

## SAFETY DATA SHEET - EXTRUDED POLYSTYRENE

### Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

**Product Name:** Extruded Polystyrene – STYROBOARD XPS Fire Retarded Grades

**Chemical Name:** Polystyrene with <2% Hexabromocyclododecane fire retardant additive.

**Trade Names:** FOAMEX STYROBOARD XPS. Comes in the form of polystyrene boards and wire cut shapes usually a light green or light blue colour.

- Not Dangerous Goods according to ADG Code for the Transport of Dangerous Goods
- Not a Workplace Hazardous Substance according to the criteria of Safe Work Australia.
- A GHS Hazardous Chemical due to the <2% HBCD Flame Retardant additive. May cause harm to breastfed babies. See Section 11. Harmful to aquatic organisms. See Section 12.

**Use:** Extruded Polystyrene boards and cut shapes for building and construction; underslab and perimeter insulation, cladding and mouldings and trims, void forms in concrete, light weight fill in civil works, Geofoam etc.

**Note:** Fire Retarded XPS is not approved for food contact in AS2070 – Plastic Materials for Food Contact Use due to the presence of HBCD.

#### MANUFACTURER / SUPPLIER CONTACT DETAILS:

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## Section 2. HAZARD IDENTIFICATION

### Emergency Overview

In normal use, does not present a Hazard. When heated to decomposition, product emits acrid smoke and irritating fumes. Keep away from heat, and ignition sources like sparks or flame. Target Organs: Central Nervous System, Eyes, Lungs.

Dangerous Goods : Not Dangerous Goods according to the ADG Code, IMDG Code and IATA

Hazardous Substance: Not a Workplace Hazardous Substance due to classifiable health effect hazards.

### GHS Hazardous Chemical Classification

Extruded Polystyrene is a GHS Hazardous Chemical due to the Reproductive Effects on Lactation and toxicity to aquatic organisms, of the <2% HBCD ingredient. See detail in sections 11 and 12.

GHS Signal Word: None

GHS Symbol: None

Hazard & Hazard Category: Reproductive Toxicity. Effects on Lactation

Risk Phrases: May cause harm to breastfed babies. Harmful to aquatic organisms. May cause long-term adverse effects on the aquatic environment.

Hazardous Chemical due to the potential for a build-up of released blowing agent DME if stored in a confined space.

Hazard & Hazard Category: Flammable Gas. May cause respiratory irritation. May Cause drowsiness or dizziness.

Risk Phrases: Keep away from heat, sparks, open flames, hot surfaces – no smoking.  
Use only in well ventilated areas.

### Precautionary Statements

Prevention – Avoid inhaling dust, avoid prolonged contact with skin. Although the HBCD Flame Retardant additive is <2% w/w and is encapsulated in the polystyrene and is not bioavailable by normal contact. See NICNAS Report Section 11.

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

Take precautionary measures against static discharge.

Avoid release to the environment.

Response - In case of fire: Use Foam, Dry Agent, Carbon Dioxide for extinction.

Storage – No special requirements.

Disposal – Harmful to aquatic life with long lasting effects. This classification is due to the encapsulated HBCD fire retardant. See section 12. Extruded Polystyrene Foam which contains <0.05% w/v of HBCD Flame retardant, may still be landfilled in Australia.

### Section 3. COMPOSITION, INFORMATION ON INGREDIENTS

Component	CAS No.	Proportion %	w/w GHS Hazards at 100%
Polystyrene	9003-53-6	>91.5%	None
Hexabromocyclododecane	25637-99-4 #	<2%	H362, H410
# 3194-55-6 is the CAS No. for 1,2,5,6,9,10-Hexabromocyclododecane, whereas 25637-99-4 covers any HBCD.			
Blowing Agent Dimethylether	115-10-6	<5%	H220, H335, H336, AUH019, AUH044
1,1,1,2- Tetrafluoroethane (Refrigerant Gas 134a)	811-97-2	<5%	None

EIGA-0783: Contains fluorinated greenhouse gases covered by the Kyoto protocol.

EIGA-As: Asphyxiant in high concentrations.

### Section 4. FIRST AID MEASURES

Eyes: Rinse eyes with plenty of water for at least 15 minutes while holding eyelids open. Seek medical attention if symptoms develop or persist.

Skin: Wash with soap and water.

Inhalation: Inhalation of small particles may occur.

Ingestion: Rinse out mouth with water. Do NOT induce vomiting. Get medical attention. XPS is not expected to be absorbed in the body.

First Aid Facilities: Normal wash room facilities nearby.

Note to Doctor: Treat symptomatically. For inhalation of decomposition fumes If overheating or combustion has occurred.

### Section 5. FIRE AND EXPLOSION HAZARD INFORMATION

#### General

The solid extruded polystyrene is a combustible thermoplastic material which will melt and drip when ignited and will decompose with high heat to give off toxic combustion products, similar to the combustion products of burning timber (according to CSIRO information).

Autoignition Temp: 427°C

Extinguishing Media: Water spray, Foam, Carbon Dioxide (CO<sub>2</sub>), Dry chemical. Do not use direct water stream.

Special Firefighting procedures: Firefighting must be equipped with self-contained breathing apparatus and full thermal and chemical protective clothing. Equipment must be thoroughly decontaminated after use.

Unusual Fire, Explosion and Decomposition Hazards: Risk of dust-air explosion in confined spaces if product is being granulated or abrasion cut producing dust. If exposed to fire, high heat will be developed and heavy black smoke will result. During combustion, Carbon Dioxide & Carbon Monoxide will be the primary decomposition products, Styrene and other Hydrocarbons may be produced. HBCD, Brominated Fire Retardant may decompose to produce acidic Hydrogen Bromide.

Freshly extruded Foam Pieces: Styroboard XPS is expanded with a mixture of flammable and non-flammable gases. Keep freshly extruded foam pieces, in well ventilated areas, away from heat, sparks or flame. These pieces or foam bead will exhibit a hydrocarbon halo which is particularly evident immediately after extrusion or cutting. The hydrocarbon halo declines thereafter and is generally no longer evident after 7 days storage at room temperature (20°C). The fire hazard diminishes markedly as the hydrocarbon concentration in the moulded foam declines during normal post production operations, storage, shipment and application (up to 21 days).

## Section 6. ACCIDENTAL RELEASE MEASURES

Spillage: Small spills of cut or granulated pieces should be swept up and disposed into suitable containers or plastic bags.

Large spills: Clean up with shovel and broom. Secure in bundles to avoid blowing around.

Special Procedures: None required.

## Section 7. HANDLING AND STORAGE

### Handling

XPS is combustible, keep away from ignition sources, heat, sparks and open flames. Mechanical operations involving this material should be done in such a manner as to prevent or minimize dust generation. Small amounts of fines or dust may accumulate in material handling systems. If permitted to accumulate, these fines or dust can, under certain conditions, pose an explosion hazard. Every effort should be made to prevent suspension, concentration or accumulation of fines or dusts in, or around, material handling systems.

Good housekeeping must be maintained to avoid dust build from cutting or recycling operations on rafters, sills and similar areas which could lead to dust fires.

### Storage

Store and use away from ignition sources, heat, sparks and open flames. Keep away from incompatibles such as oxidizing agents, and organic solvents. Store in a well ventilated area. Have appropriate extinguishing media available – sprinkler systems, portable fire extinguishers.

## Section 8. EXPOSURE CONTROL/PERSONAL PROTECTION

### Exposure Standards:

#### Hazardous Decomposition Products (under fire conditions):

Carbon Monoxide 30 ppm 34 mg/m<sup>3</sup> TWA (8 hrs)

Styrene 50 ppm 213 mg/m<sup>3</sup> TWA (8 hrs) 100 ppm 416 mg/m<sup>3</sup> STEL (15 mins)

Hydrogen Bromide 3 ppm 9.9 mg/m<sup>3</sup> TWA (8 hrs) Peak Limitation

#### Gas build-up in confined spaces:

Dimethyl Ether 400ppm 760mg/ m<sup>3</sup> TWA (8 hrs) 950mg/m<sup>3</sup> STEL

### Engineering Controls:

Take precautions to limit static electricity discharge if conveying ground offcuts or dust particles in air streams. Bond and ground all equipment and conveying ducts. Don't use plastic duct to convey materials. Earth continuity should be provided between all processing equipment and should be independently 'earthed' non electrical. See AS/NZS 1020 - The Control of Undesirable Static Electricity.

### Personal Protective Equipment:

Eyes: Safety glasses

Inhalation: Where dust is formed during cutting expanded polystyrene (e.g. band saw, serrated fast wire cutting), wear a P1 dust respirator meeting AS/NZS 1715/1716.

Skin: Clothing should be sufficient to protect from prolonged direct contact.

Hand: Wear suitable protective cotton or leather gloves, where prolonged direct contact is expected.

Feet: Wear safety footwear.

General safety and hygiene measures: Avoid inhalation of dusts/mists/vapours. Avoid prolonged contact with the skin. Always wash hands before smoking, eating, drinking or using the toilet.

## Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Low density Solid, pieces, boards shapes

Colour: Generally coloured light green or light blue

Odour: Slight hydrocarbon odour

Boiling Point: Not applicable (decomposes)

Softening Point: 50-75°C (Polystyrene); Expands at 90-100°C

Melts at 170-190°C (Polystyrene)

Decomposition Temp: >240°C

Molecular Wt: >40,000

Molecular Formula: Polystyrene (C<sub>6</sub>H<sub>6</sub>CH<sub>2</sub>CH<sub>2</sub>)<sub>n</sub>

Hexabromocyclododecane C<sub>12</sub>H<sub>18</sub>Br<sub>6</sub>

Vapor Pressure: Not applicable

Volatile Content: < 1%

Specific Gravity: 0.03 - 0.045 (Floats on water)

Bulk Density: 30 - 45kg/m<sup>3</sup>

pH: Not applicable (insoluble in water)

Flammability: Polystyrene is a combustible material, it will melt and burn in a fire.

Solubility: Insoluble in water; Not dispersible in cold or hot water. Polystyrene is soluble in; Aromatic

Hydrocarbons, ketones, organic solvents like Petrol.

## Section 10. STABILITY AND REACTIVITY

Stability: Stable, under normal conditions of storage and use.

Conditions to Avoid: Heat, ignition sources, and incompatible materials

Incompatible Materials: Strong oxidizing materials; organic solvents it dissolves in.

Hazardous Decomposition Products: In a fire situation, Carbon Monoxide, Carbon Dioxide, Styrene Monomer, Hydrogen Bromide; Brominated Organic Decomposition Compounds can be expected.

Hazardous Reactions: Dust explosions may occur from accumulation of fine dry dust from cutting Extruded Polystyrene.

Hazardous Polymerization: Will not occur

## Section 11. TOXICOLOGICAL INFORMATION

### General

Exposure to dust may be irritating to the eyes. Skin or eye contact with heated material may cause burns, ensure operators wear appropriate clothing and gloves/respirators when required. The HBCD fire retardant is encapsulated in the product and does not cause a health hazard.

Ingestion: Small numbers of granules are not expected to be harmful if swallowed. Excessive quantities are highly unlikely to be swallowed.

Inhalation: Dust formed from cutting or recycling operations of the product may cause irritation to the upper respiratory tract. There is no evidence of skin sensitising potential. Fumes evolved from overheated material or hot wire cutting may cause respiratory irritation.

Skin: Not a skin irritant. Not harmful.

Eye: Granules are not a health hazard to eyes, but may cause mechanical irritation. Dusts may cause mechanical irritation. Decomposition fumes, from overheated melted material or hot wire cutting, may irritate the eyes.

### Chronic Effects

No chronic effects for Polystyrene have been reported.

Polystyrene (as 100%):

Acute Oral Toxicity LD50 : >5000 mg/kg

Acute Skin Toxicity LD50 : >5000 mg/kg

Chronic toxicity: Chronic effects for Polystyrene have not been reported

### Hexabromocyclododecane (as 100%): (Note: This formulation is <2%)

Not harmful if swallowed. Not irritant to human skin. Not genotoxic. Not carcinogenic.

HBCD is considered to be a developmental toxic chemical, IF at >3% in a chemical formulation, it would have the Risk Phrase R64 "May cause harm to breastfed babies" or Hazard Statement H361 Suspected of damaging fertility or the unborn child. However the concentration is diluted in the expanded foam to <0.05 g/L which is encapsulated by the expanded foam and is not bioavailable by normal contact.

General exposure to HBCD in XPS is expected to be mostly through the dermal route and possible inhalation of indoor dust which may contain released HBCD from XPS Foam articles. [From PEC No. 34, June 2012. For Hexabromocyclododecane fire retardant see page x, xi & xii of <http://www.nicnas.gov.au/archived-reports/pec-reports> and select PEC34].

**GHS Criteria (Hexabromocyclododecane (as >0.3% to <2% in XPS):**

ACUTE ORAL TOXICITY : Not classified.

ACUTE SKIN TOXICITY : Not classified.

ACUTE INHALATION TOXICITY : Not classified.

SKIN CORROSION / IRRITATION : Not classified.

SERIOUS EYE DAMAGE / EYE IRRITATION : Not classified.

SKIN SENSITISATION : Not classified.

RESPIRATORY SENSITISATION : Not classified.

GERM CELL MUTAGENICITY : Not classified.

CARCINOGENICITY : Not classified.

REPRODUCTIVE TOXICITY : H362: May cause harm to breast-fed children.

SPECIFIC TARGET ORGAN TOXICITY – Single Exposure : Data Lacking

SPECIFIC TARGET ORGAN TOXICITY – Repeated Exposure : Data Lacking

ASPIRATION HAZARD : Not classified.

[ECHA Registered Substances Database]

## Section 12. ECOLOGICAL INFORMATION

### General

Classified as "Harmful to aquatic life. May cause long lasting aquatic effects to aquatic life." This is due to the <2% HBCD fire retardant ingredient that is encapsulated in the Polystyrene. Encapsulation reduces its toxic to aquatic life hazard. Granulated XPS product in small particles may also have physical effects on aquatic and terrestrial organisms. May cause sewer and waterway obstruction. Marine life may swallow beads, which may obstruct their digestive tract.

The HBCD fire retardant is <0.05% w/v of the XPS-Foam final article and is only slowly released, and is not expected to be an environmental problem in landfills. The HBCD (IF released from being encapsulated) is very toxic to aquatic organisms, and may cause long-term adverse effects in the aquatic environment.

### Hexabromocyclododecane

Acute Fish Aquatic Toxicity NOEC (Rainbow Trout, 96 hrs): >6.8 ug/L (CAS 25637-99-4) (NOEC - No Observed Effect Concentration).

Acute Algae Aquatic Toxicity EC50 (Skeletona Costatum): 10.5 ug/L

Chronic Daphnia Magna Aquatic Toxicity NOEC: 3.1 ug/L

Chronic Daphnia Magna Aquatic Toxicity MATC: 4.2 ug/L

(MATC - Maximum Acceptable Toxic Concentration)

Henry's Law Constant =  $1.167 \times 10^{-4}$  atm.m<sup>3</sup>/mole (moderately volatile from water)

HBCD is expected to adsorb to soils & sediments as indicated by its low water solubility.

Octanol Water Partition Co-efficient log Pow = 5.6 (all isomers), indicating a high bioaccumulation potential.

Acute Activated Sludge Aquatic Toxicity EC50 (Respiration inhibition): 15 mg/L

Note: HBCD has a very low water solubility of 3.4 ug/L (which in industry is mainly the gamma-HBCD form) gamma-HBCD water solubility is 2.08 ug/L & for alpha-HBCD is 48.8 ug/L.

[From PEC No. 34, June 2012. For Hexabromocyclododecane fire retardant see page xiii & xiv of [www.nicnas.gov.au/Publications/CAR/PEC/PEC34/HBCD\\_Report\\_June\\_2012\\_PDF.pdf](http://www.nicnas.gov.au/Publications/CAR/PEC/PEC34/HBCD_Report_June_2012_PDF.pdf)]

The Multiplying Factor for Hazardous to the Aquatic Environment = 10

[ECHA Registered Substances Database]

**GHS Criteria (Hexabromocyclododecane as >0.3% to <2% in unexpanded XPS):**

Hazardous to the Aquatic Environment (acute/short-term) : Not classified.

Hazardous to the Aquatic Environment (long-term) : Category 1 H410.

[ECHA Registered Substances Database]

**Environmental Fate/Mobility:**

Depending on the resin grade's specific gravity, this product may sink or float in freshwater and/or seawater. May be persistent in aquatic and terrestrial systems. Product should be recovered from water and land following spills.

The HBCD used to produce flame retardant XPS resins is unlikely to be directly released, except during disposal of the XPS-Foam articles (which has <0.05% w/v HBCDD), where there will be a gradual release over time.

**Persistence /Degradability:**

Expected to be inherently non-biodegradable. Integrated environmental half-life expected to be >100 days. Do not allow product to enter sewer or waterways.

The <2% w/w HBCD fire retardant ingredient is not biodegradable, and in certain animals may undergo bio-isomerisation from the gamma-HBCD to alpha-HBCD where the alpha- is approximately 20 times more soluble in water than the gamma-HBCD isomer.

**Bioaccumulation /Accumulation:**

Polystyrene is considered to have little potential for bioaccumulation or food chain concentration. However, the HBCD ingredient, once released from being encapsulated in the XPS-Foam, is VERY bio accumulative. With bio-concentration factors (total HBCD in whole fish) of between 8800 and 13 000. (NICNAS PEC 34, June 2012 page xiv).

HBCD has been included as a Persistent Organic Pollutant under the Stockholm Convention, and listed in Annex A for phase out at the Stockholm Meeting in May 2013.

Based on the available evidence, the risk profile concluded that HBCD is likely, as a result of longrange environmental transport, to lead to significant adverse environmental and/or human health effects, such that global action is warranted. [From PEC No. 34, June 2012, page 8]

**Section 13. DISPOSAL CONSIDERATION**

Dispose of in accordance with Local, State & Federal EPA waste regulations. Recycle, react, incinerate, or landfill, as appropriate, in an approved facility. Also advise the environmental hazard (due to the <2% w/w HBCD fire retardant). Extruded Polystyrene Foam which contains <0.05% w/v of HBCD Flame Retardant, may still be landfilled in Australia.

**Section 14. TRANSPORT INFORMATION**

Not Classified Dangerous Goods according to the Australian Code for the Transport of Dangerous Goods by Road and Rail (ADG Code); or by air according to the IACO (IATA Regulations), or by sea according to the IMO (IMDG Code).



## Section 15. REGULATORY INFORMATION

### GHS Hazardous Chemical Classification

A Hazardous Chemical due to the Reproductive Effects on lactation of the HBCD <2% ingredient.

**GHS Signal Word:** None  
**GHS Symbol:** None  
**Hazard & Hazard Category:** Reproductive Toxicity Effects on Lactation

### Hazard Statements:

HBCD <2%:

H362 - May cause harm to breast-fed children.

H412 - Harmful to aquatic life with long lasting effects.

### Precautionary Statements:

Prevention - P210 - Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

P273 - Avoid release to the environment.

Response - P370+378 - In case of fire: Use Foam, Dry Agent, Carbon Dioxide for extinction.

Storage – No special requirements. Store in a well ventilated area.

Disposal - Harmful to aquatic life with long lasting effects classification is due to the encapsulated HBCD fire retardant.

Not a Scheduled Poison.

Hazardous Subs. Not a Workplace Hazardous Substance due to classifiable health effect hazards.

### Information: RISK PHRASES

R52/53 Harmful to aquatic organisms. May cause long-term adverse effects on the aquatic environment.

### Safety Phrases

S61 Avoid release to the environment. Refer to special instructions/ Safety Data Sheets.

### Stockholm Convention

The manufacture & use of XPS foam containing HBCD Flame Retardant is being phased out by countries who ratify the Stockholm convention, or within a further 5 years where an exemption has been sought. HBCD has been classified as a Persistent Organic Pollutant under the Stockholm Convention and listed in Annex A.

Note: The Australian Federal Department of Environment is reviewing the Australian ratification process on HBCD. When the ratification process is completed, which has not proceeded prior to March 2019, there will be a transition process to alternative Flame Retardant use within XPS in Australia that maintains current physical properties of the foam. This is a Brominated Polymer that cannot leach out. The ratification process will deal with how XPS containing HBCD is to be identified and how waste product containing HBCD should be handled.

Note: The Stockholm Convention Exemption for the use of HBCD in Extruded Polystyrene in buildings, will be allowed, provided products containing it can be identified. AICS (NICNAS): All ingredients are on the Australian Inventory of Chemical Substances. Note: The Brominated Fire Retardant Ingredient, Hexabromocyclododecane, in EPS product at <1%, has been assessed by NICNAS. Go to: [www.nicnas.gov.au/archived-reports/pec-reports](http://www.nicnas.gov.au/archived-reports/pec-reports) and select PEC34

## Section 16. OTHER INFORMATION

SDS Dates and Revisions

SDS Latest Revision Date: 20/3/19

Sections Changed in Latest Revision: General review of all Sections to align with GHS.

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SDS APPROVED: Foamex Group Pty Ltd

### Acronyms Used

ADG Code	Australian Code for the Transport of Dangerous Goods by Road & Rail
Safe Work Australia	Replaced the ASCC & NOHSC. Administers their documents.
HCIS	Hazardous Chemicals Information System at: <a href="http://www.hcis.safeworkaustralia.gov.au/">www.hcis.safeworkaustralia.gov.au/</a>
HSIS	Hazardous Substance Information System at: <a href="http://hsis.safeworkaustralia.gov.au/">http://hsis.safeworkaustralia.gov.au/</a>
SUSMP	Standard for the Uniform Scheduling of Medicines and Poisons
GHS	Globally Harmonized System for Classification and Labelling of Chemicals. <a href="http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html">http://www.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html</a>
NZ EPA HSNO CCID	Environmental Risk Management Authority New Zealand, HSNO Chemical Classification Information Database. <a href="http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx">http://www.epa.govt.nz/search-databases/Pages/HSNO-CCID.aspx</a>
ECHA	European Chemicals Agency at <a href="http://echa.europa.eu/">http://echa.europa.eu/</a>
ECHA RSD	ECHA Registered Substances Database <a href="http://echa.europa.eu/information-on-chemicals/registered-substances">http://echa.europa.eu/information-on-chemicals/registered-substances</a>
ECHA C&LID	ECHA Classification & Labelling Inventory Database <a href="http://echa.europa.eu/information-on-chemicals/cl-inventory-database">http://echa.europa.eu/information-on-chemicals/cl-inventory-database</a>
e-Chem Portal	Global Portal to Information on Chemical Substances <a href="http://www.echemportal.org/echemportal/index?">http://www.echemportal.org/echemportal/index?</a>
CAS No.	Chemical Abstracts Service Registry Number
UN No.	United Nations Dangerous Goods Number
SDS Code Used	This SDS has been prepared according to the Safe Work Australia Code of Practice for the preparation of Safety Data Sheets for Hazardous Chemicals

This SDS summarises to the best of our knowledge the health and safety hazard information on the product and how to safely handle and use the product in the workplace, and should not be construed as guaranteeing specific technical properties. Each user should read this SDS and consider the information in the context of how the product will be handled and used in the workplace, including in conjunction with other products. If clarification or further information is needed to ensure that an appropriate risk assessment can be made, the user should contact this company. Since methods and conditions are beyond our control, in inappropriate contexts we do not accept liability for any damages resulting from the use of, or reliance on, this information.