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SMaRT Carcinogen Policy

Approved by the MTS Executive & SMaRT Consensus Committees March 28, 2011
Updated for Economic Benefits, TRACI 2.1 & LEED V4 Compliance March 16, 2013

This Policy contains:

- Economic Benefits of SMaRT's Carcinogen Policy
- SMaRT Prerequisites & Credits Addressing Human & Ecological Toxicity
- Carcinogen Policy Additional Requirements
    - Stockholm & Rotterdam Treaties Toxic Chemicals & International Agency for Research on Cancer (IARC) Carcinogens
    - EU Registration, Evaluation, Authorisation and Restriction of Chemical substances (REACH) Toxic Chemicals
    - Chemical Ingredients
    - Supply Chain Optimization Policy (toxic chemicals)

Economic Benefits of SMaRT's Carcinogen Policy

This supply chain Carcinogen Policy provides SMaRT Certified Manufacturers the brand, stakeholder, partner, employee and customer benefits of toxic chemical optimization which has been documented with statistically significant data to be effective, reduce costs and increase revenue (*Sustainable Value Chain Research Results, Deloitte, ASQ, ISM & CROA in cooperation with GSA Supply Chain Community of Practice 2013, Wall Street Due Diligence released at NYSE, Capital Markets Partnership, 2009 Sustainable Manufacturing Underwriting Standard 2011).*

SMaRT Prerequisites / Credits on Human & Ecological Toxicity

SMaRT prerequisites PHE 1-2 and 1-3 require that no input or output Stockholm Treaty chemical are released in the manufacture, sale, use, reuse, and end of life of the product and its constituent materials over the global supply chain and all product stages. The list of these chemicals is below and they are in the class of chemicals that are carcinogenic, mutagenic, teratogenic, and endocrine disrupting.

SMaRT prerequisites PHE 1-1 and 2-1 also require the inventory of 800 human and ecologically toxic chemicals listed in Appendix 1 (BEES Please List), 3000 LCA supply chain toxic chemicals from TRACI 2.1, and PHE 3-1, 4-1, 5-1, 6-1 provide credit for the reduction of these chemicals f up to 100% at manufacturer and supplier facilities.

SMaRT PHE 2-4 provides credit to manufacturers for Reductions Beyond Compliance of the list of 682 SARA Title III EPA Toxic Inventory Release Chemicals.

SMaRT 3-3 requires carcinogenic or reproductive toxicant VOCs shall not be emitted from products at levels above the Safe Exposure Levels (SELs).

SMaRT PHE 4-3 requires no toxic PBDE Flame Retardants.

SMaRT PHE 4-2 requires the minimization of toxic Indoor Formaldehyde Emissions.

SMaRT MATLS 4-4, 5-3, 5-4, 6-3, 6-4, 6-5 require no toxic endocrine disrupting potential products and materials since these are biobased organic products conforming to EPA/Purdue Best Management Practices.

SMaRT EOL provides credit for reuse of SMaRT Certified Products that meet the requirements above reducing toxic carcinogenic, mutagenic, teratogenic, and endocrine disrupting chemicals.

Additional Requirements

Stockholm & Rotterdam Treaty & IARC Toxic Chemicals.

The class of known toxic chemicals prohibited by the Stockholm Treaty is also covered by the Rotterdam Treaty. There is substantial global ratification of these treaties making them legally enforceable by the laws of 173 countries for the Stockholm Treaty and 74 countries for the Rotterdam Treaty.

No generation and release of carcinogens are inimical to the purpose of SMaRT and the Standard. Thus, as of the effective date of this SMaRT Policy, all SMaRT manufacturers must not generate the carcinogens listed below recognized by the International Agency for Research on Cancer (IARC) Class 1 (known) and 2a (probable), and Rotterdam Convention on Toxic Chemicals listed below in the manufacture, sale, use, reuse, and end of life of the product and its constituent materials over the global supply chain and all product stages. This Policy restricts the carcinogens in the list below to user exposure to less then the NOAEL (No Observable Adverse Effect Level) or zero if the NOAEL is unknown.

This Policy is an official SMaRT Standard Interpretation pursuant to MTS Operating Procedures. Any new chemicals added to the Stockholm or Rotterdam Conventions, or IARC lists, automatically become part of this Policy.

REACH Toxic Chemicals.

The following European REACH lists of toxic chemicals are also a required component of this Carcinogen Policy:

Six Substances of Very High Concern
http://ec.europa.eu/enterprise/newsroom/cf/itemdetail.cfm?item_id=4907
REACH Authorization List of 14 Toxic Chemicals
http://echa.europa.eu/web/guest/addressing-chemicals-of-concern/authorisation/recommendation-for-inclusion-in-the-authorisation-list/previous-recommendations/2nd-recommendation
Reach Toxic Chemical Candidate List
http://echa.europa.eu/web/guest/candidate-list-table

Chemical Ingredient (this is an optional component of this Policy)

The manufacturer has published complete content inventory for the product following these

guidelines:

- A publically available inventory of all ingredients identified by name and Chemical Abstract Service Registration Number (CASRN)
- Materials defined as trade secret or intellectual property may withhold the name and/or CASRN but must disclose role, amount and GreenScreen benchmark as defined in GreenScreen v1.2: http://www.cleanproduction.org/library/greenScreenv1-2/GreenScreen_v1-2_Benchmarks_REV.pdf

Supply Chain Optimization (toxic chemicals).

Engage in validated and robust safety, health, hazard, and risk programs. Document at least 99% by weight of the ingredients used to make the product or material are sourced from companies with independent third party verification of the following along the manufacturer supply chain:

- Processes are in place to --
    - communicate and transparently prioritize chemical ingredients along the supply chain according to available hazard, exposure and use information to identify those that require more detailed evaluation
    - identify, document, and communicate information on health, safety and environmental characteristics of chemical ingredients
    - implement measures to manage the health, safety and environmental hazard and risk of chemical ingredients
    - optimize health, safety and environmental impacts when designing and improving chemical ingredients
    - communicate, receive and evaluate chemical ingredient safety and stewardship information along the supply chain
- Safety and stewardship information about the chemical ingredients is publicly available from all points along the supply chain

SMaRT independent third party certification provides the specified preceding independent verification, and manufacturers are required as part of the SMaRT Certification Application to provide documentation of compliance with these Supply Chain Optimization requirements. The required communication of information specified above can be part of the manufacturer's required SMaRT Certification Summary on the MTS Website.

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List of Stockholm Treaty Toxic Chemicals prohibited for SMaRT Certified Manufacturers:

- **Pesticides**: aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene; chlordecone, alpha hexachlorocyclohexane, beta hexachlorocyclohexane, lindane, pentachlorobenzene;
- **Industrial chemicals:** hexachlorobenzene, polychlorinated biphenyls (PCBs); hexabromobiphenyl, hexabromodiphenyl ether, heptabromodiphenyl ether, pentachlorobenzene, perfluorooctane sulfonic acid, its salts and perfluorooctane sulfonyl fluoride, tetrabromodiphenyl ether and pentabromodiphenyl ether;
- **By-products:** hexachlorobenzene; polychlorinated dibenzo-p-dioxins and polychlorinated dibenzofurans (PCDD/PCDF), PCBs, alpha hexachlorocyclohexane, beta hexachlorocyclohexane and pentachlorobenzene
- **Mandated by SMaRT:** dioxin

List of Rotterdam Treaty Chemicals & CAS#s prohibited for SMaRT Certified Manufacturers:

2,4,5-T 93-76-5 binapacryl 485-31-4 captafol 2425-06-1 chlordimeform 6164-98-3 chlorobenzilate 510-15-6 dinitro-ortho-cresol and its salts 534-52-1 dinoseb and its salts 88-85-7 ethylene dibromide (EDB) 106-93-4 ethylene

dichloride 107-06-2 ethylene oxide 75-21-8 fluoroacetamide 640-19-7 HCH (mixed isomers) excludes gamma isomer – see lindane 608-73-1 lindane (g-BHC, g-HCH) 58-89-9 all mercury compounds, Methamidophos 10265-92-6 methazole* 20354-26-1 methyl-parathion 298-00-0 monocrotophos* 6923-22-4 parathion (ethyl)* 56-38-2 pentachlorophenol 87-86-5 phosphamidon 13171-21-6; 23783-98-4; 297-99-4 tribufos* 78-48-8 All tributyl tin compounds including:
tributyltin oxide, 56-35-9
tributyltin fluoride, 1983-10-4
tributyltin methacrylate, 2155-70-6
tributyltin benzoate, 4342-36-3
tributyltin chloride, 1461-22-9
tributyltin linoleate, 24124-25-2
tributyltin naphthenate, 85409-17-2
Dustable powder formulations containing a combination of:
benomyl at or above 7%, 17804-35-2
carbofuran at or above 10%, 1563-66-2
thiram at or above 15%, 137-26-8

List of IARC Known and Probable Carcinogens

Known:

- 4-Aminobiphenyl
- Aristolochic acid
- Arsenic and arsenic compounds (Note: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)
- Asbestos
- Azathioprine
- Benzene
- Benzidine
- Benzo[a]pyrene
- Beryllium and beryllium compounds
- N,N-Bis(2-chloroethyl)-2-naphthylamine (Chlornaphazine)
- Bis(chloromethyl)ether and chloromethyl methyl ether (technical-grade)
- 1,3-Butadiene
- 1,4-Butanediol dimethanesulfonate (Busulphan; Myleran)
- Cadmium and cadmium compounds
- Chlorambucil
- 1-(2-Chloroethyl)-3-(4-methylcyclohexyl)-1-nitrosourea (Methyl-CCNU; Semustine)
- Chromium[VI]
- Cyclophosphamide
- Cyclosporine
- Diethylstilbestrol
- Dyes metabolized to benzidine
- Epstein-Barr virus
- Erionite
- Estrogen-progestogen menopausal therapy (combined)
- Estrogen-progestogen oral contraceptives (combined) (Note: There is also convincing evidence in humans that these agents confer a protective effect against cancer in the endometrium and ovary)
- Estrogens, non-steroidal (Note: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)
- Estrogens, steroidal (Note: This evaluation applies to the group of compounds as a whole and not necessarily to all individual compounds within the group)
- Estrogen therapy, postmenopausal
- Ethanol in alcoholic beverages
- Ethylene oxide
- Etoposide
- Etoposide in combination with cisplatin and bleomycin

- Formaldehyde
- Gallium arsenide
- *Helicobacter pylori* (infection with)
- Hepatitis B virus (chronic infection with)
- Hepatitis C virus (chronic infection with)
- Human immunodeficiency virus type 1 (HIV-1) (infection with)
- Human papilloma virus (HPV) types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59 and 66 (Note: The HPV types that have been classified as carcinogenic to humans can differ by an order of magnitude in risk for cervical cancer)
- Human T-cell lymphotropic virus type I (HTLV-1)
- Melphalan
- 8-Methoxypsoralen (Methoxsalen) plus ultraviolet A radiation
- Methylenebis(chloroaniline) (MOCA)
- MOPP and other combined chemotherapy including alkylating agents
- Mustard gas (Sulfur mustard)
- 2-Naphthylamine
- Neutrons
- Nickel compounds
- N'-Nitrosonornicotine (NNN) and 4-(N-Nitrosomethylamino)-1-(3-pyridyl)-1-butanone (NNK)
- *Opisthorchis viverrini* (liver fluke; infection with)
- [Oral contraceptives, combined estrogen-progestogen: see Estrogen-progestogen oral contraceptives (combined)]
- Oral contraceptives, sequential
- Phenacetin
- Phosphorus-32, as phosphate
- Plutonium-239 and its decay products (may contain plutonium-240 and other isotopes), as aerosols
- Radioiodines, short-lived isotopes, including iodine-131, from atomic reactor accidents and nuclear weapons detonation (exposure during childhood)
- Radionuclides, alpha-particle-emitting, internally deposited (Note: Specific radionuclides for which there is sufficient evidence for carcinogenicity to humans are also listed individually as Group 1 agents)
- Radionuclides, beta-particle-emitting, internally deposited (Note: Specific radionuclides for which there is sufficient evidence for carcinogenicity to humans are also listed individually as Group 1 agents)
- Radium-224 and its decay products
- Radium-226 and its decay products
- Radium-228 and its decay products
- Radon-222 and its decay products
- *Schistosoma haematobium* (flatworm; infection with)
- Silica, crystalline (inhaled in the form of quartz or cristobalite from occupational sources)
- Solar radiation
- Talc containing asbestiform fibres
- Tamoxifen (Note: There is also conclusive evidence that tamoxifen reduces the risk of contralateral breast cancer)
- 2,3,7,8-Tetrachlorodibenzo-para-dioxin
- Thiotepa
- Thorium-232 and its decay products, administered intravenously as a colloidal dispersion of thorium-232 dioxide
- ortho-Toluidine
- Treosulfan
- Vinyl chloride
- X- and Gamma-radiation

Mixtures

- Aflatoxins (naturally occurring mixtures of)
- Alcoholic beverages
- Areca nut
- Betel quid with tobacco
- Betel quid without tobacco
- Coal-tar pitches

- Coal-tars
- Household combustion of coal, indoor emissions from
- Mineral oils, untreated and mildly treated
- Phenacetin, analgesic mixtures containing
- Plants containing aristolochic acid
- Salted fish (Chinese-style)
- Shale-oils
- Soots
- Tobacco, smokeless
- Wood dust

Exposure circumstances

- Aluminum production
- Arsenic in drinking-water
- Auramine production
- Boot and shoe manufacture and repair
- Chimney sweeping
- Coal gasification
- Coal-tar distillation
- Coke production
- Furniture and cabinet making
- Hematite mining (underground) with exposure to radon
- Involuntary smoking (exposure to secondhand or 'environmental' tobacco smoke)
- Iron and steel founding
- Isopropyl alcohol manufacture (strong-acid process)
- Magenta production
- Painter (occupational exposure as a)
- Paving and roofing with coal-tar pitch
- Rubber industry
- Strong-inorganic-acid mists containing sulfuric acid (occupational exposure to)
- Tobacco smoking and tobacco smoke

Probable:

- Acrylamide
- Adriamycin
- Androgenic (anabolic) steroids
- Azacitidine
- Bischloroethyl nitrosourea (BCNU)
- Captafol
- Chloramphenicol
- alpha-Chlorinated toluenes (benzal chloride, benzotrichloride, benzyl chloride) and benzoyl chloride (combined exposures)
- 1-(2-Chloroethyl)-3-cyclohexyl-1-nitrosourea (CCNU)
- 4-Chloro-ortho-toluidine
- Chlorozotocin
- Cisplatin
- *Clonorchis sinensis* (infection with)
- Cyclopenta[cd]pyrene
- Dibenz[a,h]anthracene
- Dibenzo[a,l]pyrene
- Diethyl sulfate
- Dimethylcarbamoyl chloride
- 1,2-Dimethylhydrazine
- Dimethyl sulfate
- Epichlorohydrin
- Ethyl carbamate (urethane)

- Ethylene dibromide
- N-Ethyl-N-nitrosourea
- Glycidol
- Indium phosphide
- IQ (2-Amino-3-methylimidazo[4,5-f]quinoline)
- Kaposi's sarcoma herpesvirus (KSHV)/human herpesvirus 8 (HHV-8)
- Lead compounds, inorganic
- 5-Methoxypsoralen
- Methyl methanesulfonate
- N-Methyl-N´-nitro-N-nitrosoguanidine(MNNG)
- N-Methyl-N-nitrosourea
- Nitrate or nitrite (ingested) under conditions that result in endogenous nitrosation
- Nitrogen mustard
- N-Nitrosodiethylamine
- N-Nitrosodimethylamine
- Procarbazine hydrochloride
- Styrene-7,8-oxide
- Teniposide
- Tetrachloroethylene
- Trichloroethylene
- 1,2,3-Trichloropropane
- Tris(2,3-dibromopropyl) phosphate
- Ultraviolet radiation A
- Ultraviolet radiation B
- Ultraviolet radiation C
- [Urethane: see Ethyl carbamate]
- Vinyl bromide (Note: For practical purposes, vinyl bromide should be considered to act similarly to the human carcinogen vinyl chloride.)
- Vinyl fluoride (Note: For practical purposes, vinyl fluoride should be considered to act similarly to the human carcinogen vinyl chloride.)

Mixtures

- Creosotes
- Diesel engine exhaust
- High-temperature frying, emissions from
- Hot mate
- Household combustion of biomass fuel (primarily wood), indoor emissions from
- Non-arsenical insecticides (occupational exposures in spraying and application of)
- Polychlorinated biphenyls

Exposure circumstances

- Art glass, glass containers and pressed ware (manufacture of)
- Carbon electrode manufacture
- Cobalt metal with tungsten carbide
- Hairdresser or barber (occupational exposure as a)
- Petroleum refining (occupational exposures in)
- Shiftwork that involves circadian disruption
- Sunlamps and sunbeds (use of)