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Material Safety Data Sheet
Expandable Polystyrene

Section 1 - Product Identification

Synonyms : FR-ESP, flame Retardant Expandable polystyrene, poly(phenylethene)
Molecular Weight : 10,000-300,000 g/mol
Chemical Formula : (C8H8)x ; (-CH(C6H5)-CH2-)x
Company Identification : Tradeasia International Pte. Limited
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Used primarily for the manufacture of foamed thermal insulation and packaging

Section 2 – Composition/Information on Ingredients

Chemical Name	EC No/CAS No	Purity, %
Expandable Polystyrene	9003-53-6	max. 99.9

Section 3 – Hazards Identification

3.1 Classification
Directive 67/548/EEC & Directive 1999/45/EC In use, may form flammable/explosive vapour-air mixture.
Regulation (EC) No. 1272/2008 (CLP) In use may form flammable/explosive vapour-air mixture.

3.2 Label elements
According to Directive 67/548/EEC & Directive 1999/45/EC
Signal Word N.A
Risk Phrases R18: In use, may form flammable/explosive vapour-air mixture
Safety Phrases
S3/7: Keep container tightly closed in a cool place.
S9: Keep container in a well-ventilated place.
S16: Keep away from sources of ignition - No smoking.
S33: Take precautionary measures against static discharges.

Section 4 – Composition/ information on ingredients

4.1 Composition comments
Component Polystyrene
CAS No. 9003-53-6

Section 5 – First-Aid Measures

5.1. Description of first aid measures

Inhalation

If inhaled, remove to fresh air. If not breathing, clear person's airway and give artificial respiration. If breathing is difficult, qualified medical personnel may administer oxygen. Get medical attention immediately.

Ingestion

If more than several mouthfuls of this material are swallowed, give two glasses of water (16 oz.). Get medical attention.

Skin

Wash skin with plenty of soap and water for several minutes. Get medical attention if skin irritation develops or persists.

Eye

Flush eyes with plenty of water for several minutes. Remove larger particulates from the eye as one would any foreign object. Get medical attention if eye irritation persists or particulates are difficult to remove from the eye.

5.2. Most important symptoms and effects, both acute and delayed

N.A.

5.3. Indication of any immediate medical attention and special treatment needed

N.A.

Section 6 – Fire Fighting Measures

6.1. Suitable Extinguishing media

Foam, water spray or fog. Dry chemical powder or carbon dioxide

6.2. Specific hazards arising from the chemical

Hazardous combustion products may include carbon monoxide and carbon dioxide. Hydrogen Bromide will also be released from flame retardant (Euroclass E) grades.

6.3. Special protective actions for fire-fighters

Wear full protective clothing (chemical splash suit) and positive pressure selfcontained breathing apparatus.

Section 7 – Accidental Release Measures

7.1. Personal precautions, protective equipment and emergency procedures

Caution - spillages may be slippery. The remaining pentane in the EPS may form explosive mixtures with air. Pentane vapor is heavier than air, watch out for pits and confined spaces. Away or avoid the danger of any cause of fire. Avoid friction, sparks and other means of ignition. Avoid static discharges. Use only non-sparking tools.

7.2. Environmental precautions

Prevent entry into sewers or drains

7.3. Methods and material for containment and cleaning up

If safe to do the following: Small spills: Sweep up and shovel into waste drums or plastic bags. Transfer to a lidded container for disposal or recovery. Large spills: If possible, use vacuum equipment suitable for hazardous environments for cleaning up spills. Transfer to a covered container for disposal or spilled material.

Section 8 – Handling and Storage

8.1. Precautions for safe Handling

Provide adequate ventilation including appropriate local extraction system. Do not breathe fumes / vapor. Avoid creating dust clouds. Should be kept away from open flames and other sources of ignition. Extinguish any other fire. Away or avoid the danger of any cause of fire. avoid friction, sparks and other means of ignition. The electrical system should not generate sparks. Do not smoke during use. Avoid static discharges. Make sure you are properly grounded. Avoid release to the environment. They must obtain permission from the appropriate local authority before discharge of waste material.

8.2. Conditions for safe storage, including any incompatibilities

When stored in closed containers of flammable concentrations may pentane. Before unloading cargo containers, keep the doors open and let it ventilate for one hour. Keep container in a cool, well ventilated place and keep tightly closed. Keep away from direct sunlight and other sources of heat or ignition. Keep away from rain and wet conditions. Mass: Keep under inert gas. Open reservoirs must be covered with an open rigid grid. Avoid static discharges. The electrical system should not generate sparks. The product is usually octagonal barrels fiber. Do not stack containers. Storage Temperature: Ambient.

Section 9 – Exposure Controls/Personal Protection

9.1. Appropriate engineering controls

Use only in well ventilated

9.2. Individual protection measures, such as personal protective equipment (PPE)

Eye protection / face

Safety glasses.

Skin protection (hand guard / Other)

Wear suitable gloves. Recommended: Impervious gloves (EN 374). Penetration time of glove material: see the information provided by the manufacturer of the gloves.

Wear suitable protective clothing.

Safety shoes or antistatic boots .

Respiratory Protection

If dust is generated during handling, you must use an approved dust mask

Section 10 – Physical and Chemical Properties

10.1. Information on basic physical and chemical properties

Appearance: Solid smalls spherical beads
Color: White.
Odor: Perceptible
Molecular Weight: 10,000-300,000
pH: Not available.
Melting Point: 240,0 ºC
Boiling Point: Not available.
Flash Point: 345-360 ºC (closed cup) (<-50ºC pentane)
Explosive properties: In use, air-mixtures may form flammable / explosive vapor.
Auto ignition (Ignition) Temperature: 285 ºC (Pentane) (ASTM E-659)
Lower Flammable (Explosive)
Limit (LFL/LEL): 1,5 % (v/v) (Pentane)
Upper Flammable (Explosive)
Limit (UFL/UEL): 7,8 % (v/v) (Pentane)
Relative Density : 1020-1050 Kg/m3@20°C (spherical)

Vapors Density (air = 1): 2,5 (Pentane)
Partition coefficient: n-octanol/water: log Pow=0.73
Solubility (Water): insoluble.
Solubility(Others) Soluble in aromatic solvents, halogenated ketones.

10.2. Other information
N.A

Section 11 – Stability and Reactivity

11.1. Reactivity
The product is stable and non-reactive under normal conditions of use, storage and transport.

11.2. Chemical stability
N.A

11.3. Possibility of hazardous reactions
In use, air-mixtures may form flammable / explosive vapor

11.4. Conditions to avoid:
Keep away from heat, ignition sources and direct sunlight

11.5. Incompatible materials
Avoid storing or handling of these materials with explosives of Class 1 UN.

11.6. Hazardous decomposition products
Pentane, styrene monomer, carbon monoxide (in case of fire or during the hot wire cutting). The release of pentane increases with temperature. (beads are expanded with the release of pentane).

Section 12 – Toxicological Information

12.1 Health effects associated with ingredients
The acute oral LD50 in rats is probably above 15,000 mg/kg. Relative to other materials, this material is classified as "relatively harmless" by ingestion.

12.2 Information on likely routes of exposure
Symptoms of overexposure may be on eye, Skin, Inhalation, Ingestion

Section 13 – Ecological Information

13.1.Toxicity
Aquatic invertebrates
EC50 (48 h)> 100 mg / l, Daphnia magna (OECD Guidelines 202, part 1, static)
Nominal concentration. The product has a low solubility in the test medium. An effluent has to be examined. No toxic effects within the range of solubility.
Aquatic plants
EC50 (72 h)> 100 mg / l (growth rate), Scenedesmus subspicatus (OECD Guidelines 202, part 1, static) Nominal concentration. The product has a low solubility in the test medium. An effluent is to be examined. No toxic effects within the range of solubility.

13.2.3. Bioaccumulative potential
The product has a low potential for bioaccumulation.

13.4. Mobility in soil
The product is essentially insoluble in water. The expandable polystyrene sinks in fresh water, can float or sink in seawater

13.5. Other adverse effects
Pentane has a Global Warming Potential (GWP) very low (<0.00044) and a zero Ozone Depletion Potential.

Section 14 – Disposal Considerations
14.1. Disposal methods
The beads old and unused surplus may contain residual pentane. Therefore, the product should be subject to all existing security measures for fresh material.

Section 15 – Transport Information

15.1 US DOT Information
Shipping Name: Polymeric beads, expandable
UN/NA #: UN2211, Hazard Class: 9, Packing group: III
Required Label (s): Class9: Miscellaneous
Additional information: 2012 Emergency Response Guidebook, Guide Nº 133.

15.2 Canadian TDG Information
Shipping Name: Polymeric beads, expandable
UN/NA #: UN2211, Hazard Class: 9, Packing group: III
Required Label (s): Class9: Miscellaneous
Additional information: 2012 Emergency Response Guidebook, Guide Nº 133.

15.3 International Air Transport Association (IATA) and International Civil Aviation Organiztion (ICAO)
Shipping Name: Polymeric beads, expandable
UN/NA #: UN2211, Hazard Class: 9, Packing group: III
Required Label (s): Class9: Miscellaneous

15.4 International Maritime Dangerous Goods (IMDG) Regulations
Shipping Name: Polymeric beads, expandable
UN/NA #: UN2211, Hazard Class: 9, Packing group: III
Required Label (s): Class9: Miscellaneous
Additional information: EmS Nº: F-A, S-I
Marine pollutant: No

Section 16 – Regulatory Information
16.1. Safety, health and environmental regulations
Federal Regulations:
SARA Title III: Section 302/304 Extremely Hazardous Substances

None.
Section 311 Hazardous Categorization:
Acute__X__ Chronic__X__ Fire__X__ Pressure____ Reactive____ N/A____
Section 313 Toxic Chemical
None.
CERCLA 102(a)/DOT Hazardous Substances:
None.
States Right-to-Know Regulations: State Right-to-know
Chemical Name Pentane FL, MA, MN, NJ, PA, RI

over long periods of time. These doses were many times higher than humans are exposed to under conditions of normal handling and use. Consequently, a precautionary decision was taken by the European Commission. Although we will comply with the body of legislation triggered by that decision, we are in process of all possible legal actions.
Ensure all national/local regulations are observed.

Section 16 : Additional Information

16.1. Mainly changes made to the previous version of this Material Safety Data Sheet (MSDS):
Risk Phrases and Safety Phrases:
R12 Extremely flammable.
R65 Harmful if swallowed can cause lung damage.
R66 Repeated exposure may cause skin dryness or cracking skin.
R67 Vapours may cause drowsiness and dizziness.

16.2. List of abbreviation and acronyms used in this MSDS
SDS : Safety Data Sheets
Index N° : atomic number of the element most characteristic of the properties of the substance
CAS No : Chemical Abstracts Service number
EC No : EINECS Number : European Inventory of Existing Commercial Substances
Repr. Cat. 2 : Substance presumed human reproductive toxicant
Acute Oral Cat. 5 : Substance which is of relatively low acute oral toxicity.
GHS : Globally Harmonised System of Classification and Labelling
LD_{50} : Median Lethal Dose
LC_{50} : Lethal Concentration, 50%
N.A. : Not Applicable
OSHA : Occupational Safety & Health Administration
Cal OSHA : The State of California Division of Occupational Safety and Health (DOSH)
PEL : Permissible Exposure Limits
ACGIH : American Conference of Governmental Industrial Hygienists
TLV : Threshold Limit Value
Japanese MITI : Japanese Ministry of International Trade and Industry
EC_{50} : Half maximal effective concentration
UN : United Nations
U.S. EPA TSCA Inventory: Inventory of the chemical substances manufactured or processed in the United States according to Toxic Substances Control Act compiled and published under the autority of the Environmental Protection Agency
Canadian DSL: Canadian Domestic Substances List
16.3. List of relevant hazard statements and precautionary statements used in this MSDS
Hazard Statement
H361 d: Suspected of damaging the unborn child

H319: Causes serious eye irritation
H303: May be harmful if swallowed
Precautionary Statements
Prevention
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P281: Use personal protective equipment as required.
P264: Wash eyes thoroughly after handling.
P280: Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response
P308 + P313: If exposed or concerned: get medical advice/attention.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
P337+P313: If eye irritation persists: Get medical advice/attention.
Storage
P405: Store locked up.
Disposal
P501: Dispose of contents/container to in accordance with local regulations.

16.4. References

1. Litovitz T L, Norman S A, Veltri J C, Annual Report of the American Association of Poison Control Centers Data Collection System. Am. J. Emerg. Med. (1986), 4, 427-458
2. Denton SM (1996). Acute oral toxicity study in the rat: anhydrous boric acid. Final report. Report no.: 1341/7-1032.
3. National Toxicology Program (NTP) – Technical Report Series No. TR324, NIH Publication No. 88 2580 (1987), PB88 213475/XAB
4. Fail et al., Fund. Appl. Toxicol. (1991) 17, 225-239
5. Heindel et al., Fund. Appl. Toxicol. (1992) 18, 266-277
6. Birge W J, Black J A, EPA-560/-76-008 (April 1977) PB 267 085
7. Scialli AR, Bonde JP, Brüske-Hohlfeld I, Culver D, Li Y, Sullivan FM; ELSEVIER 2009
8. Robbins WA, Xun L, Jia J, Kennedy N, Elashoff DA, Ping L. ;ELSEVIER 2009;(Reproductive Toxicology)
9. Hansveit and Oldersma, 2000; TNO Nutrition and Food Research Institute. Report No. V99.157.
10. Gersich, FM (1984a). Environ.Toxicol.Chem., 3 #1, 89-94 (1984)
11. Soucek et al., 2010. Illinois Natural History Survey, University of Illinois.
For general information on the toxicology of borates see ECETOC Technical Report No. 63 (1995); Patty's Industrial Hygiene and Toxicology, 4th Edition Vol. II, (1994) Chap. 42, 'Boron'.

16.5. Disclaimer of Liability

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