

Test Report

Number: 181101202SHA-001

Applicant: LithiumWerks China Manufacturing Co.,Ltd
BeiHai Road No.8, Integrated Free Trade Zone, New Strict,
Changzhou, China

Date: Jan. 4, 2019

Sample Description:

One (1) submitted sample said to be:

Item Name : APR18650M1B
Brand Name : LithiumWerks
Manufacturer : LithiumWerks China Manufacturing Co.,Ltd
BeiHai Road No.8, Integrated Free Trade Zone, New Strict, Changzhou, China

Tests conducted:

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

Conclusion:

<u>Tested sample</u>	<u>Standard</u>	<u>Result</u>
Tested groups	EU REACH Regulation No 1907/2006 Article 33(1) Obligation to provide information of safe use (see REACH requirement in report for details)	Meet requirement

To be continued

Authorized by:
For Intertek testing services Ltd., Shanghai



Jonny Jing
Operation Manager



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Tests Conducted

(I) SVHC Testing Results

By a combination of Inductively Coupled Argon Plasma Spectrometry, Gas Chromatography – Mass Spectrometry, Liquid Chromatography - Mass Spectrometry, UV-VIS Spectrophotometer, Gas Chromatography - Electron Capture Detector, Headspace Gas Chromatography - Mass Spectrometry and High-Performance Liquid Chromatography.

No.	Chemical Substance	CAS No.	Results % (w/w)
			(A)
49	1-methyl-2-pyrrolidone	872-50-4	0.022
--	Other tested SVHCs in Chemical list	--	ND

No.	Chemical Substance	CAS No.	Results % (w/w)		
			(B)	(C)	(D)
--	Tested SVHCs in Chemical list	--	ND	ND	ND

SVHC = Substance of very high concern

ND = Not Detected (less than reporting limit)

Reporting limit = 0.010%(w/w)

As applicant's requirement, materials were screened in composite testing.

(II) Tested SVHC Chemical list:

No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
1	Cobalt Dichloride Δ	7646-79-9	2	Diarsenic Pentaoxide Δ	1303-28-2
3	Diarsenic Trioxide Δ	1327-53-3	4	Lead Hydrogen Arsenate Δ	7784-40-9
5	Triethyl Arsenate Δ	15606-95-8	6	Sodium Dichromate Δ	7789-12-0, 10588-01-9
7	Bis (Tributyltin) Oxide (TBTO) Δ	56-35-9	8	Anthracene	120-12-7
9	4,4'-Diaminodiphenylmethane (MDA)	101-77-9	10	Hexabromocyclododecane (HBCDD) and All Major Diastereoisomers Identified (α-HBCDD, β-HBCDD, γ-HBCDD)	25637-99-4 and 3194-55-6 (134237-50-6, 134237-51-7, 134237-52-8)
11	5-Tert-Butyl-2,4,6-Trinitro-m-Xylene (Musk Xylene)	81-15-2	12	Bis (2-Ethylhexyl) Phthalate (DEHP)	117-81-7

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
13	Dibutyl Phthalate (DBP)	84-74-2	14	Benzyl Butyl Phthalate (BBP)	85-68-7
15	Short Chain Chlorinated Paraffins (C10-13)	85535-84-8	16	Lead Chromate Δ	7758-97-6
17	Lead Chromate Molybdate Sulphate Red (C.I. Pigment Red 104) Δ	12656-85-8	18	Lead Sulfochromate Yellow (C.I. Pigment Yellow 34) Δ	1344-37-2
19	Tris (2-Chloroethyl) Phosphate	115-96-8	20	2,4-Dinitrotoluene	121-14-2
21	Diisobutyl Phthalate (DIBP)	84-69-5	22	Coal Tar Pitch, High Temperature	65996-93-2
23	Anthracene Oil	90640-80-5	24	Anthracene Oil, Anthracene Paste, Distn. Lights	91995-17-4
25	Anthracene Oil, Anthracene Paste, Anthracene Fraction	91995-15-2	26	Anthracene Oil, Anthracene-low	90640-82-7
27	Anthracene Oil, Anthracene Paste	90640-81-6	28	Acrylamide	79-06-1
29	Boric Acid Δ	10043-35-3, 11113-50-1	30	Disodium Tetraborate, Anhydrous Δ	1330-43-4, 12179-04-3, 1303-96-4
31	Tetraboron Disodium Heptaoxide, Hydrate Δ	12267-73-1	32	Sodium Chromate Δ	7775-11-3
33	Potassium Chromate Δ	7789-00-6	34	Ammonium Dichromate Δ	7789-09-5
35	Potassium Dichromate Δ	7778-50-9	36	Trichloroethylene	79-01-6
37	2-Methoxyethanol	109-86-4	38	2-Ethoxyethanol	110-80-5
39	Cobalt Sulphate Δ	10124-43-3	40	Cobalt Dinitrate Δ	10141-05-6
41	Cobalt Carbonate Δ	513-79-1	42	Cobalt Diacetate Δ	71-48-7
43	Chromium Trioxide Δ	1333-82-0	44	Chromic Acid Δ Dichromic Acid Δ Oligomers of Chromic Acid and Dichromic Acid Δ	7738-94-5 13530-68-2 --
45	Strontium ChromateΔ	7789-06-2	46	2-ethoxyethyl acetate (2-EEA)	111-15-9
47	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	68515-42-4	48	Hydrazine	7803-57-8 302-01-2
49	1-methyl-2-pyrrolidone	872-50-4	50	1,2,3-trichloropropane	96-18-4
51	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	71888-89-6	52	Lead dipicrateΔ	6477-64-1

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
53	Lead styphnate Δ	15245-44-0	54	Lead azide; Lead diazide Δ	13424-46-9
55	Phenolphthalein	77-09-8	56	2,2'-dichloro-4,4'-methylenedianiline (MOCA)	101-14-4
57	N,N-dimethylacetamide (DMAC)	127-19-5	58	Trilead diarsenate Δ	3687-31-8
59	Calcium arsenate Δ	7778-44-1	60	Arsenic acid Δ	7778-39-4
61	Bis(2-methoxyethyl) ether	111-96-6	62	1,2-Dichloroethane	107-06-2
63	4-(1,1,3,3-tetramethylbutyl)phenol, (4-tert-Octylphenol)	140-66-9	64	2-Methoxyaniline; o-Anisidine	90-04-0
65	Bis(2-methoxyethyl) phthalate (DMEP)	117-82-8	66	Formaldehyde, oligomeric reaction products with aniline (technical MDA)	25214-70-4
67	Pentazinc chromate octahydroxide Δ	49663-84-5	68	Potassium hydroxyoctaoxodizincate dichromate Δ	11103-86-9
69	Dichromium tris(chromate) Δ	24613-89-6	70	Aluminosilicate Refractory Ceramic Fibres Δ	(Index No. 650-017-00-8)
71	Zirconia Aluminosilicate Refractory Ceramic Fibres Δ	(Index No. 650-017-00-8)	72	1,2-bis(2-methoxyethoxy)ethane (TEGDME; triglyme)	112-49-2
73	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	110-71-4	74	Diboron trioxide Δ	1303-86-2
75	Formamide	75-12-7	76	Lead(II) bis(methanesulfonate) Δ	17570-76-2
77	TGIC (1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione)	2451-62-9	78	β -TGIC (1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione)	59653-74-6
79	4,4'-bis(dimethylamino)benzophenone (Michler's ketone)	90-94-8	80	N,N,N',N'-tetramethyl-4,4'-methylenedianiline (Michler's base)	101-61-1

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
81	[4-[4,4'-bis(dimethylamino)benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride (C.I. Basic Violet 3) [with $\geq 0.1\%$ of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	548-62-9	82	[4-[[4-anilino-1-naphthyl][4-(dimethylamino)phenyl]methylen e]cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride (C.I. Basic Blue 26) [with $\geq 0.1\%$ of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	2580-56-5
83	α,α -Bis[4-(dimethylamino)phenyl]-4(phenylamino)naphthalene-1-methanol (C.I. Solvent Blue 4) [with $\geq 0.1\%$ of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	6786-83-0	84	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol [with $\geq 0.1\%$ of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]	561-41-1
85	Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)	1163-19-5	86	Pentacosafuorotridecanoic acid	72629-94-8
87	Tricosafuorododecanoic acid	307-55-1	88	Henicosafuoroundecanoic acid	2058-94-8
89	Heptacosafuorotetradecanoic acid	376-06-7	90	Diazene-1,2-dicarboxamide (C,C'-azodi(formamide))	123-77-3

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
91	Cyclohexane-1,2-dicarboxylic anhydride [1]	85-42-7	92	Hexahydromethylphthalic anhydride [1],	25550-51-0
	cis-cyclohexane-1,2-dicarboxylic anhydride [2]	13149-00-3		Hexahydro-4-methylphthalic anhydride [2],	19438-60-9
	trans-cyclohexane-1,2-dicarboxylic anhydride [3]	14166-21-3		Hexahydro-1-methylphthalic anhydride [3],	48122-14-1
	[The individual cis- [2] and trans- [3] isomer substances and all possible combinations of the cis- and trans-isomers [1] are covered by this entry].			Hexahydro-3-methylphthalic anhydride [4]	57110-29-9
93	4-Nonylphenol, branched and linear	--	94	4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated	--
	[substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, covering also UVCB- and well-defined substances which include any of the individual isomers or a combination thereof]			[covering well-defined substances and UVCB substances, polymers and homologues]	
95	Methoxyacetic acid	625-45-6	96	N,N-dimethylformamide	68-12-2
97	Dibutyltin dichloride (DBTC) Δ	683-18-1	98	Lead monoxide (Lead oxide) Δ	1317-36-8
99	Orange lead (Lead tetroxide) Δ	1314-41-6	100	Lead bis(tetrafluoroborate) Δ	13814-96-5
101	Trilead bis(carbonate)dihydroxide Δ	1319-46-6	102	Lead titanium trioxide Δ	12060-00-3

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
103	Lead titanium zirconium oxide Δ	12626-81-2	104	Silicic acid, lead salt Δ	11120-22-2
105	Silicic acid (H ₂ SiO ₅), barium salt (1:1), lead-doped Δ [with lead (Pb) content above the applicable generic concentration limit for 'toxicity for reproduction' Repr. 1A (CLP) or category 1 (DSD); the substance is a member of the group entry of lead compounds, with index number 082-001-00-6 in Regulation (EC) No 1272/2008]	68784-75-8	106	1-bromopropane (n-propyl bromide)	106-94-5
107	Methyloxirane (Propylene oxide)	75-56-9	108	1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	84777-06-0
109	Diisopentylphthalate (DIPP)	605-50-5	110	N-pentyl-isopentylphthalate	776297-69-9
111	1,2-diethoxyethane	629-14-1	112	Acetic acid, lead salt, basic Δ	51404-69-4
113	Lead oxide sulfate Δ	12036-76-9	114	[Phthalato(2-)]dioxotrilead Δ	69011-06-9
115	Dioxobis(stearato)trilead Δ	12578-12-0	116	Fatty acids, C16-18, lead salts Δ	91031-62-8
117	Lead cyanamate Δ	20837-86-9	118	Lead dinitrate Δ	10099-74-8
119	Pentalead tetraoxide sulphate Δ	12065-90-6	120	Pyrochlore, antimony lead yellow Δ	8012-00-8
121	Sulfurous acid, lead salt, dibasic Δ	62229-08-7	122	Tetraethyllead Δ	78-00-2
123	Tetralead trioxide sulphate Δ	12202-17-4	124	Trilead dioxide phosphonate Δ	12141-20-7
125	Furan	110-00-9	126	Diethyl sulphate	64-67-5
127	Dimethyl sulphate	77-78-1	128	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	143860-04-2
129	Dinoseb (6-sec-butyl-2,4-dinitrophenol)	88-85-7	130	4,4'-methylenedi-o-toluidine	838-88-0
131	4,4'-oxydianiline and its salts	101-80-4	132	4-aminoazobenzene	60-09-3
133	4-methyl-m-phenylenediamine (toluene-2,4-diamine)	95-80-7	134	6-methoxy-m-toluidine (p-cresidine)	120-71-8
135	Biphenyl-4-ylamine	92-67-1	136	o-aminoazotoluene [(4-o-tolylazo-o-toluidine)]	97-56-3

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
137	o-toluidine	95-53-4	138	N-methylacetamide	79-16-3
139	Cadmium Δ	7440-43-9	140	Cadmium oxide Δ	1306-19-0
141	Dipentyl phthalate (DPP)	131-18-0	142	4-Nonylphenol, branched and linear, ethoxylated [substances with a linear and/or branched alkyl chain with a carbon number of 9 covalently bound in position 4 to phenol, ethoxylated covering UVCB- and well-defined substances, polymers and homologues, which include any of the individual isomers and/or combinations thereof]	--
143	Ammonium pentadecafluorooctanoate (APFO)	3825-26-1	144	Pentadecafluorooctanoic acid (PFOA)	335-67-1
145	Cadmium sulphide Δ	1306-23-6	146	Disodium 3,3'-[[1,1'-biphenyl]-4,4'-diylbis(azo)]bis(4-aminonaphthalene-1-sulphonate) (C.I. Direct Red 28)	573-58-0
147	Disodium 4-amino-3'-[[4'-[(2,4-diaminophenyl)azo][1,1'-biphenyl]-4-yl]azo]-5-hydroxy-6-(phenylazo)naphthalene-2,7-disulphonate (C.I. Direct Black 38)	1937-37-7	148	Diethyl phthalate (DnHP)	84-75-3
149	Imidazolidine-2-thione (2-imidazoline-2-thiol)	96-45-7	150	Lead di(acetate) Δ	301-04-2
151	Triethyl phosphate	25155-23-1	152	1,2-Benzenedicarboxylic acid, diethyl ester, branched and linear (Diisohexyl phthalate(DIHP))	68515-50-4
153	Cadmium chloride Δ	10108-64-2	154	Sodium perborate; perboric acid, sodium salt Δ	--
155	Sodium peroxometaborate Δ	7632-04-4	156	2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	25973-55-1
157	2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	3846-71-7	158	2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)	15571-58-1
159	Cadmium fluoride Δ	7790-79-6	160	Cadmium sulphate Δ	10124-36-4; 31119-53-6

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
161	Reaction mass of 2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate and 2-ethylhexyl 10-ethyl-4-[[2-[(2-ethylhexyl)oxy]-2-oxoethyl]thio]-4-octyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (reaction mass of DOTE and MOTE)	15571-58-1; 27107-89-7	162	1,2-benzenedicarboxylic acid, di-C6-10-alkyl esters; 1,2-benzenedicarboxylic acid, mixed decyl and hexyl and octyl diesters with ≥ 0.3% of dihexyl phthalate (EC No. 201-559-5)	68515-51-5 68648-93-1
163	5-sec-butyl-2-(2,4-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [1], 5-sec-butyl-2-(4,6-dimethylcyclohex-3-en-1-yl)-5-methyl-1,3-dioxane [2] [covering any of the individual isomers of [1] and [2] or any combination thereof]	117933-89-8	164	Nitrobenzene	98-95-3
165	2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol (UV-327)	3864-99-1	166	2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol (UV-350)	36437-37-3
167	1,3-propanesultone	1120-71-4	168	Perfluorononan-1-oic-acid and its sodium and ammonium salts	375-95-1 21049-39-8 4149-60-4
169	Benzo[def]chrysene(Benzo[a]pyrene	50-32-8	170	4,4'-isopropylidenediphenol (Bisphenol A)	80-05-7
171	Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts	335-76-2 3108-42-7 3830-45-3	172	4-heptylphenol, branched and linear [substances with a linear and/or branched alkyl chain with a carbon number of 7 covalently bound predominantly in position 4 to phenol, covering also UVCB- and well-defined substances which include any of the individual isomers or a combination thereof]	--
173	p-(1,1 dimethylpropyl)phenol	80-46-6	174	Perfluorohexane-1-sulphonic acid and its salts (PFHxS)	355-46-4

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No.	Chemical Substance	CAS No.	No.	Chemical Substance	CAS No.
175	1,6,7,8,9,14,15,16,17,17,18,18-Dodecachloropentacyclo[12.2.1.16,9.02,13.05,10]octadeca-7,15-diene ("Dechlorane Plus"™) [covering any of its individual anti- and syn-isomers or any combination thereof]	13560-89-9; 135821-74-8; 135821-03-3	176	Benz[a]anthracene	56-55-3
177	Cadmium nitrate Δ	10325-94-7	178	Cadmium carbonate Δ	513-78-0
179	Cadmium hydroxide Δ	21041-95-2	180	Chrysene	218-01-9
181	Reaction products of 1,3,4-thiadiazolidine-2,5-dithione, formaldehyde and 4-heptylphenol, branched and linear (RP-HP) [with $\geq 0.1\%$ w/w 4-heptylphenol, branched and linear]	--	182	Benzene-1,2,4-tricarboxylic acid 1,2 anhydride (trimellitic anhydride, TMA)	552-30-7
183	Dicyclohexyl phthalate (DCHP)	84-61-7	184	Octamethylcyclotetrasiloxane (D4)	556-67-2
185	Decamethylcyclopentasiloxane (D5)	541-02-6	186	Dodecamethylcyclohexasiloxane (D6)	540-97-6
187	Lead	7439-92-1	188	Disodium octaborate	12008-41-2
189	Benzo[ghi]perylene	191-24-2	190	Terphenyl hydrogenate	61788-32-7
191	Ethylenediamine (EDA)	107-15-3	--	--	--

Δ = Determination was based on elemental analysis. The content was calculated based on assumption of worst-case.

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(III) Tested groups: See component list in the last section of this report.

(A): 正极片

(B): 负极片, 隔膜, 9mm 高温胶带, 盖帽塑料部分, 面垫, PET 带, 热缩管

(C): 盖帽金属部分, 弹性钢针, 钢壳

(D): 铜极耳, 铝极耳

Notes:

1. Substances of very high concern (SVHC) are classified as:
 - a. Carcinogenic, mutagenic or toxic to reproduction category 1 (proven on humans) and category 2 (proven on animals)
 - b. Persistent, bioaccumulative and toxic chemicals (PBT)
 - c. Very persistent and very bioaccumulative chemicals (vPvB)
 - d. Other similar substances such as endocrine disrupters
2. If the imported or manufactured volume of each individual SVHC in article is more than 0.1% (w/w) and if it exceeds 1 tonne per year across all product ranges, then importer or manufacturer require notification to the European Chemical Agency (ECHA). For substances included in the Candidate List on or after 1 December 2010, the notifications have to be submitted no later than 6 months after the inclusion. The following information has to be submitted for notification:
 - a. Identification of the registrant and the substance
 - b. Classification and labelling of the substance
 - c. Description of use of the substance and the article
 - d. Registration number, if available
 - e. Tonnage range

REACH requirement:

As per article 31 of regulation (EC) No. 1907/2006 (REACH), suppliers of mixtures not classified as dangerous according to directive 1999/45/EC have to provide the recipients, at their request, with a safety data sheet if the mixtures contain at least one substance on the SVHC candidate list and its individual concentration is 0.1%(w/w) or above for non-gaseous preparations.

As per article 33(1) of regulation (EC) No. 1907/2006 (REACH), recipients of product must be provided with information of safe use if any of the tested substances (SVHC) exceeded 0.1% (w/w). A product meets the requirement of article 33(1) by default when no SVHC exceeds 0.1% (w/w).
SVHC exceeds 0.1% (w/w).

Date sample received: Nov. 16, 2018 & Dec. 28, 2018

Testing period: Nov. 16, 2018 To Jan. 04, 2019



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End of report

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