

TEST REPORT

APPLICANT : Young Won Electronic Co.
Room408, Suheung Techno Valley, 107 Sandan-ro, Ansan-si,
Gyeonggi-do, Korea

DATE : Jun. 16, 2023
NUMBER : RT23R-S3166

PRODUCT DESCRIPTION:
ONE (1) GROUP OF SUBMITTED SAMPLES SAID TO BE :
SAMPLE DESCRIPTION : CO2 Welding Torch Cable
STYLE / ITEM NO. : YWP-TC-01
DATE SAMPLE RECEIVED : May 18, 2023
DATE TEST STARTED : May 24, 2023

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

<u>Tested Samples</u>	<u>Standard</u>	<u>Result</u>
Screening components of submitted samples	With reference to test method of IEC 62321 edition 1.0, screening by XRF spectroscopy, chemical confirmation test and review of previous reports for RoHS Directive 2011/65/EU and Directive 2015/863 Annex II	Pass See Test Conducted

REMARK:
As requested by the applicant, only components shown in this report were screened by XRF spectroscopy for Directive 2011/65/EU. Other components were not screened in this report.

Chemical confirmation tests were conducted to verify the inconclusive results of XRF tests.

Authorized By:
Intertek Testing Services Korea Ltd.



Bo Park
Lab. General Manager

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(I) Product photographs

Photo 1 – Upper view of CO2 Welding Torch Cable



Photo 2 – Bottom view of CO2 Welding Torch Cable



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TEST REPORT

Determination of total value of regulated substances in electro technical products, elements of cadmium (Cd), lead (Pb), mercury (Hg), chromium (Cr) and bromine (Br) content were measured by XRF spectroscopy for RoHS restricted substances. The analyzer is therefore unable to determine if it is PBB, PBDE, Cr(VI) or non restricted bromine and chromium substances in the sample.

And review was performed for the samples disjointed from the submitted samples and the related test reports provided by the applicant.

(II) Summary of verification :

(Unit : mg/kg)

Type of Components	Sample Description		Picture	Elements	XRF Results	Conclusion	Chemical Confirmation Results	Review results of Related test report	Exemption Note Y/N	Test Item	Chemical Confirmation Results
	001	1-1		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	N.D.
				Hg	N.D.	B.L.	-			DEHP	N.D.
				Cr ⁶⁺	N.D.	B.L.	-			BBP	N.D.
				PBBs/PBDEs	N.D.	B.L.	-			DIBP	N.D.
	002	1-2		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	N.D.
				Hg	N.D.	B.L.	-			DEHP	N.D.
				Cr ⁶⁺	N.D.	B.L.	-			BBP	N.D.
				PBBs/PBDEs	N.D.	B.L.	-			DIBP	N.D.
	003	1-3		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	-
				Hg	N.D.	B.L.	-			DEHP	-
				Cr ⁶⁺	N.D.	B.L.	-			BBP	-
				PBBs/PBDEs	N.A.	N.A.	-			DIBP	-
	004	1-4		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	N.D.
				Hg	N.D.	B.L.	-			DEHP	N.D.
				Cr ⁶⁺	N.D.	B.L.	-			BBP	N.D.
				PBBs/PBDEs	N.D.	B.L.	-			DIBP	N.D.
	005	1-5		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	-
				Hg	N.D.	B.L.	-			DEHP	-
				Cr ⁶⁺	N.D.	B.L.	-			BBP	-
				PBBs/PBDEs	N.A.	N.A.	-			DIBP	-
	006	1-6		Pb	N.D.	B.L.	-	-	-	Phthalates	
				Cd	N.D.	B.L.	-			DBP	N.D.
				Hg	N.D.	B.L.	-			DEHP	N.D.
				Cr ⁶⁺	N.D.	B.L.	-			BBP	N.D.
				PBBs/PBDEs	N.D.	B.L.	-			DIBP	N.D.

Tested by : Jooyeon Lee, Chano Kim, Hayan Park



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TEST REPORT

- Remarks: mg/kg = Parts per million (ppm)
- $\mu\text{g}/\text{cm}^2$ = Microgram per square centimeter
- N.D. = Not detected (< MDL) and pass, sample is found to be under detection limit of table IV& V
- MDL = Method detection limits
- N.A. = Not applicable
- Inconclusive = The screened component may have potential non-compliance and confirmation test by wet chemical analysis may be desired to obtain a quantitative result.
- B.L. = Below Limit. The screened component is found to be equal or below the lower screening threshold limit of table III.
- O.L. = Over Limit. The screened component exceeds the defined threshold (see table III) and may present non-compliance. Confirmation Test by wet chemical analysis may be desired to obtain a quantitative result.
- *1 = The screened result was found in the region of inconclusive and further chemical test was suggested (see table III).
- *2 = The screened result of Cr or Br was detected above the screening limits and further chemical test was suggested to identify the presence of hexavalent chromium or PBBs and PBDEs (see table III).
- *3 = Due to the surface area $50 \pm 5 \text{ cm}^2$ as required by the IEC 62321-7-1 Edition 1.0 : 2015 test method was not available from the submitted samples, reduced surface area from actual samples was used for Test directly by necessary adjustment of dilution factor. The test result by using this non-standardized method is for reference only.

Interpretation of Cr^{6+} results

Qualitative result	Concentration of Cr^{6+} ($\mu\text{g}/\text{cm}^2$)	Meaning
Negative	< 0.10	The sample coating is considered a non- Cr^{6+} based coating.
Inconclusive	$0.10 \leq \text{and} \leq 0.13$	Unavoidable coating variation may influence the determination.
Positive	> 0.13	The sample coating is considered to contain Cr^{6+} .

- The qualitative results should be determination by the average result of three test results.
(If concentration of Cr^{6+} is over $0.10 \mu\text{g}/\text{cm}^2$)
- The above results will be carried out by visual comparison only with the standard.

* The XRF result of Cr(VI) and PBBs/PBDEs are screened as Cr and Br



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TEST REPORT

(III) XRF screening limits in mg/kg for regulated elements in various materials.

Elements	Polymer Materials	Metallic Materials	Composite Materials
Pb	$B.L. \leq 700 < X < 1300 \leq O.L.$	$B.L. \leq 700 < X < 1300 \leq O.L.$	$B.L. \leq 500 < X < 1500 \leq O.L.$
Cd	$B.L. \leq 70 < X < 130 \leq O.L.$	$B.L. \leq 70 < X < 130 \leq O.L.$	$B.L. \leq 70 < X < 150 \leq O.L.$
Hg	$B.L. \leq 700 < X < 1300 \leq O.L.$	$B.L. \leq 700 < X < 1300 \leq O.L.$	$B.L. \leq 500 < X < 1500 \leq O.L.$
Cr	$B.L. \leq 700 < X$	$B.L. \leq 700 < X$	$B.L. \leq 500 < X$
Br	$B.L. \leq 300 < X$	Not Applicable	$B.L. \leq 250 < X$

Remark: mg/kg = Milligram per kilogram = ppm
 B.L. = Below Limit
 X = Measured value (further investigation is necessary)
 O.L. = Over Limit

(IV) Estimated detection limits of XRF in mg/kg for regulated elements in various matrices.

Elements	Polymer Materials	Metallic Materials	Composite Materials
Pb	100	200	200
Cd	50	70	70
Hg	100	200	200
Cr	100	200	200
Br	200	Not Applicable	200

Disclaimers:

The numerical XRF data of test report is for reference purposes only due to the data variation incurred from various factors as described in next paragraph. The applicant shall make its/his/her own judgment as to whether the information provided in this test report is sufficient for its/his/her purposes.

The results shown in this test report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.



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(V) Method detection limits in mg/kg for chemical confirmation test.

Test Items	Method detection limits (MDL)	Chemical Test Method
Pb	5	IEC 62321-5 : 2013, by acid digestion and determined by ICP-OES
Cd	0.5	
Hg	2	IEC 62321-4 : 2013/AMD : 2017, by acid digestion and determined by ICP-OES
Cr ⁶⁺ (for non-metal)	8	IEC 62321-7-2 : 2017, by alkaline/toluene digestion and determined by UV-VIS Spectrophotometer
Cr ⁶⁺ (for metal)	0.10 µg/cm ²	IEC 62321-7-1 : 2015, by boiling water extraction and determined by UV-VIS Spectrophotometer
PBBs/PBDEs	5	IEC 62321-6 : 2015, by solvent extraction and determined by GC/MS
Phthalate	50	IEC 62321-8 : 2017, by solvent extraction and determined by GC/MS

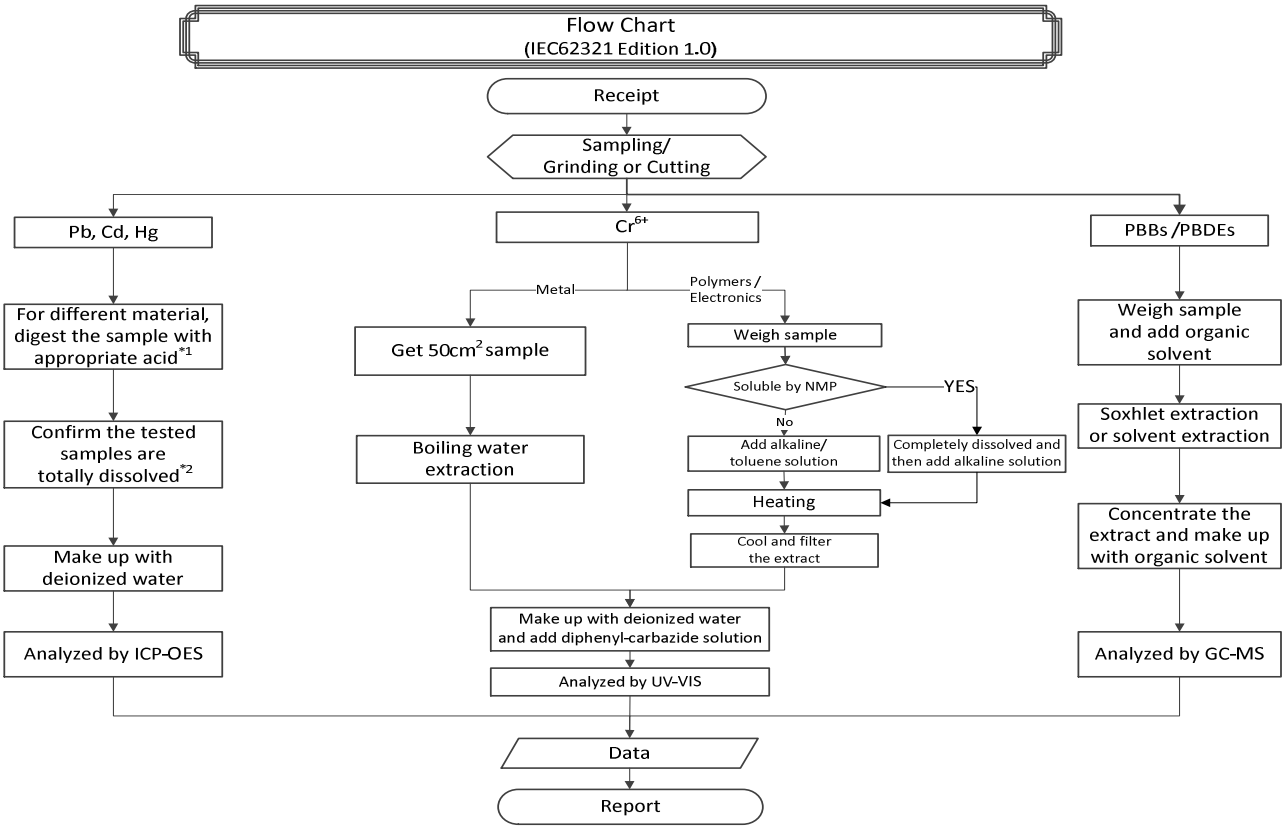
(VI) RoHS Requirement:

Restricted Substances	Limits
Lead (Pb)	0.1 % (1000 mg/kg)
Cadmium (Cd)	0.01 % (100 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)	0.1 % (1000 mg/kg)
Di(2-ethylhexyl) phthalate (DEHP)	0.1 % (1000 mg/kg)
Benzyl butyl phthalate (BBP)	0.1 % (1000 mg/kg)
Diisobutyl phthalate (DIBP)	0.1 % (1000 mg/kg)

The above limits were quoted from 2011/65/EU and 2015/863 Annex II for homogeneous material.



TEST REPORT



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 the result of spot test is positive, Chromium (VI) would be determined as detected.
No further analysis is required.

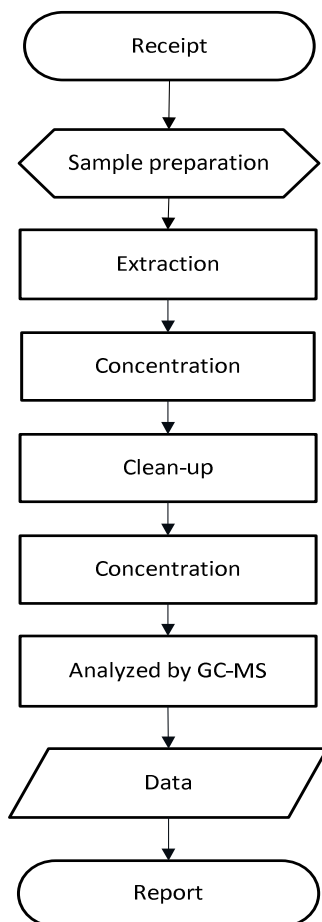
*3 : The samples were dissolved totally by pre-conditioning method according to above flow chart.



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Flow Chart (Phthalates)



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

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