

# List of SSMC Banned Materials with Restriction to Use

Internal

Products (materials, parts, (semi-)finished goods, subassemblies) and Packaging delivered to and used in SSMC products must be free of "Hazardous Substances" at levels above our established threshold levels.

## Category A: Prohibited Substances

The intentional use of following substances is prohibited for all applications. SSMC does not allow its intentional use under the conditions as set by our objectives and scope. SSMC accepts impurities of substances in naturally occurring amount and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible.

S/N	Prohibited Substances	SSMC Threshold (units)	Remarks
1	1,2,4 Trichlorobenzene	1000 ppm	
2	Aldehydes	0.09 ppm 0.05 ppm (Wood Packaging)	
3	Amines - Specific	100 ppm	
4	Aniline and its salts	100 ppm	
5	Antimony Trioxide	1000 ppm	
6	Asbestos	Intentionally added	
7	Azo compounds (azocolourants and azodyes)	Intentionally added	
8	1,2-Benzenedicarboxylic acid, di-C6-8-branched alkyl esters, C7-rich (DIHP)	1000 ppm	
9	1,2-Benzenedicarboxylic acid, di-C7-11-branched and linear alkyl esters (DHNUP)	1000 ppm	
10	Benzene	1.6 mg/m <sup>3</sup> (0.5 ppm)	
11	Benzenamine, N-phenyl-, reaction products with styrene and 2,4,4-trimethylpentene (BNST)	Non-use	
12	Benzidine compounds and salts	30 ppm	
13	Beryllium and its compounds	Report if amount > 1000 ppm	
14	Biocides - Specific	10 ppb	

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15	4-[4,4'-bis(dimethylamino)benzhydrylidene] cyclohexa-2,5-dien-1-ylidene] dimethylammonium chloride	1000 ppm	
16	Bis(2-methoxyethyl) ether	1000 ppm	
17	Bis(2-methoxyethyl) phthalate	1000 ppm	
18	Bromine and its compounds	900 ppm bromine 900 ppm chlorine 1500 ppm (bromine + chlorine)	
19	Brominated & Chlorinated flame retardants (other than PBBs, PBDEs, or HBCDD)	1000 ppm in plastic material 900 ppm in the laminate	
20	Bisphenol A (BPA)	Report amount of unpolymerized BPA	
21	Boric acid	1000 ppm	
22	Cadmium and its compounds (Cd)	5 ppm	
23	Chlorinated Organic Solvents	No intentional use as a cleaning agent or degreaser	
24	Chlorinated paraffins (C chain > 10 C)	0.1 ppm	
25	Chlorinated Hydrocarbons (CHCs)	0.1 ppm	
26	Chlorine and its compounds	900 ppm bromine 900 ppm chlorine 1500 ppm (bromine + chlorine)	
27	Chlorofluorocarbons (CFCs)	0.1 ppm	
28	Cobalt dichloride	1000 ppm	
29	Cyanide compounds - Specific	0.1 ppm	
30	Diarsenic pentoxide	1000 ppm	
31	Diarsenic trioxide	1000 ppm	
32	Dibutyltin Compounds (DBT)	1000 ppm of tin	

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33	2,2'-dichloro-4,4'-methylenedianiline (MOCA)	1000 ppm	
34	Diocetyltn Compounds (DOT)	1000 ppm of tin	
35	Dioxins and Furans	0.1 ppm	
36	Disodium tetraborate, anhydrous	1000 ppm	
37	DiMethylFumarate (DMF)	0.1 ppm	
38	Diphenylamine, Substituted (SDPA)	Report use of substance	
39	Endangered species of flora and fauna	Not Used	
40	Ethanol, 2-[(2-aminoethyl)amino]-	Report use of substance	
41	Expanded PolyStyrene (EPS), specified substance	Not Used	
42	Formaldehyde	Intentionally added	
43	Fluorotelomers	50 ppm	
44	Greenhouse Gases (including but limited to PFC, HFC, SF6)	Intentionally added	
45	Halons	0.1 ppm	
46	Halogenated Compounds - Specific	100 ppm	
47	Halogenated Benzenes (including but not limited to Chlorbenzens, excl. Hexachlorobenzene)	10 ppm	
48	Halogenated Dioxins and Furans (including but not limited to PBDD, PBDF, PCDD, PCDF)	1 ppb	
49	Halogenated -Dyphenyl Methanes	0.1 ppm	
50	Hexabromocyclododecane (HBCDD) and all major diastereoisomers	1000 ppm	
51	HexaChloroBenzene (HCB), specified substance - CAS No. 118-74-1	0.020 ppm	
52	Hexavalent Chromium compounds (Cr VI)	100 ppm	
53	Hydrobromofluorocarbons (HBFCs)	0.1 ppm	
54	Hydrochlorofluorocarbons (HCFCs)	0.1 ppm	
55	Hydrofluorocarbons (HFCs)	0.1 ppm	
56	Inorganic compounds - Specific	100 ppm	
57	Isocyanates - Specific	100 ppm	

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S/N	Prohibited Substances	SSMC Threshold (units)	Remarks
58	Lead and its compounds	20 ppm (Non-metallic) 20 ppm for packaging 40 ppm in battery	
59	Mercury and its compounds (Hg)	2 ppm 1 ppm in battery	
60	Metal carbonyls	1000 ppm	
61	n-Hexane	100 mg/m3 (28 ppm)	
62	N,N-dimethylacetamide (DMAC)	1000 ppm	
63	Nickel & its compounds	Intentionally added	
64	Nitrides separating substances	100 ppm	
65	Nitrosamines	0.1 ppm	
66	Nonylphenols (NP's) & Nonylphenol Ethoxylates (NPE's)	0.1 ppm	
67	Non-Halogenated Organic Compounds	0.1 ppm	
68	Pentazinc chromate octahydroxide	1000 ppm	
69	PentaChloroPhenol (PCP) and its salts and esters	5 ppm	
70	Perchlorates	0.006 ppm	
71	PerFluorinatedCarboxylicAcid (PFCA) and its derivatives	50 ppm	
72	PerFluoroAlkylSulfonates (PFAS) and derivatives	10ppm	
73	Perfluorooctanoic Acid (PFOA)	Intentionally added	
74	Perfluorooctyl Sulfonates (PFOS)	Intentionally added	
75	Pesticides/herbicides/insecticides	1000 ppm	
76	Phenol, n-methyl-	10 ppm	
77	Phenol, 2-(2H-benzotriazol-2-yl)-4,6-bis(1,1-dimethylethyl)-	Intentionally added	
78	Phosphorus compounds - Specific	100 ppm	
79	Phthalates	100 ppm	
80	Polybrominated Biphenyls (PBB's)	10 ppm	

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S/N	Prohibited Substances	SSMC Threshold (units)	Remarks
81	Polybrominated diphenylethers (PBDE's)	10 ppm	
82	PolyBrominated Terphenyls (PBTs)	0.1 ppm	
83	Polychlorinated Biphenyls (PCB's)	Intentionally added	
84	Polychlorinated diphenylethers (PCDE's)	0.1 ppm	
85	Polychlorinated Naphthalenes (PCN's)	Intentionally added	
86	Polychlorinated Terphenyls (PCT's)	0.1 ppm	
87	Polycyclic aromatic compounds (PAC's) - including but not limited to: Polycyclic Aromatic Hydrocarbons (PAH's) and Thioxanthenes	0.1 ppm	
88	Polyvinyl Chloride (PVC) for product packing material	Intentionally added	
89	Potassium hydroxyoctaoxodizincate dichromate	1000 ppm	
90	Refractory Ceramic Fibers, Aluminosilicate	1000 ppm	
91	Refractory Ceramic Fibers, Zirconia Aluminosilicate	1000 ppm	
92	Radioactive Substances	Intentionally added	
93	Residual monomers	5 ppm	
94	Selenium and its compounds (Se)	100 ppm	
95	Sodium Dichromate	1000 ppm	
96	Strontium chromate	1000 ppm	
97	Tar Oils and Creosotes	5 ppm	
98	Tetraboron disodium heptaoxide, hydrate	1000 ppm	
100	4-(1,1,3,3-tetramethylbutyl)phenol,(4-tert-Octylphenol)	1000 ppm	
101	Toxic glycol ethers - including but not limited to: Ethyl-/Methyl-Glycol and their Acetates	Intentionally added	
102	Organic Tin compounds (including but not limited to: Tributyl Tin, Triphenyl Tin and oxides)	Intentionally added	
103	Tri-substituted organostannic compounds	Intentionally added or 1000 ppm of tin in a material	
104	Triclosan, specified substance - CAS No. 3380-34-5	10 ppm	
105	Trichloroethylene	Intentionally added	

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## Category B: Restricted Substances

The intentional use of following substances is restricted. SSMC allows its intentional use only for specific applications under the conditions as set by our objectives and scope. SSMC accepts impurities of substances in naturally occurring amount and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible.

S/N	Restricted Substances	SSMC Thresholds (ppm)	Restricted applications
1	Arsenic and its compounds (As)	25 10 in packaging	All applications, except IC's (as dopant or GaAs based dies)
2	Bisphenol A	10	All new materials
3	Carcinogens Mutagens & Reproductive Toxins (CMR's), - including but not limited to: Tar oils	1000	All applications, except Carbon Black as pigment in mould compounds and packaging materials, NiO in passive components and InP in photo diodes
4	Cobalt and its compounds	100	All applications in direct and prolonged skin contact, Printed Circuit Boards (PCBs) laminates.
5	Cyanide compounds	10	Packaging Materials
6	Halogenated compounds	900	Halogen-Free Materials
7	Lead and its compounds	100	All metallic
8	Methylhexahydrophthalic anhydride	1000	All materials
9	Mineral and ceramic fibers (excl. Asbestos)	0.1	All Materials Except: Glass Reinforced Plastics (GRP's) in Printed Circuit Boards and Die Encapsulations.
10	Natural rubber (latex), specified substance - CAS No. 9006-04-6	100	All applications, except in photo diodes
11	Persistent, Bioaccumulative and Inherently Toxic Substances (PBI's) and very Persistent and very Bioaccumulative Substances (vPvB's)	1000	All applications, except active Tetrabromobisphenol-A (TBBPA) as flame retardant in mould compounds and certain metal oxides (ZnO, CoO, Cu <sub>2</sub> O) in passive components

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12	Phenols (excl. PCP's, NP's, NPE's and BenzoTriazole)	50	Only applications in direct and prolonged skin contact and laminates of printing wiring boards
13	Substances that may cause skin sensitization	1000	Only applications in direct and prolonged skin contact and laminates of printing wiring boards
14	Tri-(2,3-dibromo-propyl)phosphate (TRIS), specified substance	Non-use	Only applications in direct and prolonged skin contact and laminates of printing wiring boards
15	Tris(1-aziridiny)phosphine oxide (TEPA), specified substance	Non-use	Only applications in direct and prolonged skin contact and laminates of printing wiring boards
16	Antimony Oxides	900	Only applications dedicated to be used for Halogen / Antimony Free products
17	Chlorinated or Brominated Compounds (including Organic Solvents)	900	- Only applications dedicated to be used for Halogen / Antimony Free products - No intentional use as a cleaning agent or degreaser

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## **Category C: Declarable Substances**

The declaration of intentional and/or unintentional use of substances is mandatory if material supplied to SSMC is in the Candidate List of Substances of Very High Concern for Authorization (refer to the list on <http://echa.europa.eu/candidate-list-table>).

The declaration of intentional and/or unintentional use of substances is mandatory if material supplied to SSMC is in the NEA List Of Controlled Hazardous Substances (refer to the list on <https://www.nea.gov.sg/docs/default-source/our-services/hazardous-waste/hs--table-1.pdf>).

The intentional use of following substances is declarable. SSMC allows its intentional use only for specific applications under the conditions as set by our objectives and scope. SSMC accepts impurities of substances in naturally occurring amount and/or amounts generated via synthesis which cannot be avoided and where removal is not feasible.

S/N	Declarable Substances	SSMC Thresholds (ppm)	Scope of Declarable Application
1	Acrylates	100 ppm	All materials
2	Acrylonitrile compounds	100 ppm	All materials
3	Aldehydes	100 ppm	Product materials
4	Aliphatic Amines	100 ppm	All materials
5	Aluminum and its compounds	100 ppm	All materials
6	Anhydrides	100 ppm	All materials
7	Antimony and its compounds	100 ppm	All materials
8	Aromatic amines and their salts	100 ppm	All materials
9	Aromatic hydrocarbon compounds	100 ppm	All materials
10	Azo compounds	100 ppm	All materials
11	Barium and its compounds	100 ppm	All materials
12	Bismuth and its compounds	100 ppm	All materials
13	Boron and its compounds	100 ppm	All materials
14	Brominated Flame Retardants (excluding banned groups)	100 ppm	All materials



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15	Calcium and its compounds	100 ppm	All materials
16	Chromium and Chromium III compounds	100 ppm	All materials
17	Clay	100 ppm	All materials
18	Copper and its compounds	100 ppm	All materials
19	Cyanide compounds	100 ppm	Product materials
20	Epoxy Resins	100 ppm	All materials
21	Ferrosilicon and its compounds	100 ppm	All materials
22	Germanium and its compounds	100 ppm	All materials
23	Glycidyl ethers	100 ppm	All materials
24	Gold and its compounds	100 ppm	All materials
25	Guanidine compounds	100 ppm	All materials
26	Halogenated Inorganic Compounds	100 ppm	All materials
27	Halogenated Organic Compounds	100 ppm	All materials
28	Imidazole compounds	100 ppm	All materials
29	Indium and its compounds	100 ppm	All materials
30	Inorganic compounds	100 ppm	All materials
31	Inorganic Silicon compounds	100 ppm	All materials
32	Iron and its compounds	100 ppm	All materials
33	Isocyanates	100 ppm	All materials
34	Isothiazolinones	100 ppm	All materials
35	Magnesium and its compounds	100 ppm	All materials
36	Manganese and its compounds	100 ppm	All materials
37	Molybdenum and its compounds	100 ppm	All materials
38	Nanomaterials	100 ppm	All materials
39	Nitrates and Nitrites	100 ppm	All materials
40	Nitrosamines	100 ppm	All materials

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41	Organic compounds	100 ppm	All materials
42	Organic Phosphorus compounds	100 ppm	All materials
43	Organic Silicon compounds	100 ppm	All materials
44	Organic Tin	100 ppm	All materials
45	Palladium and its compounds	100 ppm	All materials
46	Phenols and Phenolic Resins	100 ppm	All materials
47	Phosphorus compounds	100 ppm	All materials
48	Phthalates	100 ppm	All materials
49	Platinum and its compounds	100 ppm	All materials
50	Polymers	100 ppm	All materials
51	PVC and vinyl chloride monomer	100 ppm	Packaging Materials
52	Rare Earth Metals and its compounds	100 ppm	All materials
53	Rosins	100 ppm	All materials
54	Ruthenium and its compounds	100 ppm	All materials
55	Silver and its compounds	100 ppm	All materials
56	Strontium and its compounds	100 ppm	All materials
57	Tantalum and its compounds	100 ppm	All materials
58	Tellurium and its compounds	100 ppm	All materials
59	Thallium and its compounds	100 ppm	All materials
60	Tin and its compounds	100 ppm	All materials
61	Titanium and its compounds	100 ppm	All materials
62	Tungsten and its compounds	100 ppm	All materials
63	Vanadium and its compounds	100 ppm	All materials
64	Zinc and its compounds	100 ppm	All materials
65	Zirconium and its compounds	100 ppm	All materials

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## **References:**

NEA List Of Controlled Hazardous Substances (<https://www.nea.gov.sg/docs/default-source/our-services/hazardous-waste/hs--table-1.pdf>)

NXP ECO Products Substance Control Products Packaging (<https://www.nxp.com/docs/en/supporting-information/ECO-Products-Substance-Control-Products-Packaging.pdf>)

TSMC Green Procurement for Hazardous Substances ([http://www.tsmc.com/download/csr/2018\\_tsmc\\_csr/english/pdf/e\\_all.pdf](http://www.tsmc.com/download/csr/2018_tsmc_csr/english/pdf/e_all.pdf))