



**BUREAU
VERITAS**

TEST REPORT

LAB NO. : (8818)316-0106
DATE : Nov 20, 2018
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APPLICANT : **PARTICLE INDUSTRIES, INC**
126 POST ST, 4TH FLOOR, SAN FRANCISCO, CA 94108
USA

DATE OF SUBMISSION : NOV 12, 2018

TEST PERIOD : NOV 12, 2018 TO NOV 20, 2018

SAMPLE DESCRIPTION : BORON LTE

Style No. : BRN402

Sample Size: 1

SUMMARY OF TEST RESULTS

TEST REQUESTED	CONCLUSION	REMARK
European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)	PASS	-

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RT/CX/JO

REMARK

If there are questions or concerns on this report, please contact the following persons:

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Photo of the Submitted Sample



Test Item Description and Photo List

Test Item(s)	Sample Photo	Item / Component Description(s)	Location(s)	Style(s)
I001		Multi- color coated brown plastic	Sticker, big cover, big PCB, boron LTE	-
I002		Silvery metal	Big cover, big PCB, boron LTE	-
I003		Silvery metal	Small cover, big PCB, boron LTE	-
I004		Silvery metal	Cover, USB plug, big PCB, boron LTE	-
I005		Black plastic	Pin holder, USB plug, big PCB, boron LTE	-
I006		Silvery metal	Pin, USB plug, big PCB, boron LTE	-
I007		Black plastic	Small socket, big PCB, boron LTE	-
I008		Golden metal	Pin, small socket, big PCB, boron LTE	-
I009		Black plastic	Big socket, big PCB, boron LTE	-
I010		Silvery metal	Pin, big socket, big PCB, boron LTE	-
I011		Black body	SMD diode, side big socket, big PCB, boron LTE	-
I012		Black plastic	Button, switch, big PCB, boron LTE	-
I013		Silvery metal	Case, switch, big PCB, boron LTE	-
I014		Silvery metal	Contact plate, switch, big PCB, boron LTE	-
I015		Black plastic	Base, switch, big PCB, boron LTE	-
I016		Silvery metal	Pin, switch, big PCB, boron LTE	-
I017		Black/translucent body	EC, side switch, big PCB, boron LTE	-
I018		Golden metal	Case, smaller socket, big PCB, boron LTE	-

Test Item(s)	Sample Photo	Item / Component Description(s)	Location(s)	Style(s)
I019		Golden metal	Pin, smaller socket, big PCB, boron LTE	-
I020		White plastic	Pin holder, smaller socket, big PCB, boron LTE	-
I021		Black coated green body	EC, side smaller socket, big PCB, boron LTE	-
I022		Black body	Biggest IC, MXIC, small PCB, boron LTE	-
I023		Black body	Bigger IC, QUALCOMM, small PCB, boron LTE	-
I024		Black body	Big IC, 68001, small PCB, boron LTE	-
I025		Black body	Small IC, small PCB, boron LTE	-
I026		Black body	Smaller IC, small PCB, boron LTE	-
I027		Silvery body	EC, D733, small PCB, boron LTE	-
I028		Grey metal	Inductor, small PCB, boron LTE	-
I029		Coppery metal	Coil, inductor, small PCB, boron LTE	-
I030		White body	SMD capacitor, small PCB, boron LTE	-
I031		Brown body	SMD capacitor, small PCB, boron LTE	-
I032		Green coated translucent plastic with coppery metal	Small PCB, boron LTE	-
I033		Black plastic	Pin holder, bigger socket, big PCB, boron LTE	-
I034		Golden metal	Pin, bigger socket, big PCB, boron LTE	-
I035		Silvery metal	Case, socket, big PCB, boron LTE	-
I036		Silvery metal	Base, socket, big PCB, boron LTE	-
I037		Silvery metal	Pin, socket, big PCB, boron LTE	-
I038		Black metal	Big inductor, 2R2, big PCB, boron LTE	-

Test Item(s)	Sample Photo	Item / Component Description(s)	Location(s)	Style(s)
I039		Coppery metal	Coil, big inductor, 2R2, big PCB, boron LTE	-
I040		Black metal	Small inductor, big PCB, boron LTE	-
I041		Coppery metal	Coil, small inductor, big PCB, boron LTE	-
I042		Black body	IC, Z146P, big PCB, boron LTE	-
I043		Silvery metal	Pin, IC, Z146P, big PCB, boron LTE	-
I044		Black body	IC, L3233F, big PCB, boron LTE	-
I045		Black body	IC, 8901410, big PCB, boron LTE	-
I046		Black body	IC, NS2840, big PCB, boron LTE	-
I047		Dull brown body	EC, side IC, NS2840, big PCB, boron LTE	-
I048		Beige body	SMD capacitor, 227G, big PCB, boron LTE	-
I049		Black body	IC, ZVK 46J, big PCB, boron LTE	-
I050		Black body	IC, CV5, big PCB, boron LTE	-
I051		White body	SMD capacitor, big PCB, boron LTE	-
I052		Blue body	SMD capacitor, big PCB, boron LTE	-
I053		Black body	SMD resistor, big PCB, boron LTE	-
I054		Silvery solder	Solder, big PCB, boron LTE	-
I055		Black coated translucent plastic with coppery metal	Big PCB, boron LTE	-

TEST RESULT

Compliance Test – European Parliament and Council Directive 2011/65/EU on the Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment (RoHS)

Test Method : See Appendix.

See Analytes and their corresponding Maximum Allowable Limit in Appendix

-	Result						
Parameter	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Chromium VI (Cr VI)	PBBs	PBDEs	Conclusion
Unit	mg/kg						-
Test Item(s)	-	-	-	-	-	-	-
I001	ND	ND	ND	ND	ND	ND	PASS
I002	ND	ND	ND	ND	NA	NA	PASS
I003	ND	ND	ND	ND	NA	NA	PASS
I004	ND	ND	ND	ND	NA	NA	PASS
I005	ND	ND	ND	ND	ND	ND	PASS
I006	ND	ND	ND	ND	NA	NA	PASS
I007	ND	ND	ND	ND	ND*	ND*	PASS
I008	ND	ND	ND	ND	NA	NA	PASS
I009	ND	ND	ND	ND	ND*	ND*	PASS
I010	ND	ND	ND	ND	NA	NA	PASS
I011	ND	ND	ND	ND	ND	ND	PASS
I012	ND	ND	ND	ND	ND	ND	PASS
I013	ND	ND	ND	ND	NA	NA	PASS
I014	ND	ND	ND	ND	NA	NA	PASS
I015	ND	ND	ND	ND	ND	ND	PASS
I016	ND	ND	ND	ND	NA	NA	PASS
I017	ND	ND	ND	ND	ND	ND	PASS
I018	ND	ND	ND	ND	NA	NA	PASS
I019	ND	ND	ND	ND	NA	NA	PASS
I020	ND	ND	ND	ND	ND	ND	PASS
I021	ND	ND	ND	ND	ND	ND	PASS
I022	ND	ND	ND	ND	ND	ND	PASS
I023	ND	ND	ND	ND	ND	ND	PASS
I024	ND	ND	ND	ND	ND	ND	PASS
I025	ND	ND	ND	ND	ND	ND	PASS
I026	ND	ND	ND	ND	ND	ND	PASS
I027	ND	ND	ND	ND	ND	ND	PASS

-	Result						
Parameter	Lead (Pb)	Cadmium (Cd)	Mercury (Hg)	Chromium VI (Cr VI)	PBBs	PBDEs	Conclusion
Unit	mg/kg						-
Test Item(s)	-	-	-	-	-	-	-
I028	ND	ND	ND	ND	NA	NA	PASS
I029	ND	ND	ND	ND	NA	NA	PASS
I030	ND	ND	ND	ND	ND	ND	PASS
I031	ND	ND	ND	ND	ND	ND	PASS
I032	ND	ND	ND	ND	ND	ND	PASS
I033	ND	ND	ND	ND	ND*	ND*	PASS
I034	ND	ND	ND	ND	NA	NA	PASS
I035	ND	ND	ND	ND	NA	NA	PASS
I036	ND	ND	ND	ND	NA	NA	PASS
I037	ND	ND	ND	ND	NA	NA	PASS
I038	ND	ND	ND	ND	NA	NA	PASS
I039	ND	ND	ND	ND	NA	NA	PASS
I040	ND	ND	ND	ND	NA	NA	PASS
I041	ND	ND	ND	ND	NA	NA	PASS
I042	ND	ND	ND	ND	ND	ND	PASS
I043	ND	ND	ND	ND	NA	NA	PASS
I044	ND	ND	ND	ND	ND	ND	PASS
I045	ND	ND	ND	ND	ND	ND	PASS
I046	ND	ND	ND	ND	ND	ND	PASS
I047	ND	ND	ND	ND	ND	ND	PASS
I048	ND	ND	ND	ND	ND	ND	PASS
I049	ND	ND	ND	ND	ND	ND	PASS
I050	ND	ND	ND	ND	ND	ND	PASS
I051	ND	ND	ND	ND	ND	ND	PASS
I052	ND	ND	ND	ND	ND	ND	PASS
I053	ND	ND	ND	ND	ND	ND	PASS
I054	ND	ND	ND	ND	NA	NA	PASS
I055	ND	ND	ND	ND	ND*	ND*	PASS

Note / Key:

ND = Not detected

NR = Not requested

NA = Not applicable

Detection Limit : See Appendix.

“>” = Greater than

mg/kg = milligram(s) per kilogram = ppm = part(s) per million

% = percent

“<” = Less than

10000 mg/kg = 1 %



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Remark:

- The testing approach is listed in table of Appendix.
 - * denotes as reported result(s) was (were) performed by wet chemistry method. Others were screened by XRF. For XRF screening, the result(s) of Cr VI was (were) reported as total chromium and the result(s) of PBBs and PBDEs was (were) reported as total bromine. Also, the XRF result(s) may be different to the actual content based on various factors including, but not limit to, sample size, thickness, area, non-uniformity composition, surface flatness.
 - According to European Council Directive 2011/65/EU, Article 5 “Adaptation of the Annexes to scientific and technical progress”, exemption(s) should be granted to the materials and components of Test Item(s) in the lists in Annexes III and IV of this directive.
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APPENDIX

List of Analytes and their Corresponding Test Methods, Detection Limit and Maximum Allowable Limit [Compliance Test for European Parliament and Council Directive 2011/65/EU] :						
No.	Name of Analytes	Detection Limit (mg/kg)				Maximum Allowable Limit (mg/kg)
		X-ray fluorescence (XRF) ^[a]			Wet Chemistry	
		Plastic	Metallic / glass / ceramic	Others		
1	Lead (Pb)	100	200	200	10 ^[b]	1000
2	Cadmium (Cd)	50	50	50	10 ^[b]	100
3	Mercury (Hg)	100	200	200	10 ^[c]	1000
4	Chromium (Cr)	100	200	200	NA	NA
5	Chromium VI (Cr VI)	NA	NA	NA	3 ^[g, h] / 10 ^[d] / See ^[e, i]	1000 / Negative ^[j]
6	Bromine (Br)	200	NA	200	NA	NA
7	Polybromobiphenyls (PBBs) - Bromobiphenyl (MonoBB) - Dibromobiphenyl (DiBB) - Tribromobiphenyl (TriBB) - Tetrabromobiphenyl (TetraBB) - Pentabromobiphenyl (PentaBB) - Hexabromobiphenyl (HexaBB) - Heptabromobiphenyl (HeptaBB) - Octabromobiphenyl (OctaBB) - Nonabromobiphenyl (NonaBB) - Decabromobiphenyl (DecaBB)	NA	NA	NA	Each 50 ^[f]	Sum 1000
8	Polybromodiphenyl ethers (PBDEs) - Bromodiphenyl ether (MonoBDE) - Dibromodiphenyl ether (DiBDE) - Tribromodiphenyl ether (TriBDE) - Tetrabromodiphenyl ether (TetraBDE) - Pentabromodiphenyl ether (PentaBDE) - Hexabromodiphenyl ether (HexaBDE) - Heptabromodiphenyl ether (HeptaBDE) - Octabromodiphenyl ether (OctaBDE) - Nonabromodiphenyl ether (NonaBDE) - Decabromodiphenyl ether (DecaBDE)	NA	NA	NA	Each 50 ^[f]	Sum 1000

List of Analytes and their Corresponding Test Methods, Detection Limit and Maximum Allowable Limit [Compliance Test for European Parliament and Council Directive 2011/65/EU] :

	NA = Not applicable
[a]	Test method with reference to International Standard IEC 62321-3-1: 2013.
[b]	Test method with reference to International Standard IEC 62321-5: 2013.
[c]	Test method with reference to International Standard IEC 62321-4: 2017.
[d]	Polymers and Electronics - Test method with reference to European Standard EN 62321-7-2: 2017.
[e]	Metal - Test method with reference to International Standard IEC 62321-7-1: 2015.
[f]	Test method with reference to International Standard IEC 62321-6: 2015.
[g]	Leather - Test method International Standard ISO 17075-1:2017.
[h]	Other Than Metal, Leather, Polymers and Electronics - Test method with reference to International Standard ISO 17075-1:2017.
[i]	The principle of this method was evaluated and supported by two studies organized by IEC TC 111 WG3. These studies were focused on detecting the presence of Cr VI in the corrosion protection coatings on metallic samples.
[j]	Result(s) of Cr VI for metallic material(s) was (were) expressed in term of positive and negative. Negative means the absence of Cr VI on the tested areas and the result(s) was (were) regarded as in compliance with European Parliament and Council Directive 2011/65/EU, Article 4(1). While, positive means the presence of Cr VI on tested areas and the result(s) was (were) regarded as in conflict with European Parliament and Council Directive 2011/65/EU, Article 4(1).

Testing Approach [Compliance Test for European Parliament and Council Directive 2011/65/EU] :

The testing approach was with reference to the following document(s).

- 1 International Standards IEC 62321-1: 2013 and IEC 62321-2: 2013
- 2 "RoHS Enforcement Guidance Document Version 1" by EU RoHS Enforcement Authorities Informal Network. (May 2006)
- 3 "RoHS Regulations - Government Guidance Notes" by United Kingdom Department for Business Innovation & Skills. (February 2011)
- 4 "Final Report to RoHS substances (Hg, Pb, Cr(VI), Cd, PBB and PBDE) in electrical and electronic equipment in Belgium" by Belgium Federal Public Service Health, Food Chain Safety and Environment. (November 2005)

*** End of Report ***