



Test Report

Report No.: 161101018SZN-002

Issue date: Nov. 03, 2016

Applicant: RADIUS INDUSTRIES

S-57, F.I.E.E.OKHLA INDUSTRIAL AREA,PHASE-II,NEW DELHI-110020 INDIA

Sample Description:

Test item description.....: METAL FILM RESISTORS

Trade Mark: RADCOM

Date of Sample Received.....: Oct. 31, 2016

Testing Period: Oct. 31, 2016 to Nov. 03, 2016

Tests conducted:

As requested by the applicant, refer to following page(s) for details.

Conclusion:

<u>Tested samples</u>	<u>Standard</u>	<u>Result</u>
Tested components of submitted sample	RoHS Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863 with effective from 22 July 2019	See test conducted

Remark: As requested by the applicant, different materials of tested component (1) were tested together.

No test was conducted on component (2), all results of this components stated in this report were referred to our report 160316019SZN-001 dated on Mar. 29, 2016.



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◆ **RoHS Chemical Test:**

(A) Test Result Summary:

Testing Item	Result	
	(1)	(2)
Cadmium (Cd) Content (mg/kg)	ND	ND
Lead (Pb) Content (mg/kg)	ND	ND
Mercury (Hg) Content (mg/kg)	ND	ND
Chromium (VI)(Cr ⁶⁺) Content (mg/kg)	ND	--
Chromium (VI)(Cr ⁶⁺) Result (By Boiling Water Extraction on Metal) (µg/cm ²)	--	Negative
Polybrominated Biphenyls (PBBs)(mg/kg)		
Monobromobiphenyl (MonoBB)	ND	NT
Dibromobiphenyl (DiBB)	ND	NT
Tribromobiphenyl (TriBB)	ND	NT
Tetrabromobiphenyl (TetraBB)	ND	NT
Pentabromobiphenyl (PentaBB)	ND	NT
Hexabromobiphenyl (HexaBB)	ND	NT
Heptabromobiphenyl (HeptaBB)	ND	NT
Octabromobiphenyl (OctaBB)	ND	NT
Nonabromobiphenyl (NonaBB)	ND	NT
Decabromobiphenyl (DecaBB)	ND	NT
Polybrominated Diphenyl Ethers (PBDEs)(mg/kg)		
Monobromodiphenyl Ether (MonoBDE)	ND	NT
Dibromodiphenyl Ether (DiBDE)	ND	NT
Tribromodiphenyl Ether (TriBDE)	ND	NT
Tetrabromodiphenyl Ether (TetraBDE)	ND	NT
Pentabromodiphenyl Ether (PentaBDE)	ND	NT
Hexabromodiphenyl Ether (HexaBDE)	ND	NT
Heptabromodiphenyl Ether (HeptaBDE)	ND	NT
Octabromodiphenyl Ether (OctaBDE)	ND	NT
Nonabromodiphenyl Ether (NonaBDE)	ND	NT
Decabromodiphenyl Ether (DecaBDE)	ND	NT



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Testing Item	Result	
	(1)	(2)
Dibutyl phthalate (DBP) (mg/kg)	ND	NT
Di-(2-ethyl hexyl) phthalate (DEHP) (mg/kg)	ND	NT
Benzyl butyl phthalate (BBP) (mg/kg)	ND	NT
Di-(iso-butyl) phthalate (DIBP) (mg/kg)	ND	NT
<ul style="list-style-type: none"> - ND = Not detected - NT = Not tested - Positive = A positive test result indicated the concentration of Cr(VI) is greater than threshold of 0.13µg/cm² for boiling-water-extraction procedures by visual comparison / by UV-VIS Spectrophotometer analysis. The sample coating is considered to contain Cr(VI). - Negative = A negative test result indicated the concentration of Cr(VI) is less than threshold of 0.10µg/cm² for boiling-water-extraction procedures by UV-VIS Spectrophotometer analysis. The coating is considered a non-Cr(VI) based coating. 		

Tested Components:

- (1) Blue body with coatings.
- (2) Silver color metal pin.

(B) RoHS Requirement:

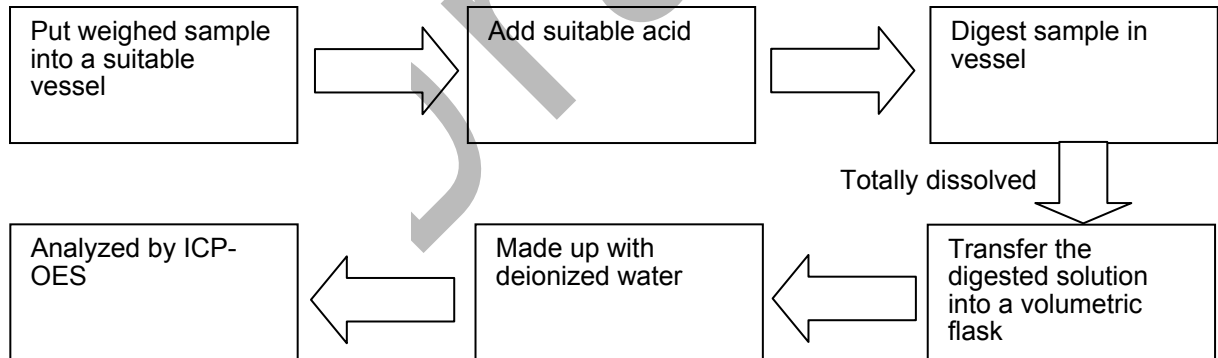
Restricted Substances	Limits
Cadmium (Cd)	0.01% (100 mg/kg)
Lead (Pb)	0.1% (1000 mg/kg)
Mercury (Hg)	0.1% (1000 mg/kg)
Chromium (VI) (Cr ⁶⁺)	0.1% (1000 mg/kg)
Polybrominated Biphenyls (PBBs)	0.1% (1000 mg/kg)
Polybrominated Diphenyl Ethers (PBDEs)	0.1% (1000 mg/kg)
Dibutyl phthalate (DBP) (mg/kg)	0.1% (1000 mg/kg)
Di-(2-ethyl hexyl) phthalate (DEHP) (mg/kg)	0.1% (1000 mg/kg)
Benzyl butyl phthalate (BBP) (mg/kg)	0.1% (1000 mg/kg)
Di-(iso-butyl) phthalate (DIBP) (mg/kg)	0.1% (1000 mg/kg)
<ul style="list-style-type: none"> - The above limits were quoted from Directive 2011/65/EU and amendment Commission Delegated Directive (EU) 2015/863 for homogeneous material. 	

(C) Test Method:

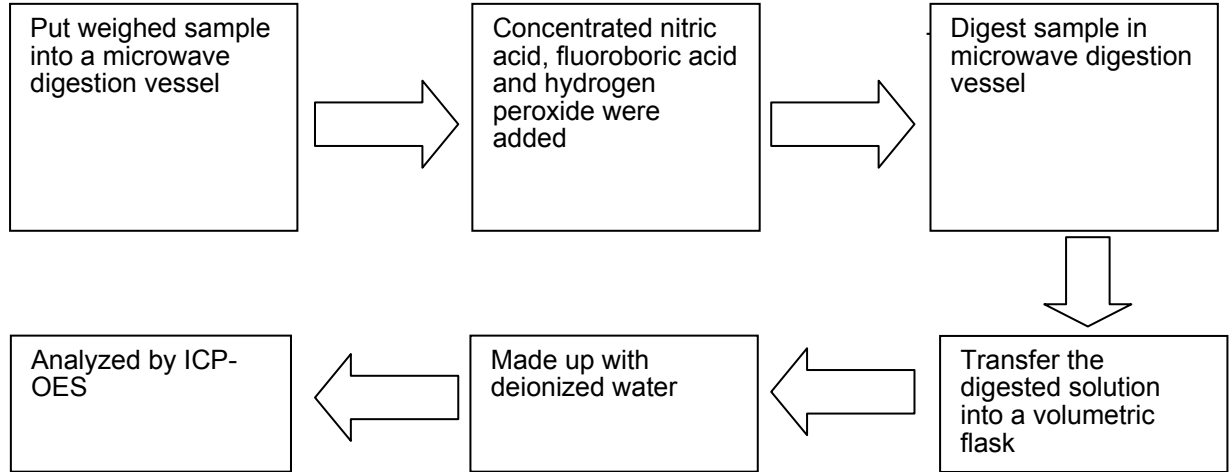
Testing Item	Testing Method	Reporting Limit
Cadmium (Cd) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion and determined by ICP - OES	2 mg/kg
Lead (Pb) Content	With reference to IEC 62321-5 Edition 1.0:2013, by acid digestion and determined by ICP - OES	2 mg/kg
Mercury (Hg) Content	With reference to IEC 62321-4 Edition 1.0:2013, by acid digestion and determined by ICP - OES	2 mg/kg
Chromium (VI)(Cr ⁶⁺) Content	With reference to IEC 62321 Edition 1.0:2008, by alkaline digestion and determined by UV-VIS Spectrophotometer	1 mg/kg
Polybrominated Biphenyls (PBBs)& Polybrominated Diphenyl Ethers (PBDEs)	With reference to IEC 62321-6 Edition 1.0:2015, by solvent extraction and determined by GC/MS and further HPLC confirmation when necessary	5 mg/kg
Dibutyl phthalate (DBP) & Di-(2-ethyl hexyl) phthalate (DEHP) & Benzyl butyl phthalate (BBP) & Di-(iso-butyl) phthalate (DIBP)	With reference to EN 14372, by Gas Chromatographic-Mass Spectrometric (GC-MS) analysis	100mg/kg

(D) Measurement Flowchart:

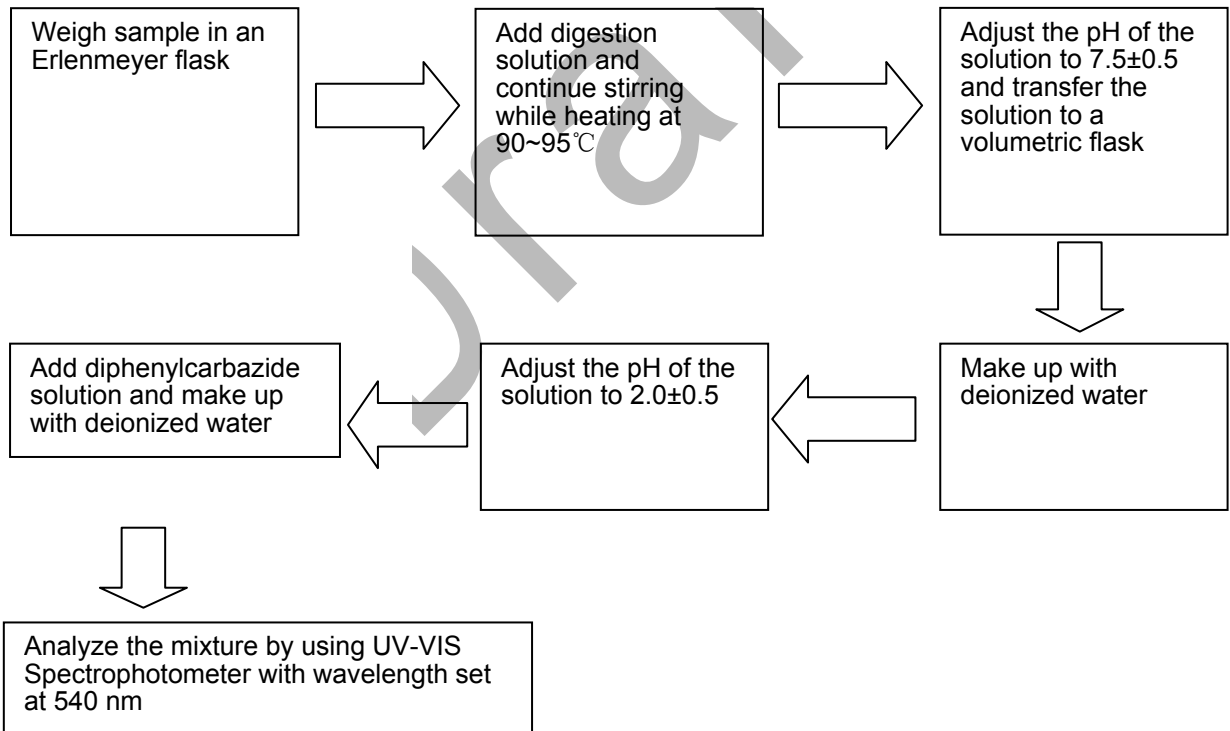
1. Test for Cd/Pb Contents



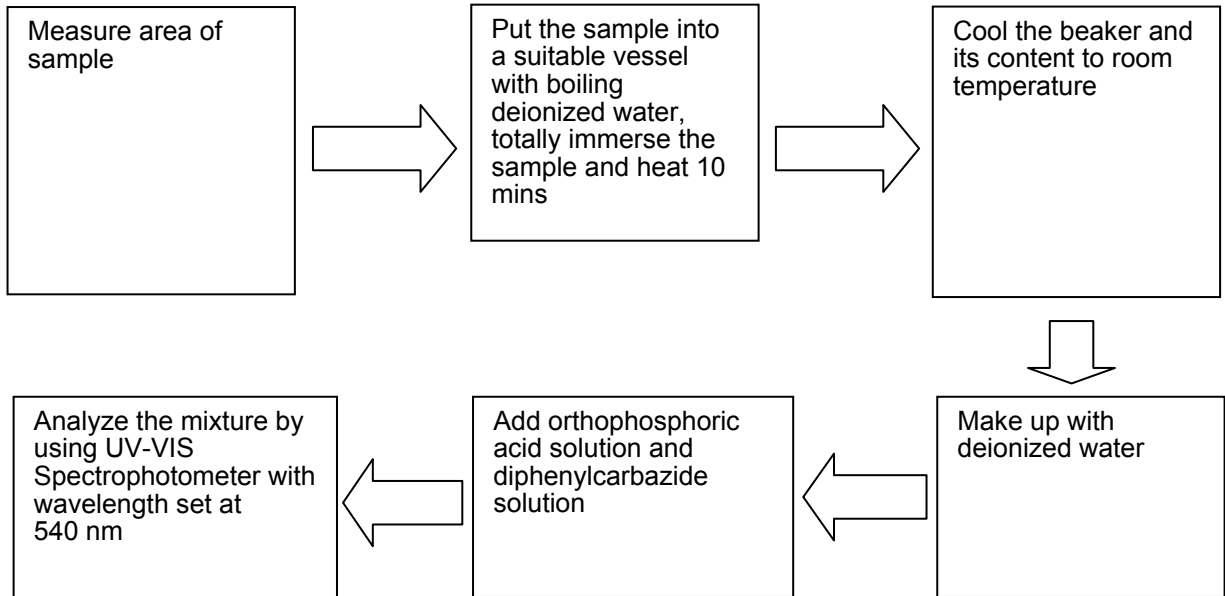
2. Test for Hg Content



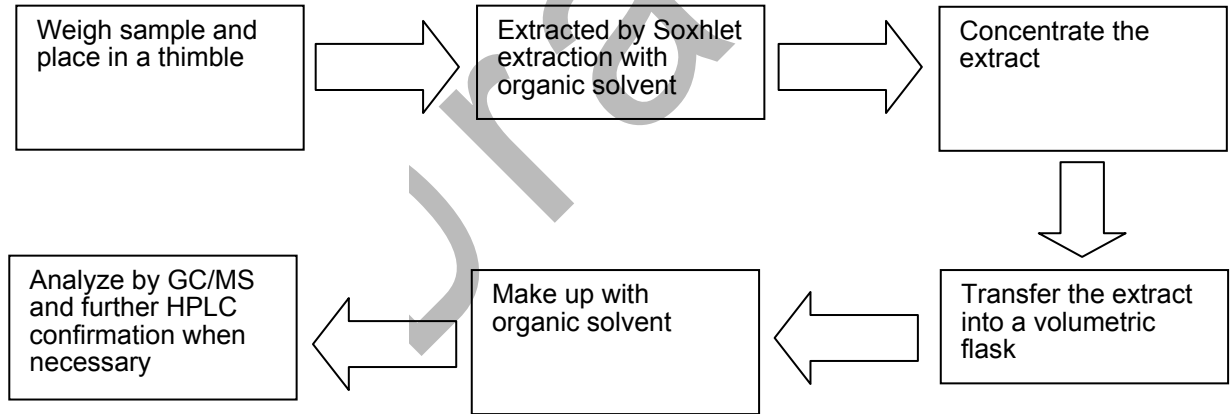
3. Test for Chromium (VI) (Cr⁶⁺) Content (Alkaline Digestion)



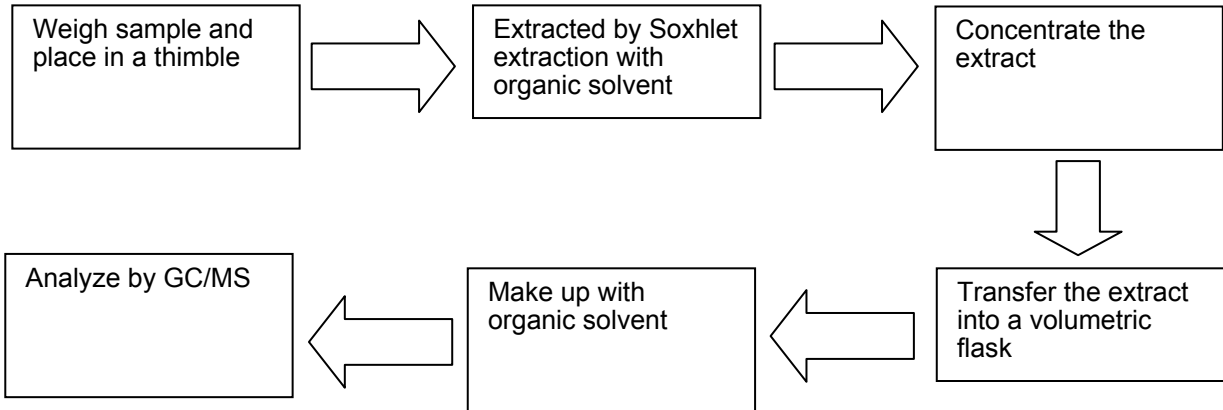
4. Test for Chromium (VI) (Cr6+) Content (Boiling Water Extraction)



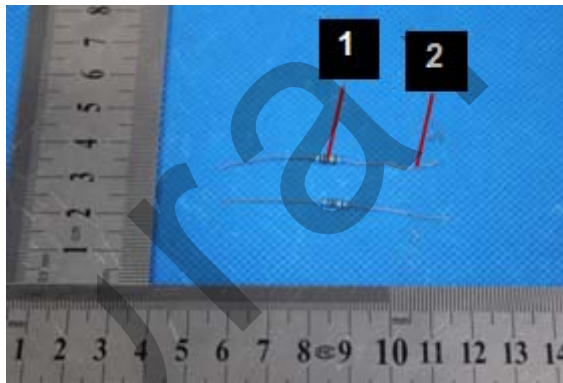
5. Test for PBBs/PBDEs Contents



6. Test for Phthalate Contents



Photos for Test Sample :



***** End of Report *****

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