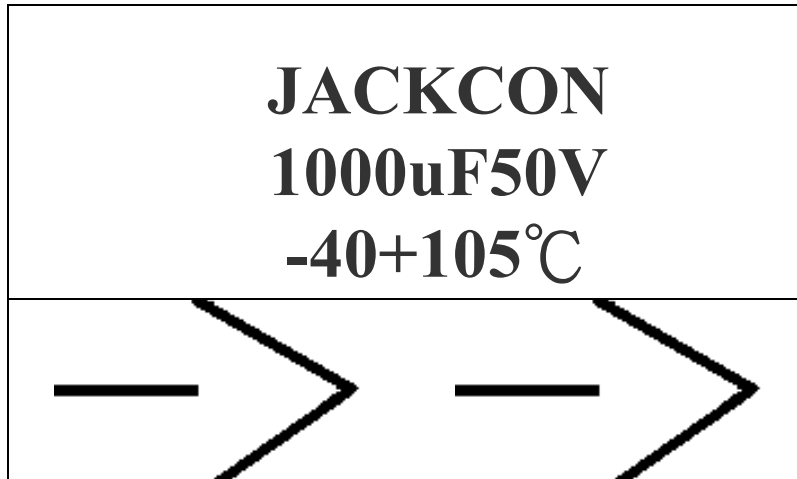
Lot No : 8 070313-000314

DATE LOT NO.

JACKCON *Electrolytic Capacitors*

Marking

FRONT



Test Report

Applicant: Jackcon Capacitor Electronics Co., Ltd.
5F., No.90, Shingde Road,
Sanchung Dist., New Taipei City, 24158,
Taiwan

Number : TWNC00957019

Issue Date : Feb 18, 2021

Sample Description:

One (1) Group of Submitted Samples Said To Be :

Sample Description : AL. ELECTROLYTIC CAPACITORS FULL RANGE

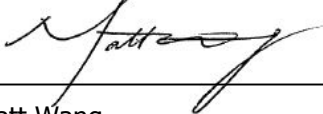
Date Sample Received : Feb 01, 2021

Date Test Started : Feb 01, 2021

Test Conducted:

As requested by the applicant, for details please refer to attached pages.

Authorized By:
On behalf of Intertek Testing Services
Taiwan Limited



Matt Wang
Director



Signed by:



Thomas Chou
Manager



Test Conducted :

Test Result Summary:

Test Item	Unit	Test Method	Result	RL
			Black electronic component (mixed all parts)	
Heavy Metal				
Cadmium (Cd) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	ND	2
Lead (Pb) Content	ppm	With reference to IEC 62321-5: 2013, by microwave or acid digestion and determined by ICP-OES.	4	2
Mercury (Hg) Content	ppm	With reference to IEC 62321-4:2013+AMD1:2017, by microwave or acid digestion and determined by ICP-OES.	ND	2
Chromium VI (Cr(VI)) Content	ppm	With reference to IEC 62321-7-2: 2017, organic solvent was used to dissolve or swell sample matrix, followed by alkaline digestion and determined by UV-Vis Spectrophotometer.	ND	8
Polybrominated Biphenyls (PBBs)				
Monobrominated Biphenyls (MonoBB)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Biphenyls (DiBB)	ppm		ND	5
Tribrominated Biphenyls (TriBB)	ppm		ND	5
Tetrabrominated Biphenyls (TetraBB)	ppm		ND	5
Pentabrominated Biphenyls (PentaBB)	ppm		ND	5
Hexabrominated Biphenyls (HexaBB)	ppm		ND	5
Heptabrominated Biphenyls (HeptaBB)	ppm		ND	5
Octabrominated Biphenyls (OctaBB)	ppm		ND	5
Nonabrominated Biphenyls (NonaBB)	ppm		ND	5
Decabrominated Biphenyl (DecaBB)	ppm		ND	5



Test Conducted :

Test Item	Unit	Test Method	Result	RL
			Black electronic component (mixed all parts)	
Polybrominated Diphenyl Ethers (PBDEs)				
Monobrominated Diphenyl Ethers (MonoBDE)	ppm	With reference to IEC 62321-6: 2015, by solvent extraction and determined by GC-MS and further HPLC-DAD confirmation when necessary.	ND	5
Dibrominated Diphenyl Ethers (DiBDE)	ppm		ND	5
Tribrominated Diphenyl Ethers (TriBDE)	ppm		ND	5
Tetrabrominated Diphenyl Ethers (TetraBDE)	ppm		ND	5
Pentabrominated Diphenyl Ethers (PentaBDE)	ppm		ND	5
Hexabrominated Diphenyl Ethers (HexaBDE)	ppm		ND	5
Heptabrominated Diphenyl Ethers (HeptaBDE)	ppm		ND	5
Octabrominated Diphenyl Ethers (OctaBDE)	ppm		ND	5
Nonabrominated Diphenyl Ethers (NonaBDE)	ppm		ND	5
Decabrominated Diphenyl Ether (DecaBDE)	ppm		ND	5
Phthalates				
Di(2-ethylhexyl) Phthalate (DEHP)	ppm	With reference to IEC 62321-8:2017, by solvent extraction and determined by GC-MS.	ND	50
Dibutyl Phthalate (DBP)	ppm		ND	50
Benzyl Butyl Phthalate (BBP)	ppm		ND	50
Diisobutyl Phthalate (DIBP)	ppm		ND	50

Remarks: ppm = Parts per million based on weight of tested sample = mg/kg
 ND = Not detected
 RL = Reporting limit, quantitation limit of analyte in sample

Responsibility of Chemist: Pelyn Hsiao/ Vita Fu

Date Sample Received : Feb 01, 2021
 Test Period : Feb 01, 2021 to Feb 05, 2021



Test Conducted :

RoHS Limit

<u>Restricted Substances</u>	<u>Limits</u>
Cadmium (Cd) content	0.01% (100ppm)
Lead (Pb) content	0.1% (1000ppm)
Mercury (Hg) content	0.1% (1000ppm)
Chromium VI (Cr(VI)) content	0.1% (1000ppm)
Polybrominated Biphenyls (PBBs)	0.1% (1000ppm)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000ppm)
Di(2-ethylhexyl) Phthalate (DEHP)	0.1% (1000ppm)
Dibutyl Phthalate (DBP)	0.1% (1000ppm)
Benzyl Butyl Phthalate (BBP)	0.1% (1000ppm)
Diisobutyl Phthalate (DIBP)	0.1% (1000ppm)

The limits were quoted from Annex II of 2011/65/EU and Amendment (EU) 2015/863 for homogeneous material.



Test Conducted :

Measurement Flowchart:

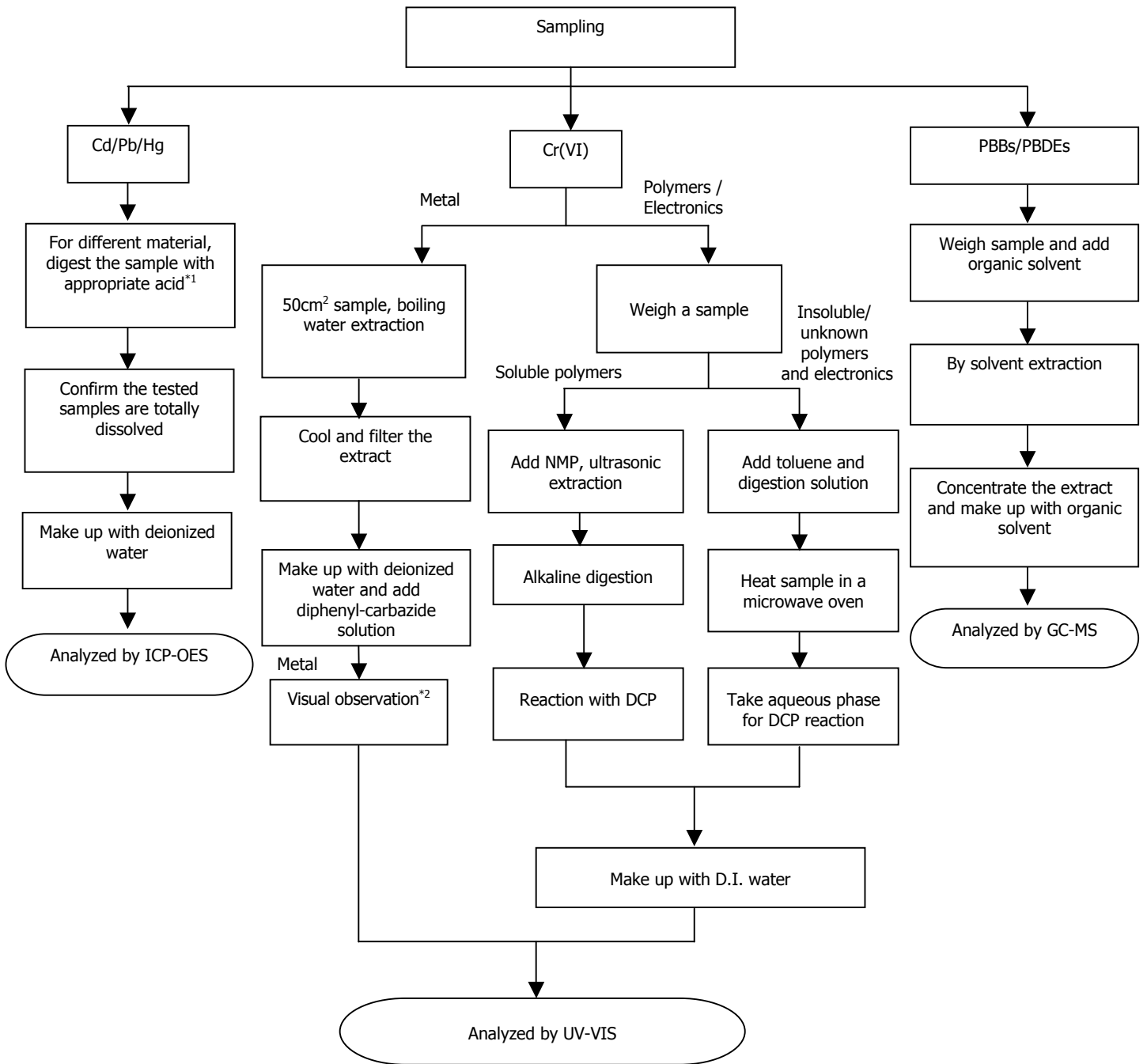
Test for Cd/Pb/Hg/Chromium (VI)/PBBs/PBDEs Content

Reference Standard : Cd/Pb: IEC 62321-5:2013; Hg: IEC 62321-4:2013+AMD1:2017;

Chromium (VI): IEC 62321-7-1:2015 (boiling water extraction);

Chromium (VI): IEC 62321-7-2:2017 (solvent and alkaline extraction);

PBBs/PBDEs: IEC 62321-6:2015



Test Conducted :

Remarks:

*1: List of Appropriate Acid :

Material	Acid Added for Digestion
Polymers	HNO ₃ , HCl, HF, H ₂ O ₂ , H ₃ BO ₃
Metals	HNO ₃ , HCl, HF
Electronics	HNO ₃ , HCl, H ₂ O ₂ , HBF ₄

*2: If sample solution is significantly more intense than 0.13 µg/cm² equivalent comparison standard, Chromium VI would be determined as detected, the result of visual observation is positive.

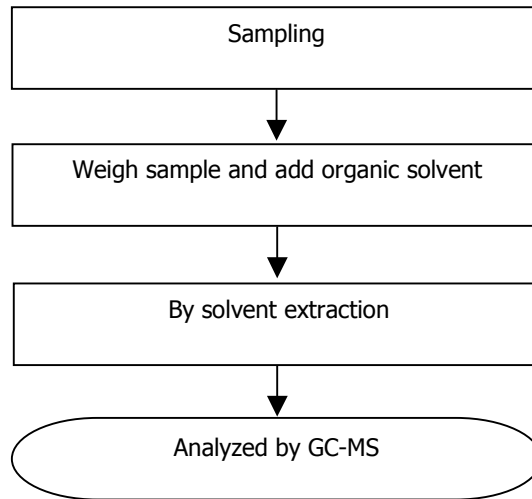


Test Conducted :

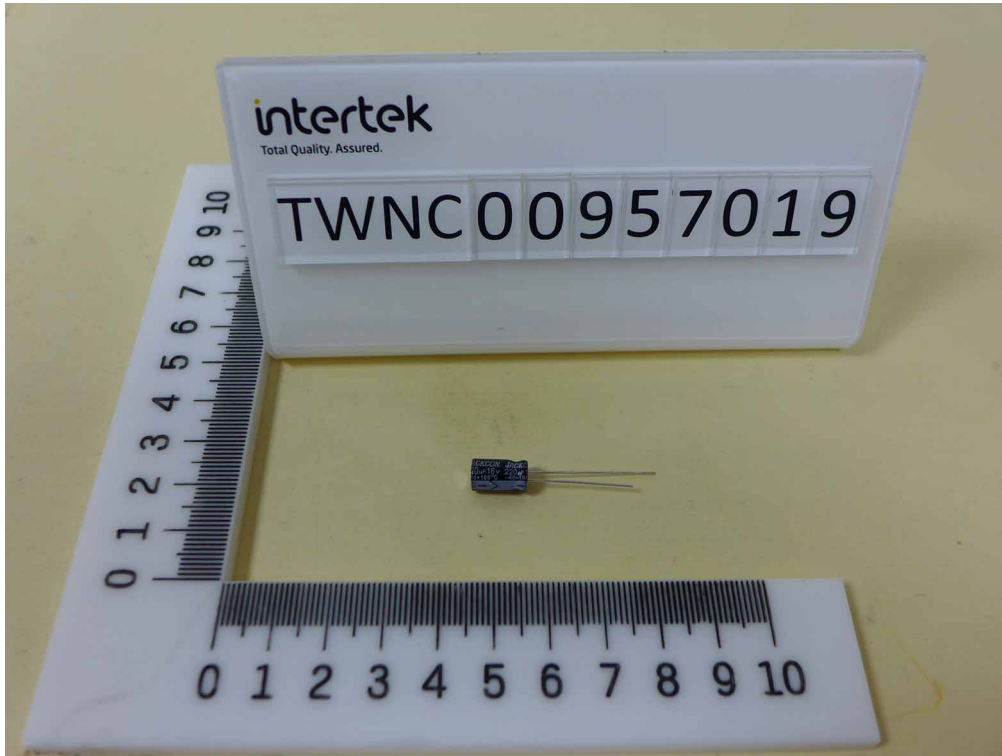
Measurement Flowchart:

Test for Phthalates Content

Reference Method : IEC 62321-8:2017



Sample photo:



End of Report

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