# 1,2,5,6,9,10-Hexabromocyclododecane

## sc-222899

**Material Safety Data Sheet**

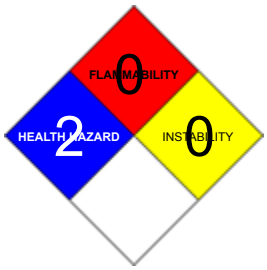
| Hazard Alert Code Key: | EXTREME | HIGH | MODERATE | LOW |
|---|---|---|---|---|

## Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**PRODUCT NAME**
1,2,5,6,9,10-Hexabromocyclododecane

**STATEMENT OF HAZARDOUS NATURE**
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

**NFPA**

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Santa Cruz Biotechnology, Inc.
2145 Delaware Avenue
Santa Cruz, California 95060
800.457.3801 or 831.457.3800

**EMERGENCY**
ChemWatch
Within the US & Canada: 877-715-9305
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(1-800-CHEMCALL) or call +613 9573 3112

**SYNONYMS**
C12-H18-Br6, "hexa bromo cyclo dodecane", "hexabromo cyclododecane", "cyclododecane, hexabromo-", "cyclodecane, hexabromo, isomers", "hexabromocyclodecan 1, 2, 5, 6, 9, 10", "1, 2, 5, 6, 9, 10-hexabromocyclododecane", CD75-P, "Saytex 6006L Flame Retardant", "Saytex BCT-610", "Saytex HBCD-LM Flame retardant", "Saytex HP-900P", "Saytex HBCD-HM Powder", "Saex HBCD VHM", "Bromkal 736CD", "brominated aliphatic hydrocarbon", "fire retardant chemical additive"

## Section 2 - HAZARDS IDENTIFICATION

**CHEMWATCH HAZARD RATINGS**

| | | Min | Max |
|---|---|---|---|
| Flammability | 0 | | |
| Toxicity | 0 | | |
| Body Contact | 2 | | |

Min/Nil=0
Low=1
Moderate=2
High=3
Extreme=4

| | | |
|---|---|---|
| Reactivity | 1 | |
| Chronic | 3 | |

**CANADIAN WHMIS SYMBOLS**

**EMERGENCY OVERVIEW**

**RISK**

Irritating to eyes, respiratory system and skin.

**POTENTIAL HEALTH EFFECTS**

**ACUTE HEALTH EFFECTS**

**SWALLOWED**

■ Although ingestion is not thought to produce harmful effects, the material may still be damaging to the health of the individual following ingestion, especially where pre-existing organ (e.
g.

**EYE**

■ This material can cause eye irritation and damage in some persons.

**SKIN**

■ This material can cause inflammation of the skin oncontact in some persons.
■ The material may accentuate any pre-existing dermatitis condition.
■ Skin contact is not thought to have harmful health effects, however the material may still produce health damage following entry through wounds, lesions or abrasions.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.
Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

**INHALED**

■ The material can cause respiratory irritation in some persons.
The body's response to such irritation can cause further lung damage.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

**CHRONIC HEALTH EFFECTS**

■ Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems.
Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems.
There is some evidence that human exposure to the material may result in developmental toxicity. This evidence is based on animal studies where effects have been observed in the absence of marked maternal toxicity, or at around the same dose levels as other toxic effects but which are not secondary non-specific consequences of the other toxic effects.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung.
Chronic intoxication with ionic bromides, historically, has resulted from medical use of bromides but not from environmental or occupational exposure; depression, hallucinosis, and schizophreniform psychosis can be seen in the absence of other signs of intoxication. Bromides may also induce sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness (aphasias), dysarthria, weakness, fatigue, vertigo, stupor, coma, decreased appetite, nausea and vomiting, diarrhoea, hallucinations, an acne like rash on the face, legs and trunk, known as bronchoderma (seen in 25-30% of case involving bromide ion), and a profuse discharge from the nostrils (coryza). Ataxia and generalised hyperreflexia have also been observed. Correlation of neurologic symptoms with blood levels of bromide is inexact. The use of substances such as brompheniramine, as antihistamines, largely reflect current day usage of bromides; ionic bromides have been largely withdrawn from

therapeutic use due to their toxicity. Several cases of foetal abnormalities have been described in mothers who took large doses of bromides during pregnancy.

## Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

| NAME | CAS RN | % |
|---|---|---|
| hexabromocyclododecane | 3194-55-6 | >98 |

## Section 4 - FIRST AID MEASURES

**SWALLOWED**

- Immediately give a glass of water.
- First aid is not generally required. If in doubt, contact a Poisons Information Center or a doctor.

**EYE**

If this product comes in contact with the eyes

- Wash out immediately with fresh running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

**SKIN**

If skin contact occurs

- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).

**INHALED**

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.

**NOTES TO PHYSICIAN**

■ Treat symptomatically.

## Section 5 - FIRE FIGHTING MEASURES

| | |
|---|---|
| Vapour Pressure (mmHG) | Negligible |
| Upper Explosive Limit (%) | Not available. |
| Specific Gravity (water=1) | Not available |
| Lower Explosive Limit (%) | Not available |

**EXTINGUISHING MEDIA**

- There is no restriction on the type of extinguisher which may be used.

Use **EXTINGUISHING MEDIA** suitable for surrounding area.

**FIRE FIGHTING**

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.

**GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS**

Combustion products include carbon monoxide (CO), carbon dioxide ($CO_2$), hydrogen bromide, other pyrolysis products typical of burning organic material.

Flame retardants may not themselves be immune from combustion but will quickly self-extinguish under fire normal conditions. Their thermal degradation products may be be required to break the combustion cycle of materials in which they are found. When materials burn they introduce flammable gases into the immediate environment, The gas flame itself is maintained by the action of high energy "radicals" (that is $H^+$ and $OH^-$ in the gas phase) which decompose molecules to give free carbon. This free carbon may react with oxygen in air to " burn" to $CO_2$, generating heat energy.

Halogenated flame retardants act by effectively removing the $H^+$ and $OH^-$ radicals in the gas flame phase. This considerable slows or prevents the burning process, thus reducing heat generation and, as a result, the production of further gaseous material. The halogenated flame retardants release bromine or chlorine as free

radicals (Br- or Cl- as appropriate) which react with the flammable gases to give off HBr or HCl. These then react with the high energy H+ or OH- radicals to give water and the much lower energy Br- or Cl- radicals which then become available to begin a new cycle of H+ and OH- radical removal.
Because chlorine (from chorinated retardants) is released over a wider range of temperatures than bromine, it is present in the flame zone at lower concentrations and is thus less effective.
May emit poisonous fumes.
May emit corrosive fumes.

**FIRE INCOMPATIBILITY**

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

**EXTINGUISHING MEDIA**

- There is no restriction on the type of extinguisher which may be used.

Use **EXTINGUISHING MEDIA** suitable for surrounding area.

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- Wear breathing apparatus plus protective gloves for fire only.

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## Section 6 - ACCIDENTAL RELEASE MEASURES

**MINOR SPILLS**

- Clean up all spills immediately.
- Avoid breathing dust and contact with skin and eyes.

**MAJOR SPILLS**

Moderate hazard.

- CAUTION Advise personnel in area.
- Alert Emergency Responders and tell them location and nature of hazard.

## Section 7 - HANDLING AND STORAGE

**PROCEDURE FOR HANDLING**

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts

may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers.
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

**RECOMMENDED STORAGE METHODS**

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

**STORAGE REQUIREMENTS**

- Store in original containers.
- Keep containers securely sealed.

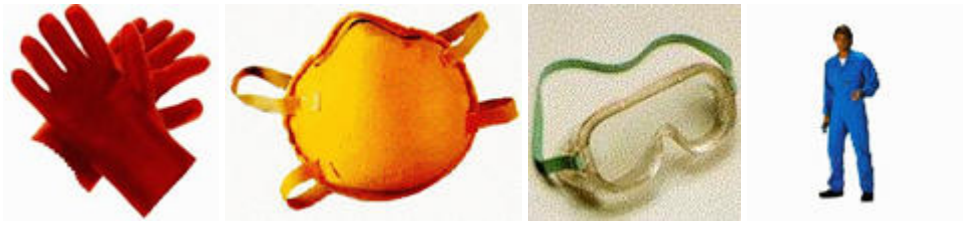
## Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

**EXPOSURE CONTROLS**

| Source | Material | TWA ppm | TWA mg/m³ | STEL ppm | STEL mg/m³ | Peak ppm | Peak mg/m³ | TWA F/CC | Notes |
|---|---|---|---|---|---|---|---|---|---|
| Canada - Ontario Occupational Exposure Limits | hexabromocyclododecane (Particles (Insoluble or Poorly Soluble) Not Otherwise) | | 10 (I) | | | | | | |
| Canada - British Columbia Occupational Exposure Limits | hexabromocyclododecane (Particles (Insoluble or Poorly Soluble) Not Otherwise Classified (PNOC)) | | 10 (N) | | | | | | |
| Canada - Ontario Occupational Exposure Limits | hexabromocyclododecane (Specified (PNOS) / Particules (insolubles ou peu solubles) non précisées par ailleurs) | | 3 (R) | | | | | | |
| US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants | hexabromocyclododecane (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | |
| US - California Permissible Exposure Limits for Chemical Contaminants | hexabromocyclododecane (Particulates not otherwise regulated Respirable fraction) | | 5 | | | | | | (n) |
| US - Oregon Permissible Exposure Limits (Z-1) | hexabromocyclododecane (Particulates not otherwise regulated (PNOR) (f) Total Dust) | - | 10 | | | | | | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are |

| | | | | |
|---|---|---|---|---|
| | | | | different than the federal Limits. PNOR means “particles not otherwise regulated.” |
| US - Michigan Exposure Limits for Air Contaminants | hexabromocyclododecane (Particulates not otherwise regulated, Respirable dust) | | 5 | |
| US - Oregon Permissible Exposure Limits (Z-1) | hexabromocyclododecane (Particulates not otherwise regulated (PNOR) (f) Respirable Fraction) | - | 5 | Bold print identifies substances for which the Oregon Permissible Exposure Limits (PELs) are different than the federal Limits. PNOR means “particles not otherwise regulated.” |
| US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants | hexabromocyclododecane (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction) | | 5 | |
| Canada - Prince Edward Island Occupational Exposure Limits | hexabromocyclododecane (Particles (Insoluble or Poorly Soluble) [NOS] Inhalable particles) | | 10 | See Appendix B current TLV/BEI Book |

**PERSONAL PROTECTION**



**RESPIRATOR**

•Particulate. (AS/NZS 1716 & 1715, EN 1432000 & 1492001, ANSI Z88 or national equivalent)

**EYE**

- Safety glasses with side shields.
- Chemical goggles.

**HANDS/FEET**

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.

- polychloroprene
- nitrile rubber
- butyl rubber
- fluorocaoutchouc
- polyvinyl chloride

Gloves should be examined for wear and/ or degradation constantly.

**OTHER**

- Overalls.
- P.V.C. apron.
- Barrier cream.
- Skin cleansing cream.
- Eye wash unit.

**ENGINEERING CONTROLS**

- Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.
- If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered.

## Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

**PHYSICAL PROPERTIES**

Solid.
Does not mix with water.

| | | | |
|---|---|---|---|
| State | Divided solid | Molecular Weight | 641.70 |
| Melting Range (°F) | 370- 376 | Viscosity | Not Applicable |
| Boiling Range (°F) | Not available | Solubility in water (g/L) | Partly miscible |
| Flash Point (°F) | Not Applicable | pH (1% solution) | Not applicable |
| Decomposition Temp (°F) | Not available. | pH (as supplied) | Not applicable |
| Autoignition Temp (°F) | Not available | Vapour Pressure (mmHG) | Negligible |
| Upper Explosive Limit (%) | Not available. | Specific Gravity (water=1) | Not available |
| Lower Explosive Limit (%) | Not available | Relative Vapor Density (air=1) | Not Applicable |
| Volatile Component (%vol) | Negligible | Evaporation Rate | Not applicable |

**APPEARANCE**

Dense powder; does not mix well with water. No odor.

Environmental Fate Overall, it has been determined that varying the physico-chemical properties of logKow, water solubility and vapour pressure over a wide range had little effect on distribution to the aquatic and terrestrial compartments. However, a much larger effect was noticed in the atmospheric compartment. Release to the environment will be slow and diffuse over the life of products containing PBFRs. Where released to the environment, some PBFRs are expected to be stable, both microbially and abiotically. When released to land, they should bind strongly to the organic component of soils and be immobile. In the event of release to water, movement from the water column is likely to be rapid with the compounds partitioning to sediments and biota, where bioaccumulation is expected from the commercial pentabromo diphenyl ether compounds (tetra- to hexa-). Bioaccumulation is not anticipated with octabromodiphenyl ethers (OBDPE) and decabromodiphenyl ether (DBDPE) while hexabromocyclododecane (HBCD) has the potential to bioaccumulate. A relatively high bioconcentration factor for tetrabromobisphenol A (TBBPA) is balanced by rapid excretion and the compound has not been found in environmental biological samples. Components of commercial pentabromodiphenyl ether (PeBDPE) may volatilise to the atmosphere from water. It is speculated that they may bind to atmospheric particles with the potential to undergo long-range atmospheric transport.

| Material | Value |
|---|---|

## Section 10 - CHEMICAL STABILITY

**CONDITIONS CONTRIBUTING TO INSTABILITY**

- Presence of incompatible materials.
- Product is considered stable.

**STORAGE INCOMPATIBILITY**

¦ Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

## Section 11 - TOXICOLOGICAL INFORMATION

hexabromocyclododecane

**TOXICITY AND IRRITATION**

HEXABROMOCYCLODODECANE

unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

| TOXICITY | IRRITATION |
|---|---|
| Oral (rat) LD50 >10,000 mg/kg [ALBEMARLE] | |
| Dermal (rabbit) LD50 >8,000 mg/kg | |
| Inhalation (rat) LC50 >200 mg/L/hr | |

Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The primary health concerns revolve around the potential of polybrominated fire retardants (PBFRs) to act as carcinogens, endocrine disruptors and neurodevelopmental toxicants based on data for some members of this class of chemicals. In addition, their structural similarities to the polychlorinated diphenyl ethers (PCDEs), nitrofen and polychlorinated biphenyls (PCBs) lends further support to concerns for health effects exerted by these chemicals.

Three PBFRs, the penta-, octa- and decabromodipheyl ethers (BDPE)s, have been and remain of significant

commercial interest.
Nonetheless, the field of PBFRs is expanding and a diverse range of these chemicals are now available . Emphasis on the health effects of PBFRs is directed to certain chemical compounds within this class, namely decabromodipehyl ether (DBDPE), pentabromodipheyl ether (PeBDPE), octabromodiphemyl ether (OBDPE) and hexabromocyclododecane (HBCD). Also discussed are the polybrominated biphenyls (PCBs) and tris(2,3-dibromopropylphosphate (TDBPP), though no longer used, due to their significant adverse health effects.
The PBFRs are a structurally diverse group of chemical compounds, some of which share similarities in chemical structure while others vary significantly. Pharmacokinetic studies are limited for most of the chemicals . However, the available information indicates that some brominated flame retardants such as tetrabromodiphenyl ether (TBDPE), HBCD, TDBPP and PBBs are readily absorbed via the gastrointestinal tract. Data available for the polybrominated diphenyl ethers (PBDPE)s and PBBs indicate that the degree of gastrointestinal absorption is inversely proportional to the level of bromination. Dermal absorption has also been reported for TDBPP.
They are generally of low acute toxicity with no or slight and transient irritation to the skin and eyes of experimental animals. Inhalation studies in animals revealed that exposure to PBDPEs caused transient respiratory difficulties.
Like the PBDPEs, tetrabromobisphenol A (TBBPA) and its derivatives have low acute and repeated dose toxicity. They are neither skin or eye irritants nor skin sensitisers in experimental animals. Reversible respiratory effects were reported following inhalation exposure.
With a few exceptions, mutagenicity studies indicate that the majority of the PBRs are neither mutagenic to microbial or eukaryotic organisms nor genotoxic in experimental in vivo and in vitro systems. TBDPE and HBCD caused an increase in the recombination frequency in some cell lines.
Of the commercially and commonly used PBFRs, penta- and tetra-bromodiphenyl ethers appear to be of greatest significance where health effects are concerned.
Evidence indicates that the liver, and possibly the thyroid, are the organs most sensitive to these chemicals. According to available data, they are endocrine disruptors and neurodevelopmental toxicants in experimental animals. Whether neurodevelopmental effects are a consequence of changes in thyroid hormone levels or are caused by direct neurotoxicity remain to be elucidated. The absence of clinical, physiological and biochemical correlates precludes any conclusions as to the nature of the mechanisms involved. PeBDPE has been classified as a hazardous chemical, Harmful- Danger of Serious Damage to Health by Prolonged Exposure in Contact with Skin and if Swallowed. A similar toxicity profile is apparent for TBDPE. OBDPE is another chemical of concern due to its adverse effects on reproduction in experimental animals.
The two other groups with significant adverse health effects are TDBPP and PBBs. Although both have relatively low acute toxicity in experimental animals, evidence for carcinogenicity, endocrine disruption and reproductive effects exists. Little human data is available, however, epidemiological reports and follow up studies indicate that PBDPE, TDBPP and PBBs are absorbed and can be detected in the serum, adipose tissue and breast milk of directly and/or indirectly exposed individuals. The available evidence indicates that, in some countries, levels of these chemicals are increasing in animal and human tissues (including breast milk), which suggests they are bioaccumulative and persistent. Thyroid effects appear to be the major adverse health effect, with hypothyroidism seen in animals (e.g. OBDPE and PeBDPE, HBCD and PBB) and humans (e.g. DBDPE and deca-BB), although some PBFRs (e.g. DBDPE, TDBPP, HBCD and PBB) elicit carcinogenic effects in animal studies.
Blooming potential Blooming is defined as the migration (or more appropriately, diffusion) of an ingredient (e.g., plasticiser or flame retardant) in rubber or plastic material to the outer surface after curing. It is sometimes incorrectly referred to as "leaching" or "degassing". Diffusion is generally considered to be a slow process. Blooming has been identified as a source of potential exposure (human and environmental) to PBFRs, particularly for low molecular weight additive PBFRs.
It is generally accepted that "reactive", PBFRs such as TBBPA (and derivatives) and esters of acrylic (propenoic) acid, which are directly incorporated into polymers (e.g., polyester or epoxy resins) via chemical reaction (i.e., covalent binding) have a low or negligible blooming potential, although such chemicals can also be used as non-reactive (i.e., additive) ingredients.
So-called "additive" PBFRs (e.g., PBDPEs, PBBs, HBCD) are more likely to be subject to blooming, as these compounds are not chemically bound to the polymer backbone. Additive PBFRs reside within the polymer matrix as discrete molecules, but may be subject to weak Van der Waals and electrostatic interaction both between PBFR molecules and with the polymer backbone. High molecular weight polymeric additive flame retardants such as brominated polystyrene are more likely to remain within the matrix due to the slow rate of diffusion. Other PBFRs may undergo both reactive and/or additive reactions with polymer matrices e.g., tetrabromophthalic anhydride and brominated polystyrenes. Increased temperature is also associated with an increase in the rate of PBFR migration. Release of PBFRs or degradation products may occur at high temperatures during thermal processing or recycling e.g. PBDPEs emissions have been reported during thermal recycling activities.

**CARCINOGEN**

| | | |
|---|---|---|
| BROMINE COMPOUNDS (ORGANIC OR INORGANIC) | US Environmental Defense Scorecard Suspected Carcinogens | Reference(s) P65-MC |
| VPVB_(VERY~ | US - Maine Chemicals of High Concern List | Carcinogen |

## Section 12 - ECOLOGICAL INFORMATION

No data

## Section 13 - DISPOSAL CONSIDERATIONS

**Disposal Instructions**
All waste must be handled in accordance with local, state and federal regulations.
¦ Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible.
- Consult manufacturer for recycling options or consult Waste Management Authority for disposal if no suitable treatment or disposal facility can be identified.

## Section 14 - TRANSPORTATION INFORMATION

NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS: DOT, IATA, IMDG

## Section 15 - REGULATORY INFORMATION

**hexabromocyclododecane (CAS: 3194-55-6,22374-57-8) is found on the following regulatory lists;**
"Canada Domestic Substances List (DSL)","US - Maine Chemicals of High Concern List","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory","US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List"

## Section 16 - OTHER INFORMATION

**LIMITED EVIDENCE**
■ Cumulative effects may result following exposure*.
■ May be harmful to the foetus/ embryo*.
* (limited evidence).

**Denmark Advisory list for selfclassification of dangerous substances**

| Substance | CAS | Suggested codes |
|---|---|---|
| hexabromocyclododecane | 3194- 55- 6 | Rep3; R63 N; R50/53 |

**Ingredients with multiple CAS Nos**

| Ingredient Name | CAS |
|---|---|

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■ Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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