

**LOTTE ADVANCED MATERIALS**

332-2, Gocheon-Dong, Uiwang-Si Gyeonggi-Do, Korea 437-711

Tel: +82-31-596-3671 / Fax: +82-31-596-3490

E-MAIL : adms@lottechem.com

## PRODUCT CERTIFICATE

2018.1.9

1. Supplier: LOTTE ADVANCED MATERIALS CO., LTD. Yeosu Plant

2. Address

Yeosu Factory: 62, Pyeongnyeo-dong, Yeosu-shi, Jeollanam-do, KOREA

This products do not use or add intentionally any of the 174 substances listed on REACH SVHC (Substance of Very High Concern: CMR cat.1,2, PBT, vPvB), as published on the ECHA website [July 07<sup>th</sup> 2017](#), in an individual concentration above 0.1%(w/w).

: CMR cat.1,2 (Cancer-causing, Mutation-causing, Generative toxicity)

: PBT (Persistence, Bioaccumulation, Toxicity)

: vPvB (High persistence, High generative toxicity)

Material	Grade
PC/GF FR	HN-3104, HN-3204

Signature



Manager of Quality Control Team

Quality Management Team  
LOTTE ADVANCED MATERIALS

### Quality Management Team

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 1st(14) 2008.10.28	1	Lead hydrogen arsenate	7784-40-9
	2	Benzyl butyl phthalate (BBP)_ <a href="#">Authorisation List</a>	85-68-7
	3	Bis (2-ethylhexyl)phthalate (DEHP)_ <a href="#">Authorisation List</a>	117-81-7
	4	5-tert-butyl-2,4,6-trinitro-m-xylene (musk xylene)_ <a href="#">Authorisation List</a>	81-15-2
	5	Diarsenic trioxide_ <a href="#">Authorisation List</a>	1327-53-3
	6	Bis(tributyltin)oxide (TBTO)	56-35-9
	7	Triethyl arsenate	15606-95-8
	8	Diarsenic pentaoxide_ <a href="#">Authorisation List</a>	1303-28-2
	9	Sodium dichromate_ <a href="#">Authorisation List</a>	7789-12-0 10588-01-9
	10	Dibutyl phthalate (DBP)_ <a href="#">Authorisation List</a>	84-74-2
	11	4,4'- Diaminodiphenylmethane (MDA)_ <a href="#">Authorisation List</a>	101-77-9
	12	Alkanes, C10-13, chloro (Short Chain Chlorinated Paraffins)	85535-84-8
	13	Anthracene	120-12-7
	14	Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified: Alpha-hexabromocyclododecane Beta-hexabromocyclododecane Gamma-hexabromocyclododecane_ <a href="#">Authorisation List</a>	25637-99-4 3194-55-6 134237-50-6 134237-51-7 134237-52-8
REACH SVHC Candidate Substances 2nd(12) 2010.01.13	15	Lead sulfochromate yellow (C.I. Pigment Yellow 34)_ <a href="#">Authorisation List</a>	1344-37-2
	16	Lead chromate molybdate sulphate red (C.I. Pigment Red 104)_ <a href="#">Authorisation List</a>	12656-85-8
	17	Anthracene oil <a href="#">Authorisation List</a>	90640-80-5
	18	2,4-Dinitrotoluene_ <a href="#">Authorisation List</a>	121-14-2
	19	Anthracene oil, anthracene paste, anthracene fraction	91995-15-2
	20	Anthracene oil, anthracene-low	90640-82-7
	21	Tris(2-chloroethyl)phosphate_ <a href="#">Authorisation List</a>	115-96-8
	22	Diisobutyl phthalate (DIBP)_ <a href="#">Authorisation List</a>	84-69-5
	23	Lead chromate_ <a href="#">Authorisation List</a>	7758-97-6
	24	Anthracene oil, anthracene paste	90640-81-6
	25	Pitch, coal tar, high temp. <a href="#">Authorisation List</a>	65996-93-2
	26	Anthracene oil, anthracene paste, distn. lights	91995-17-4

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 3rd(1) 2010.03.30	27	Acrylamide	79-06-1
REACH SVHC Candidate Substances 4th(8) 2010.06.18	28	Trichloroethylene_ <a href="#">Authorisation List</a>	79-01-6
	29	Potassium dichromate_ <a href="#">Authorisation List</a>	7778-50-9
	30	Tetraboron disodium heptaoxide, hydrate	12267-73-1
	31	Ammonium dichromate_ <a href="#">Authorisation List</a>	7789-09-5
	32	Boric acid	10043-35-3 11113-50-1
	33	Sodium chromate_ <a href="#">Authorisation List</a>	7775-11-3
	34	Disodium tetraborate, anhydrous	1303-96-4 1330-43-4 12179-04-3
	35	Potassium chromate_ <a href="#">Authorisation List</a>	7789-00-6
REACH SVHC Candidate Substances 5th(8) 2010.12.15	36	Cobalt(II) diacetate	71-48-7
	37	Cobalt(II) sulphate	10124-43-3
	38	2-Ethoxyethanol	110-80-5
	39	Acids generated from chromium trioxide and their oligomers. Names of the acids and their oligomers: Chromic acid, Dichromic acid, Oligomers of chromic acid and dichromic acid. <a href="#">Authorisation List</a>	7738-94-5 13530-68-2
	40	2-Methoxyethanol	109-86-4
	41	Chromium trioxide_ <a href="#">Authorisation List</a>	1333-82-0
	42	Cobalt(II) carbonate	513-79-1
	43	Cobalt(II) dinitrate	10141-05-6
REACH SVHC Candidate Substances 6th(+7) 2011.06.20	44	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich <a href="#">Authorisation List</a>	71888-89-6
	45	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters <a href="#">Authorisation List</a>	68515-42-4
	46	Strontium chromate_ <a href="#">Authorisation List</a>	10588-01-9
	47	1-Methyl-2-pyrrolidone	872-50-4
	48	1,2,3-Trichloropropane	96-18-4
	49	2-Ethoxyethyl acetate	111-15-9
	50	Hydrazine	302-01-2 7803-57-8

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Classification	No.	Substance	Cas No.
	51	4-(1,1,3,3-tetramethylbutyl)phenol	140-66-9
	52	N,N-dimethylacetamide	127-19-5
	53	Phenolphthalein	77-09-8
	54	Lead diazide, Lead azide	13424-46-9
	55	Lead dipicrate	6477-64-1
	56	1,2-dichloroethane_ <a href="#">Authorisation List</a>	107-06-2
	57	Calcium arsenate	7778-44-1
	58	Dichromium tris(chromate)_ <a href="#">Authorisation List</a>	24613-89-6
	59	2-Methoxyaniline; o-Anisidine	90-04-0
	60	Pentazinc chromate octahydroxide_ <a href="#">Authorisation List</a>	49663-84-5
	61	Arsenic acid_ <a href="#">Authorisation List</a>	7778-39-4
	62	Potassium hydroxyoctaoxodizincatedichromate <a href="#">Authorisation List</a>	11103-86-9
	63	Formaldehyde, oligomeric reaction products with aniline <a href="#">Authorisation List</a>	25214-70-4
	64	Lead styphnate	15245-44-0
	65	Trilead diarsenate	3687-31-8
REACH SVHC Candidate Substances 7th(20) 2011.12.19	66	Zirconia Aluminosilicate Refractory Ceramic Fibres; are fibres covered by index number 650-017-00-8 in Annex VI, part 3, table 3.1 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and fulfil the three following conditions: a) oxides of aluminium, silicon and zirconium are the main components present (in the fibres) within variable concentration ranges b) fibres have a length weighted geometric mean diameter less two standard geometric errors of 6 or less micrometres (µm). c) alkaline oxide and alkali earth oxide (Na <sub>2</sub> O+K <sub>2</sub> O+CaO+MgO+BaO) content less or equal to 18% by weight	-
	67	Bis(2-methoxyethyl) phthalate <a href="#">Authorisation List</a>	117-82-8
	68	Aluminosilicate Refractory Ceramic Fibres; are fibres covered by index number 650-017-00-8 in Annex VI, part 3, table 3.1 of Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, and fulfil the three following conditions: a) oxides of aluminium and silicon are the main components present (in the fibres) within variable concentration ranges b) fibres have a length weighted geometric mean diameter less two standard geometric errors of 6 or less micrometres (µm) c) alkaline oxide and alkali earth oxide (Na <sub>2</sub> O+K <sub>2</sub> O+CaO+MgO+BaO) content less or equal to 18% by weight	-

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 7th(20) 2011.12.19	69	Bis(2-methoxyethyl) ether_ <a href="#">Authorisation List</a>	111-96-6
	70	2,2'-dichloro-4,4'-methylenedianiline_ <a href="#">Authorisation List</a>	101-14-4
REACH SVHC Candidate Substances 8th(+14) 2012.06.18	71	$\alpha,\alpha$ -Bis[4-(dimethylamino)phenyl]-4 (phenylamino)naphthalene-1-methanol (C.I. Solvent Blue 4) <em>[with $\geq$ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]</em>	6786-83-0
	72	N,N,N',N'-tetramethyl-4,4'-methylenedianiline (Michler's base)	101-61-1
	73	1,3,5-tris[(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione ( $\beta$ -TGIC)	59653-74-6
	74	Diboron trioxide	1303-86-2
	75	1,2-bis(2-methoxyethoxy)ethane (TEGDME; triglyme)	112-49-2
	76	4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol <em>[with $\geq$ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]</em>	561-41-1
	77	Lead(II) bis(methanesulfonate)	17570-76-2
	78	Formamide	75-12-7
	79	[4-[4,4'-bis(dimethylamino) benzhydrylidene]cyclohexa-2,5-dien-1-ylidene]dimethylammonium chloride (C.I. Basic Violet 3) <em>[with $\geq$ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]</em>	548-62-9
	80	1,2-dimethoxyethane; ethylene glycol dimethyl ether (EGDME)	110-71-4
	81	[4-[[4-anilino-1-naphthyl][4-(dimethylamino)phenyl]methylene]cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride (C.I. Basic Blue 26) <em>[with $\geq$ 0.1% of Michler's ketone (EC No. 202-027-5) or Michler's base (EC No. 202-959-2)]</em>	2580-56-5
	82	1,3,5-Tris(oxiran-2-ylmethyl)-1,3,5-triazinane-2,4,6-trione (TGIC)	2451-62-9
83	4,4'-bis(dimethylamino)benzophenone (Michler's ketone)	90-94-8	
84	Cobalt dichloride	7646-79-9	

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 9th(+54) 2012.12.19	85	Pyrochlore, antimony lead yellow	8012-00-8
	86	6-methoxy-m-toluidine (p-cresidine)	120-71-8
	87	Henicosafuoroundecanoic acid	2058-94-8
	88	Hexahydromethylphthalic anhydride [1], Hexahydro-4-methylphthalic anhydride [2], Hexahydro-1-methylphthalic anhydride [3], Hexahydro-3-methylphthalic anhydride [4] [The individual isomers [2], [3] and [4] (including their cis- and trans-stereo isomeric forms) and all possible combinations of the isomers [1] are covered by this entry]	25550-51-0
			19438-60-9
			48122-14-1
			57110-29-9
	89	Cyclohexane-1,2-dicarboxylic anhydride [1], cis-cyclohexane-1,2-dicarboxylic anhydride [2], trans-cyclohexane-1,2-dicarboxylic anhydride [3] [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]	85-42-7
			13149-00-3
			14166-21-3
	90	Dibutyltin dichloride (DBTC)	683-18-1
	91	Lead bis(tetrafluoroborate)	13814-96-5
	92	Lead dinitrate	10099-74-8
	93	Silicic acid, lead salt	11120-22-2
	94	4-Aminoazobenzene	60-09-3
	95	Lead titanium zirconium oxide	12626-81-2
	96	Lead monoxide (lead oxide)	1317-36-8
	97	o-Toluidine	95-53-4
	98	3-ethyl-2-methyl-2-(3-methylbutyl)-1,3-oxazolidine	143860-04-2
	99	Silicic acid (H <sub>2</sub> Si <sub>2</sub> O <sub>5</sub> ), barium salt (1:1), lead-doped <b>[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]</b>	68784-75-8
100	Trilead bis(carbonate)dihydroxide	1319-46-6	
101	Furan	110-00-9	
102	N,N-dimethylformamide	68-12-2	
103	4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated [covering well-defined substances and UVCB substances, polymers and homologues] <a href="#">Authorisation List</a>	-	
104	4-Nonylphenol, branched and linear [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]	-	

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 9th(+54) 2012.12.19	105	4,4'-methylenedi-o-toluidine	838-88-0
	106	Diethyl sulphate	64-67-5
	107	Dimethyl sulphate	77-78-1
	108	Lead oxide sulfate	12036-76-9
	109	Lead titanium trioxide	12060-00-3
	110	Acetic acid, lead salt, basic	51404-69-4
	111	[Phthalato(2-)]dioxotrilead	69011-06-9
	112	Bis(pentabromophenyl) ether (decabromodiphenyl ether; DecaBDE)	1163-19-5
	113	N-methylacetamide	79-16-3
	114	Dinoseb (6-sec-butyl-2,4-dinitrophenol)	88-85-7
	115	1,2-Diethoxyethane	629-14-1
	116	Tetralead trioxide sulphate	12202-17-4
	117	N-pentyl-isopentylphthalate <a href="#">Authorisation List</a>	776297-69-9
	118	Dioxobis(stearato)trilead	12578-12-0
	119	Tetraethyllead	78-00-2
	120	Pentalead tetraoxide sulphate	12065-90-6
	121	Pentacosafuorotridecanoic acid	72629-94-8
	122	Tricosafuorododecanoic acid	307-55-1
	123	Heptacosafuorotetradecanoic acid	376-06-7
	124	1-bromopropane (n-propyl bromide) <a href="#">Authorisation List</a>	106-94-5
	125	Methoxyacetic acid	625-45-6
	126	4-methyl-m-phenylenediamine (toluene-2,4-diamine)	95-80-7
	127	Methyloxirane (Propylene oxide)	75-56-9
	128	Trilead dioxide phosphonate	12141-20-7
	129	o-aminoazotoluene	97-56-3
	130	1,2-Benzenedicarboxylic acid, dipentylester, branched and linear ) <a href="#">Authorisation List</a>	84777-06-0
	131	4,4'-oxydianiline and its salts	101-80-4
	132	Orange lead (lead tetroxide)	1314-41-6
	133	Biphenyl-4-ylamine	92-67-1
	134	Diisopentylphthalate <a href="#">Authorisation List</a>	605-50-5
	135	Fatty acids, C16-18, lead salts	91031-62-8
	136	Diazene-1,2-dicarboxamide (C,C'-azodi(formamide))	123-77-3
	137	Sulfurous acid, lead salt, dibasic	62229-08-7
	138	Lead cyanamidate	20837-86-9

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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 10th(+6) 2013.6.20	139	Cadmium	7440-43-9
	140	Ammonium pentadecafluorooctanoate (APFO)	3825-26-1
	141	Pentadecafluorooctanoic acid (PFOA)	335-67-1
	142	Dipentyl phthalate (DPP) <a href="#">Authorisation List</a>	131-18-0
	143	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] <a href="#">Authorisation List</a>	-
	144	Cadmium oxide	1306-19-0
REACH SVHC Candidate Substances 11th(+7) 2013.12.16	145	Cadmium sulphide	1306-23-6
	146	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
	147	Dihexyl phthalate	84-75-3
	148	Imidazolidine-2-thione; (2-imidazoline-2-thiol)	96-45-7
	149	Trixylyl phosphate	25155-23-1
	150	Disodium 3,3'-[[1,1'-biphenyl]-4,4'-diylbis(azo)]bis(4-aminonaphthalene-1-sulphonate) (C.I. Direct Red 28)	573-58-0
REACH SVHC Candidate Substances 12th(+4) 2014.06.16	151	Lead di(acetate)	301-04-2
	152	1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear	68515-50-4
	153	Sodium perborate; perboric acid, sodium salt	-
	154	Sodium peroxometaborate	7632-04-4
REACH SVHC Candidate Substances 13th(+6) 2014.12.17	155	Cadmium chloride	10108-64-2
	156	Cadmium sulphate	10124-36-4, 31119-53-6
	157	Cadmium fluoride	7790-79-6
	158	2-(2H-benzotriazol-2-yl)-4,6-ditertpentylphenol (UV-328)	25973-55-1
	159	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)	-
	160	2-ethylhexyl 10-ethyl-4,4-dioctyl-7-oxo-8-oxa-3,5-dithia-4-stannatetradecanoate (DOTE)	15571-58-1
161	2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320)	3846-71-7	



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Classification	No.	Substance	Cas No.
REACH SVHC Candidate Substances 14th(+2) 2015.6.15	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 stereoisomers of [1] and [2] or any combination thereof]	-
REACH SVHC Candidate Substances 15th(+5) 2015.12.17	164	1,3-propanesultone	1120-71-4
	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	Nitrobenzene	98-95-3
	168	Perfluorononan-1-oic-acid and its sodium and ammonium salts	375-95-1 21049-39-8 4149-60-4
REACH SVHC Candidate Substances 16th(+1) 2016.06.20	169	Benzo[def]chrysene	50-32-8
REACH SVHC Candidate Substances 17th(+4) 2017.01.12	170	4,4'-isopropylidenediphenol	80-05-7
	171	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	-
	172	Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts Nonadecafluorodecanoic acid EC no.: 206-400-3   CAS no.: 335-76-2 Ammonium nonadecafluorodecanoate EC no.: 221-470-5   CAS no.: 3108-42-7 Decanoic acid, nonadecafluoro-, sodium salt EC no.: -   CAS no.: 3830-45-3	-
	173	p-(1,1-dimethylpropyl)phenol	80-46-6
REACH SVHC Candidate Substances 18th(+1) 2017.07.07	174	Perfluorohexane-1-sulphonic acid and its salts	-