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MATERIAL SAFETY DATA SHEET

PUFFIN TOPGARD ENAMEL BASE B

Published : January 2021 Product-identity no: IW-PTGEB
Edited : 1
Distribution date : June 2025

TRADE NAME : PUFFIN TOPGARD ENAMEL BASE B

1. IDENTIFICATION OF SUBSTANCE AND COMPANY

Identification of Substance or Preparation Chemical Description: Aliphatic Isocyanate

Recommendation : Hardener

Company / Undertaking Identification Supplier

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2. HAZARD IDENTIFICATION

Classification of the substance or mixture

- **FLAMMABLE LIQUIDS – Category 3**
- **ACUTE TOXICITY (inhalation) – Category 4**
- **SKIN SENSITISATION – Category 1**
- **SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE (Respiratory tract Irritation)**
Category 3 GHS Label elements

Hazard pictograms:



Signal Word : **Warning.**

Hazard Statements: Flammable liquid and vapor. Harmful if inhaled. May cause an allergic skin reaction. May cause respiratory irritation

Precautionary Statements

Prevention: Avoid breathing vapor. Wear protective gloves. Keep away from heat, hot surfaces, sparks, open flames, and other ignition sources. No smoking. Keep the container tightly closed. Use only outdoors or in a well-ventilated area.

Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a Poison Center or a physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs, get medical attention.

Storage: Store locked up. Store in a well-ventilated place. Keep cool

Disposal: Dispose of contents and container by all local, regional, national, and international regulations

Other hazards which do not result in classification: None known

3. COMPOSITION / INFORMATION ON INGREDIENTS :

Substance / mixture : mixture
Other means of identification : Not available
CAS number/other identifiers :
CAS number : Not applicable.
EC number : Mixture.
Product code : 3240

Ingredients Name	%	Cas Number
Hexane,1,6-diisocyanato-,homopolymern-butyl acetate	≥75-≤90	28182-81-2
N-butyl acetate hydro carbons, C9, aromatic	<10	123-86-4
Hexamethylene-di-isocyanate	<10	64742-95-6
	≤0.3	822-06-0

There are no additional ingredients present that, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8. Chemical formula: Not applicable.

4. FIRST AID MEASURES

Description of first aid measures

- 1. Eye contact:** Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- 2. Inhalation:** Remove the victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in a recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- 3. Skin contact:** Wash with plenty of soap and water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- 4. Ingestion:** Wash out mouth with water. Remove dentures if any. Remove the victim to fresh air and keep them at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick, as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention if adverse health effects persist or are severe. Never give anything by mouth to a person. If unconscious, place in a recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

Most important symptoms and effects, both acute and delayed. Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : Harmful if inhaled. May cause respiratory irritation.
- Skin contact** : May cause an allergic skin reaction.
- Ingestion** : No known significant effects or critical hazards

Over - exposure signs / symptoms

Eye contact : No specific data.

Inhalation : Adverse symptoms may include respiratory tract irritation and coughing.
Skin contact : Adverse symptoms may include the following: irritation, redness
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Note: stop the physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments: No specific treatment.

Protection of first-aiders: No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person

Providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. See toxicological information (Section 11)

5. FIREFIGHTING MEASURES

Extinguishing media

Suitable extinguishing media: Used dry chemical, CO₂, water spray (fog), or foam.

Unsuitable extinguishing media: Do not use water jet.

Specific hazards arising from the chemical: Flammable liquid and vapour. Runoff to the sewer may create a fire or explosion hazard. In a fire or if heated, a pressure increase will occur, and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products: Decomposition products may include the following materials: carbon dioxide, carbon monoxide, nitrogen oxides

Special protective actions for fire-fighters: Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire, and action shall be taken involving any personal risk or without suitable training. Move containers from the fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full-face-piece operated in positive pressure mode.

6.ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate the surrounding areas. Keep unnecessary and unprotected personnel from entering not touching, or walking through spilled material. Shut off all ignition sources. No flares, smoking, or flames in the hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear an appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "Non-emergency personnel".

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains, and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil, or air).

Methods and materials for containment and cleaning up

Small spill: Stop the leak if without risk. Move containers from the spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill: Stop the leak without risk. Move containers from the spill area. Use spark-proof tools and explosion-proof equipment. Approach the release from upwind. Prevent entry into sewers, water courses, basements, or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with noncombustible, absorbent material, e.g., sand, earth, vermiculite, or diatomaceous earth and place in a container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7. HANDLING AND STORAGE

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in the eyes or on the skin or clothing. Do not ingest. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear an appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame, or any other ignition source. Use explosion-proof electrical (ventilating, lighting, and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse the container.

Advice on general occupational hygiene: Eating, drinking, and smoking should be prohibited in areas where this material is handled and processed. Workers should wash their hands and face before eating, drinking, and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities: Store by local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep the container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. See Section 10 for incompatible materials before handling or use.

8. EXPOSURE CONTROL PERSONAL PROTECTION

Control parameters: Occupational exposure limits

Ingredient Name	Exposure Limits
n-butylacetate	Workplace Safety and Health Act (Singapore, 2/2006). PEL(short-term):950mg/m ³ 15minutes. PEL (short term): 200 ppm 15 minutes. PEL (long term): 713 mg/m ³ 8 hours. PEL (long term): 150 ppm8 hours. Workplace Safety and Health Act (Singapore, 2/2006).
hexamethylene-di-isocyanate	PEL (long term): 0.005 ppm 8 hours. PEL(long-term):0.034mg/m ³ 8hours.

Appropriate engineering controls: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor, and dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters, or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures: Wash hands, forearms, and face thoroughly after handling chemical products, before eating, smoking, and using the lavatory, and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eye wash stations and safety showers are close to the work station location.

Eye / face protection: Safety eyewear complying with EN 166 should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases, or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side shields

Skin protection

Hand protection: There is no one glove material or combination of materials that will give unlimited resistance to any individual or combination of chemicals.

The breakthrough time must be greater than the product.

The instructions and information provided by the glove manufacturer on use, storage, maintenance replacement must be followed.

Gloves should be replaced regularly, and if there is any sign of damage to the glove material. Always ensure that gloves are free from defects and that they are stored and used correctly. The performance or effectiveness of the glove may be reduced by physical/ chemical damage and poor maintenance.

Barrier creams may help to protect the exposed areas of the skin, but should not be applied once exposure has occurred.

Recommended, gloves (break through time) > 8 hours: Teflon, polyvinylalcohol (PVA) May be used, gloves (breakthrough time) 4 - 8 hours: 4H, butyl rubber, nitrile rubber Not recommended, gloves (breakthrough time) < 1 hour: neoprene, PVC, Viton®, PE

For the right choice of glove materials, with a focus on chemical resistance and time of penetration, seek advice from the supplier of chemical-resistant gloves. The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment.

Body protection: Personal protective equipment. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots, and gloves.

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved, and should be approved by a specialist before handling this product.

Respiratory protection: Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Physical state	: Liquid.
Colour	: Yellowish-brown
Odour	: Characteristic
Odour threshold	: Not Available
PH	: Not applicable
Melting point	: Not applicable
Boiling point	: Lowest known value:126°C(258.8°F) (nbutylacetate). Weighted average: 149.25°C (300.6°F)
Flashpoint	: Closed cup:47°C (116.6°F)
Burning time	: Not applicable.
Burning rate	: Not applicable.
Evaporation rate	: 1(n-butylacetate) compared with butylacetate
Flammability(solid,gas)	: Not applicable
Lower and upper explosive (flammable) limits	: 1.4- 7.6%
Vapour pressure	: Highest known value:1.5kPa (11.3mmHg) (at20°C) (n-butyl acetate) Weight edaverage:0.08k Pa (0.6mmHg) (at20°C)
Vapour density	: Highest known value: 4 (Air=1) (n-butylacetate).
Relative density	: 1.13 g/cm ³
Solubility	: Insoluble in the following materials: cold water and hot water.
Solubility in water	: Not available
Partition coefficient:	

octanol/water	: Not available
Auto-ignition temperature	: Lowest known
Value	: 280 to 470 °C (536 to 878 °F) (<i>Hydrocarbons, C9, aromatic</i>)
Decomposition temperature	: Not available
SADT (Self-Accelerating Decomposition Temperature)	: Not available
Viscosity	:
Dynamic	: Highest known value: 3851.69 cP (Hexane, 1,6-diisocyanato-, homopolymer)
Kinematic	: Highest known value: 0.83 cSt (<i>n-butyl acetate</i>)
Kinematic (40 °C)	: > 20.5 cSt

10. STABILITY AND REACTIVITY

Reactivity: Non-specific test data related to reactivity available for this product or its ingredients.

Chemical Stability: The product is stable.

Possibility of Hazardous Reaction: Under normal conditions of storage and use, hazardous reactions will not occur

Conditions to avoid: Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind, or expose containers to heat or sources of ignition.

Incompatible materials: Keep away from the following materials to prevent strong exothermic reactions: oxidizing agents, strong alkalis, strong acids

Hazardous Decomposition Products : Under normal conditions of storage and use, hazardous decomposition products should not be produced

SADT: Not available.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects: Acute toxicity

Product / Ingredient name	Result	Species	Dose	Exposure
n-butylacetate	LC50InhalationVapo	Rat	>21.1mg/l	4 hours
	LD50 Dermal	Rabbit	>17600mg/kg	-
	LD50 Oral	Rat Rat	13100mg/kg	-
hexamethylene-diisocyanate	LC50Inhalationdusts mists		124 m/m ³	4 hours

Irritation/corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Observation	Eyes-Moderate Irritant	Rabbit Rabbit	-	100 mg	-
	Skin-Moderate Irritant	Mammal species unspecified Mammal	-	500 mg	-
hexamethylene-di-isocyanate	Skin-Mild irritant	species unspecified	-	-	-
	Eyes-Mild irritant		-	-	-

Sensitisation

Product / Ingredient name	Route of Exposure	Species	Result
Hexamethylene diisocyanate, oligomers	Skin	Mammal-species unspecified	Sensitising
hexamethylene-di-isocyanate	Skin	Mammal-species unspecified	Sensitising

Mutagenicity : Not available.

Carcinogenicity : Not available.

Reproductive toxicity : Not available.

Teratogenicity : Not available

Specific target or gantoxicity (single exposure)

Name	Category	Route of Exposure	Target Organs
Hexamethylenediisocyanate, oligomers	Category 3	Not applicable.	Respiratory tract irritation
n-butyl acetate hydrocarbons, C9, aromatic	Category 3 Category 3 Category 3	Not applicable. Not applicable. Not applicable.	Narcotic effects Narcotic effects Respiratory tract irritation and Narcotic effects
hexamethylene-di-isocyanate	Category 3	Not applicable.	And Narcotic effects

Specific target or gan toxicity (repeated exposure)

Not available.

Aspiration hazard

Name	Result
hydrocarbons,C9,aromatic	ASPIRATIONHAZARD-Category1

Information on likely routes of exposure: Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : Harmful inhaled. May cause respiratory irritation.

Skin contact : May cause an allergic skin reaction.

Ingestion : No known significant effects or critical hazards.

Symptoms related to the physical, chemical, and toxicological characteristics.

Eye contact : No specific data.

Inhalation : Adverse symptoms may include the following: respiratory tract irritation
coughing

Skin contact : Adverse symptoms may include the following: irritation
redness

Ingestion : No specific data.

Delayed and immediate effects as well as chronic effects from short and long - term exposure Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

long-term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects : Not available.

***General:** Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.*

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity Acute toxicity estimates

Route	ATE value
Inhalation (vapours) Inhalation (dust and mists)	333.33mg/l 1.67mg/l

12. ECOLOGICAL INFORMATION

Toxicity

Product/ingredient name	Result	Species	Exposure
hydrocarbons,C9,aromatic	AcuteEC50<10mg/l	Daphnia Algae	48hours
	Acute IC50 <10 mg/l	Fish	72hours
	AcuteLC50<10mg/l		96hours

Persistence/degradability

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
hydrocarbons,C9,aromatic	-	-	Not Readily

Bio accumulative potential

Product/ingredient name	Log Pow	BCF	Potential
Hexamethylene diisocyanate, oligomers,	5.54	367.7	Low Low high
n-butyl acetate	2.3	-	Low
hydrocarbons,C9,aromatic	- 0.02	10to2500	
hex methylene-di-isocyanate		57.63	

Mobility in soil

Soil/water partition : Not available.

Coefficient (KOC)




Other adverse effects : No known significant effects or critical hazards.

13. DISPOSAL CONSIDERATION

Disposal Methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions, and any by-products should at all times comply with the requirements of environmental protection waste disposal legislation and any regional, local authority requirements.

Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated into the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfills should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld, or grind a used container unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and run off and contact with soil, waterways, drains, and sewers. Do not allow entry into drains or watercourses. Material and/or container must be disposed of as hazardous waste.

14. TRANSPORT INFORMATION

	UN	IMDG	IATA
UN number	UN1866	UN1866	UN1866
UN proper shipping name	Resin solution	Resin solution	Resin solution
Transport hazard class(es)	3 	3 	3 
Packing group	III	III	III
Environmental hazards	No.	No.	No.
Additional information	-	Emergency schedules F- E, S-E	-

Additional information

Transport by ADR/RID, IMDG/IMO, and ICAO/IATA, and national regulations.

ADR / RID : Tunnel restriction code:(D/E) Hazard identification number: 30

IMDG :

Special precautions for user: transport within the user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code: Not available.

15. REGULATORY INFORMATION

Singapore-hazardous chemicals under government control

Ingredient name	Status
Isocyanates	Listed

16. OTHER INFORMATION

Key to abbreviations:

- **ATE** : Acute Toxicity Estimate
- **BCF** : Bio concentration Factor
- **GHS** : Globally Harmonized System of Classification and Labelling of Chemicals
- **IATA** : International Air Transport Association
- **IBC** : Intermediate Bulk Container
- **IMDG** : International Maritime Dangerous Goods
- **Log Pow** : **logarithm** of the octanol/water partition coefficient
- **MARPOL** : **International Convention for the Prevention of Pollution from Ships**, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- **UN** : United Nations.

References - Not available.

NOTES

PT. INDOWIJAYA SAKTI TEGUH has a responsibility to take reasonable care for our health and safety and the health and safety of others who may be affected by our acts or omissions. This MSDS at the date of issue, has Health and Safety Information of the product, and how to safely handle and use this product in the workplace.

All information given is our best knowledge, and because we cannot anticipate or control the conditions of the end use of these products, prior to usage, each user must determine by reviewing this M.S.D.S., the Safe Handling and usage of these products in the Workplace.

PT. INDOWIJAYA SAKTI TEGUH believes this information to be reliable, and in good faith, but no guarantees or warranties of any kind are made as to its accuracy, suitability, or particular applications due to variations in methods, conditions, and equipment. When **PT. INDOWIJAYA SAKTI TEGUH** provides information and service involving skill, assistance, judgment, recommendations, and or advice. This is done on the best of our knowledge only; information is not to be relied upon.

Full-scale testing and performance of the product is the responsibility of the end user. For further information or classification of certain points to ensure that the user has made a proper assessment and reasonable precautions have been applied, please contact **PT.INDOWIJAYA SAKTI TEGUH**.