

Section 1. Identification

1.1 Product Identifier

Trade Name: Part 1; Enduraheal Foam

Product code: Isocyanate

Product type: Liquid

1.2 Material Uses

Component of a Polyurethane Elastomer

1.3 Supplier's Details

Company: Primal Pursuit, LLP

Telephone: (385)244-0498

Email address: main@theprimalpursuit.com

www.theprimalpursuit.com

484 W 1490 N #101, Logan, Utah 84341

1.4 Emergency Contact: Poison Control; 1(800)222-1222

Section 2. Hazards Identification

2.1 OSHA/HCS status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

2.2 Classification of the substance or mixture

H315 Skin corrosion/irritation – Category 2

H317 Skin sensitization – Category 1

H320 Eye Damage/irritation - Category 2B

H332 Acute toxicity, inhalation – Category 4

H334 Respiratory Sensitization – Category 1

H335 Specific target organ toxicity – single exposure – Category 3 (respiratory)

H351 Carcinogenicity – Category 2

H373 Specific Target Organ Toxicity, repeated exposure Category 2 (respiratory)

2.3 GHS Label elements, including precautionary statements

Hazard pictograms:

Signal word: Danger

Health Hazards

H315 Causes skin irritation.

H317 May cause an allergic skin reaction.

H320 Causes eye irritation.

H332 Harmful if inhaled.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H335 May cause respiratory irritation.

H351 Suspected of causing cancer.

H373 May cause damage to organs (Olfactory organs) through prolonged or repeated exposure (inhalation).



General Precautions

P101 If medical advice is needed, have a product container or label at hand.

P102 Keep out of reach of children.

P103 Read label before use.

Prevention Precautions

P201 Obtain special instructions before use.

P202 Do not handle until all safety precautions have been read and understood. P260 Do not breathe dust/fume/gas/mist/vapors/spray. P264 Wash skin thoroughly after handling. P271 Use only outdoors or in a well-ventilated area. P272 Contaminated work clothing should not be allowed out of the workplace. P280 Wear protective gloves/protective clothing/eye protection/face protection. P284 [In case of inadequate ventilation] wear respiratory protection.

Response Precautions

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P311 IF exposed or concerned: Call a POISON CENTER or doctor/physician.
P312 Call a POISON CENTER or doctor/physician if you feel unwell. P314 Get medical advice/attention if you feel unwell.
P332 + P313 IF SKIN irritation occurs: Get medical advice/attention.
P333 + P311 If skin irritation or rash occurs: Call a POISON CENTER or doctor/physician. P337 + P311 If eye irritation persists: Call a POISON CENTER or doctor/physician. P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage Precautions

P403 + P233 Store in a well-ventilated place. Keep the container tightly closed. P405 Store locked up.

Disposal Precautions

P501 Dispose of contents/container according to local, state and federal laws.

2.4 Hazards not otherwise classified

Not available/ none known.

Section 3. Composition/information on ingredients

3.1 Substances/Mixtures

The following ingredients are hazardous according to Regulation 2012 OSHA Hazard Communication Standard: 29 CFR 1910.1200:

| Ingredient name | % | CAS number |
|--|--------|------------|
| Isocyanic acid, polymethylenepolyphenylene ester | 60-100 | 9016-87-9 |
| Diphenylmethane 4,4'-diisocyanate | 30-60 | 101-68-8 |

Any concentration shown as a range is to protect confidentiality or is due to batch variation. **Occupational exposure limits, if available , are listed in Section B.**

Section 4. First aid measures

4.1 Description of first aid measures

Inhalation

Remove source(s) of contamination and move victim to fresh air. If breathing has stopped, give artificial respiration, then oxygen if needed. Contact a physician immediately.

Eye Contact

Flush eyes with plenty of water occasionally lifting the upper and lower eyelids. Check and remove any contact lenses if safe to do so. Continue to rinse for at least 15 minutes. If irritation develops, seek medical attention.

Skin Contact

After contact with skin, wash immediately with plenty of warm soapy water: Remove contaminated clothing and shoes. Continue to rinse for at least 10 minutes. An MDI study has demonstrated that a polyglycol-based skin cleanser (such as D-Tam™. PEG-400) or corn oil may be more effective than soap and water. Get medical attention if symptoms occur. Chemical burns must be treated promptly by a physician. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion

Do not induce vomiting unless instructed by a physician. Never give anything by mouth to an unconscious person. 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. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs.

4.2 Most important symptoms/effects, acute and delayed potential acute health effects

Eye contact

Causes eye irritation

Inhalation

Harmful if inhaled. May cause respiratory irritation. This product is a respiratory irritant and potential respiratory sensitizer: repeated inhalation of vapor or aerosol at levels above the occupational exposure limit could cause respiratory sensitization. Symptoms may include irritation to the eyes, nose, throat and lungs, possibly combined with dryness of the throat, tightness of chest and difficulty in breathing. The onset of the respiratory symptoms may be delayed for several hours after exposure. **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.** A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons. LC50 (rat): ca. 490 mg/m³ (4 hours): using experimentally produced respirable aerosol having aerodynamic diameter <5 microns.

Skin contact

Causes skin irritation. May cause sensitization by skin contact. Animal studies have shown that respiratory sensitization can be induced by skin contact with known respiratory sensitizers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

Ingestion

Low oral toxicity, but ingestion may cause irritation of the gastrointestinal tract.

4.3 Over-exposure signs/symptoms

Eye contact

Adverse symptoms may include the following: pain or irritation, Watering, and redness

Inhalation

Adverse symptoms may include the following: respiratory tract irritation, coughing, wheezing and breathing difficulties asthma

Skin contact

Adverse symptoms may include the following: Irritation, and redness.

Ingestion

No specific data.

4.3 Indication of immediate medical attention and special treatment needed. If necessary.

Notes to physician

Symptomatic treatment and supportive therapy as indicated. Following severe exposure the patient should be kept under medical review for at least 48 hours.

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)

Section 5. Fire-fighting measures

5.1 Flash point

Closed cup: >150°C (>302°F)

Open cup: 230°C (446°F)

5.2 Extinguishing media

Water fog, dry chemical, and carbon dioxide foam. Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous. Prevent washings from entering water courses, keep fire exposed containers cool by spraying with water.

5.3 Specific hazards arising from the chemical

In a fire or if heated, a pressure increase will occur and the container may burst.

5.4 Hazardous thermal decomposition products

Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN.

5.5 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: No action shall be taken involving any personal risk or without suitable training.

5.6 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. PVC boots, gloves, safety helmet and protective clothing should be worn.

5.7 Remark

Due to reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Containers may burst if overheated.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

6.1 For non-emergency personnel

No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear an appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

6.2 For emergency personnel

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 "For non-emergency personnel".

6.3 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).

6.4 Methods and materials for containment and cleaning up.

If the product is in its solid form: Spilled MDI flakes should be picked up carefully. The area should be vacuum-cleaned to remove remaining dust particles completely. If the product is in its liquid form: Absorb spillages onto sand, earth or any suitable

adsorbent material. Leave to react for at least 30 minutes. Shovel into open-top drums for further decontamination. Wash the spillage area with water. Test atmosphere for MDI vapor. Neutralize small spillages with decontaminant. Remove and dispose of residues. The compositions of liquid decontaminants are given in Section 16. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

6.4 Reference to other sections

See Section 3 for list of Hazardous Ingredients; Sections 8 for Exposure Controls; and Section 13 for Disposal.

Section 7. Handling and Storage

7.1 Precaution for safe handling

Protective Measures

Put on appropriate personal protective equipment (see Section 8). Persons with a history of skin sensitization problems or asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used. Avoid exposure - obtain special instructions before use. Do not handle it until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Use only with adequate ventilation. Wear an appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous.

Advice on general occupational hygiene

Eating, drinking, and smoking should be prohibited in areas where this material is handled, stored, 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.

7.2 Conditions for safe storage, including any incompatibilities

Store per local regulations. Keep the container tightly closed in a cool, well-ventilated place. Keep away from moisture. Due to the reaction with water producing CO₂-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Do not reseal contaminated containers. Uncontaminated containers, free of moisture, may be resealed only after placing them under a nitrogen blanket. Do not store it in unlabeled containers. Use appropriate containment to avoid environmental contamination. Unsuitable containers: Do not store in containers made of copper, copper alloys, or galvanized surfaces.

7.3 Specific end use(s)

These precautions are for room temperature handling. Other uses including elevated temperatures or aerosol/spray applications may require added precautions.

Section 8. Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

| Ingredient name | Exposure limits |
|-------------------------------------|---|
| 4,4'-Methylenediphenyl diisocyanate | ACGIH TLV (United States, 6/2013). TWA: 0.005 ppm 8 hours. OSHA PEL (United States, 2/2013). CEIL: 0.02 ppm CEIL: 0.2 mg/m ³ |

8.2 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. Diisocyanates can only be smelled if the occupational exposure limit has been exceeded considerably.

Medical supervision of all employees who handle or come in contact with respiratory sensitizers is: recommended. Personnel with a history of asthma-type conditions, bronchitis, or skin sensitization conditions should not work with MDI-based products. The Occupational Exposure Limits listed do not apply to previously sensitized individuals. Sensitized individuals should be removed from any further exposure.

8.3 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.

8.4 Individual exposure controls

Hygiene measure

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. Wash contaminated clothing before reusing it. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection

Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, or dust.

Hand protection

Use chemical, resistant gloves classified under Standard EN374: protective gloves against chemicals and microorganisms. Examples of glove materials that might provide suitable protection include Butyl rubber, Chlorinated polyethylene, Polyethylene, Ethyl vinyl alcohol copolymers laminated ("EVAL"), Polychloroprene (Neoprene*), Nitrile/butadiene rubber ("nitrile" or "NBR"), Polyvinyl chloride ("PVC" or "vinyl"), Fluor elastomer (Viton*).

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 EN374) is recommended.

Contaminated gloves should be decontaminated and disposed of.

Notice: The selection of a specific glove for a particular application and duration of use in a workplace should also consider all requisite workplace factors such as, but not limited to other chemicals that may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), as well as instructions/specifications provided by the glove supplier. Protective gloves should be worn when

handling freshly made polyurethane products to avoid contact with trace residual materials which may be hazardous in contact with skin.

Body protection

Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: Overall (preferably heavy cotton) or Tyvek-Pro Tech 'C', Tyvek-Pro 'F' disposable coverall.

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

Use a properly fitted, air-purifying, or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product, and the safe working limits of the selected respirator.

Thermal hazards

Flash point: Closed cup: >150°C (>302°F); Open cup: 230°C (446°F). No other information available.

Section 9. Physical and chemical properties

9.1 Information on Basic physical and chemical properties

| | | | |
|--|--|---|------------------------|
| Appearance: | Amber liquid | Vapor pressure: | < 0.00016 mmHg (68 °F) |
| Odor: | Musty odor | Vapor density (Air=1): | > 1 |
| pH: | No data | Evaporation rate: | No data |
| Flash Point: | Closed cup: >150°C (>302°F); | Solubility in water: | Insoluble |
| | Open cup: 230°C (446°F) | Auto-ignition temperature: | >600°C |
| Freezing point: | 37°F | Partition coefficient: noctano/water | No data |
| Boiling/Condensation point: | >300°C decomposes | Relative density: | No data |
| Flammability (solid, gas): | No data | Decomposition temperature: | No data |
| Lower and upper explosive (flammable) limits: | No data | Viscosity: | 30 – 100 cPs |

Section 10. Stability and reactivity

10.1 Reactivity

No specific test data related to reactivity is available for this product or its ingredients.

10.2 Chemical stability

Stable at room temperature.

10.3 Possibility of hazardous reactions

Reaction with water (moisture) produces CO₂ gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents. MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface. A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.

10.4 Conditions to avoid

Avoid high temperatures.

10.5 Incompatible materials

Water, alcohol, amines, bases, and acids

10.6 Hazardous decomposition products

Combustion products may include carbon oxides (CO, CO₂) nitrogen oxides (NO, NO₂, etc.) hydrocarbons and HCN

Section 11. Toxicological Information

11.1 Information on toxicological effects

Acute toxicity

| Product/ ingredient Name | Test | Endpoint | Species | Result |
|--|------------------------------------|---------------------------------|-----------------------|--------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 403 Acute Inhalation Toxicity | LC50 Inhalation Dusts and mists | Rat- Male, Female | 0.49 mg/l |
| | OECD 402 Acute Dermal Toxicity. | LD50 Dermal | Rabbit - Male, Female | >9400 mg/kg |
| | OECD 401 Acute Oral Toxicity | LD50 Oral | Rat- Male | >10000 mg/kg |
| 4,4'-Methylenediphenyl diisocyanate | OECD 403 Acute Inhalation Toxicity | LC50 Inhalation Dusts and mists | Rat- Male, Female | 0.49 mg/l |
| | OECD 402 Acute Dermal Toxicity | LD50 Dermal | Rabbit - Male, Female | >9400 mg/kg |
| | OECD 401 Acute Oral Toxicity | D50 Oral | Rat- Male | >10000 mg/kg |

Conclusion/Summary

| | |
|-------------------------------------|---------------------------------------|
| 4,4'-Methylenediphenyl diisocyanate | Irritating to the respiratory system. |
|-------------------------------------|---------------------------------------|

Irritation/Corrosion

| Product/ ingredient Name | Test | Species | Result |
|--|---|---------|----------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 404 dermal Irritation/corrosion | Rabbit | Skin - Mid Irritant |
| | OECD 405 Acute eye irritation/corrosion | Rabbit | Eyes - Non- irritant |
| Diphenylmethylen 4,4'-diisocyanate | OECD 404 dermal Irritation/corrosion | Rabbit | Skin - Irritant |
| | OECD 405 Acute eye irritation/corrosion | Rabbit | Eyes Non- irritant |

Conclusion/Summary

| | | |
|--------------------|--|--|
| Skin | Isocyanic acid, polymethylenepolyphenylene ester | Irritating to skin |
| | Diphenylmethylen 4,4'-diisocyanate | Irritating to skin |
| Eyes | Isocyanic acid, polymethylenepolyphenylene ester | Based on occupational exposure data, this substance is considered as irritating to eyes. |
| | Diphenylmethylen 4,4'-diisocyanate | Based on occupational exposure data, this substance is considered as irritating to eyes. |
| Respiratory | Isocyanic acid, polymethylenepolyphenylene ester | No additional information |
| | Diphenylmethylen 4,4'-diisocyanate | No additional information |

Sensitization

| Product/ ingredient Name | Test | Route of exposure | Species | Result |
|--|---|-------------------|------------|-----------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 406 Skin sensitization | Skin | Guinea pig | Not sensitizing |
| | No official guidelines | Respiratory | Rat | Sensitizing |
| | - | Skin | Guinea pig | Sensitizing |
| Diphenylmethylen 4,4'-diisocyanate | OECD 429 Skin sensitization; local lymph node assay | Skin | Mouse | Sensitizing |
| | OECD 406 Skin Sensitization | Skin | Guinea pig | Not sensitizing |
| | No official guidelines | Respiratory | Guinea pig | Sensitizing |

Mutagenicity

| Product/ ingredient Name | Test | Result |
|---|---|-----------|
| Isocyanic acid, polymethylenepolyphenylene ester | Experiment: In vitro Subject: Bacteria Metabolic Activation +/- | Negative |
| | Experiment: In vitro Subject: Mammalian - Animal | Negative |
| | Experiment: In vitro Subject: Mammalian - Human | Equivocal |
| Diphenylmethylen 4,4'-diisocyanate | Experiment: In vitro Subject: Mammalian - Animal | Negative |
| | Experiment: In vitro Subject: Mammalian - Human | Negative |

Conclusion/Summary

| | |
|---|----------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | No mutagenic effect. |
| Diphenylmethylen 4,4'-diisocyanate | No mutagenic effect. |

Carcinogenicity

| Product/ ingredient Name | Test | Species | Dose | Exposure | Result/ Result type |
|---|---|--------------------------|------------------------|--------------------------------|-------------------------------------|
| Isocyanic acid, polymethylenepolyp henylene ester | OECD 453 combined chronic toxicity/ carcinogenicity studies | Rat - Male, Female | 1 mg/m ³ | 2 years; 5 days per week | Negative - Inhalation - NOAEL |
| Diphenylmethylen 4,4'-diisocyanate | OECD 453 combined chronic toxicity/ carcinogenicity studies | Rat - Male, Female | 1 mg/m ³ | 2 years; 5 days per week | Positive- Inhalation - NOAEL |

Carcinogenic class

| Product/ ingredient Name | IARC | OSHA |
|--|------|------|
| Isocyanic acid, polymethylenepolyphenylene ester | 3 | - |
| 4,4'-Methylenediphenyl diisocyanate | 3 | - |

Reproductive Toxicity

| Product/ ingredient Name | Test | Species | Maternal Toxicity | Fertility | Developmental Effects |
|--|--|--------------------|---------------------|--------------------------|-------------------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 414 prenatal developmental toxicity study | Rat - Male, Female | 1 mg/m ³ | 2 years; 5 days per week | Negative - Inhalation - NOAEL |

Conclusion/Summary

| | |
|--|--|
| Isocyanic acid, polymethylenepolyphenylene ester | No known significant effects or critical hazards |
| 4,4'-Methylenediphenyl diisocyanate | No known significant effects or critical hazards |

Teratogenicity

| Product/ ingredient Name | Test | Species | Result |
|--|--|--------------------|-----------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 414 prenatal developmental toxicity study | Rat - Male, Female | Negative - Inhalation |
| | OECD 414 prenatal developmental toxicity study | Rat - Male, Female | Negative - Inhalation |
| Diphenylmethane 4,4'-diisocyanate | OECD 414 prenatal developmental toxicity study | Rat - Female | Negative - Inhalation |

Conclusion/Summary

| | |
|--|--|
| Isocyanic acid, polymethylenepolyphenylene ester | No known significant effects or critical hazards |
| 4,4'-Methylenediphenyl diisocyanate | No known significant effects or critical hazards |

Specific target organ toxicity (single exposure)

| Product/ ingredient Name | Category | Route of exposure | Target organs |
|--|------------|-------------------|------------------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | Category 3 | Not Applicable | Respiratory tract irritation |
| Diphenylmethane 4,4'-diisocyanate | Category 3 | Not Applicable | Respiratory tract irritation |

Specific target organ toxicity (Repeated exposure)

Not available.

Aspiration hazard

Not available

Information on the likely routes of exposure: Not available

11.2 Potential acute health effects

Eye contact

Causes eye irritation.

Inhalation

Harmful if inhaled. May cause respiratory irritation. This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapor or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation. Symptoms may include irritation to the eyes, nose, throat and lungs, possibly combined with dryness of the throat, tightness of chest and difficulty in breathing. The onset of the respiratory symptoms may be delayed for several hours after exposure. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitized persons. LC50 (rat): ca. 490 mg/m³ (4 hours); using experimentally produced respirable aerosol having aerodynamic diameter <5 microns.

Skin contact

Causes skin irritation. May cause sensitization by skin contact. Animal studies have shown that respiratory sensitisation can be induced by skin contact with known respiratory sensitisers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

Ingestion

Low oral toxicity, but ingestion may cause irritation of the gastrointestinal tract.

11.3 Symptoms related to the physical, chemical and toxicological characteristics

Eye contact

Adverse symptoms may include the following:

- Pain or irritation
- Watering
- redness

Inhalation

Adverse symptoms may include the following:

- Respiratory tract irritation
- Coughing
- Wheezing and breathing difficulties
- asthma

Skin contact

Adverse symptoms may include the following:

- Irritation
- Redness

Ingestion

No specific data.

11.4 Delayed and immediate effects and also 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.

11.5 Potential chronic health effects

| Product/ ingredient Name | Test | Endpoint | Species | Result |
|--|---|---|--------------------|-----------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 453 COmbined chronic toxicity/ carcinogenicity studies | Chronic NOEC inhalation dusts and mists | Rat - Male, Female | 0.2 mg/m ³ |

General

May cause damage to organs through prolonged or repeated exposure if inhaled. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity

Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m³), there was a significant incidence of a benign tumor of the lung (adenoma) and one malignant tumor (adenocarcinoma). There were no lung tumors at 1 mg/ m³ and no effects at 0.2 mg/m³. Overall, the tumor incidence, both benign and malignant, and the number of animals with the tumors were not different from controls. The increased incidence of lung tumors is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumor formation will occur.

Mutagenicity

No known significant effects or critical hazards.

Teratogenicity

No known significant effects or critical hazards.

Developmental effects

No birth defects were seen in two independent animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.

Fertility effects

No known significant effects or critical hazards.

11.6 Numerical measures of toxicity

Acute toxicity estimates

| Route | ATE value |
|------------|-----------|
| Inhalation | 1.5 mg/l |

Other information

Not available

Section 12. Ecological Information

12.1 Toxicity

| Product/ ingredient Name | Test | Endpoint | Exposure | Species | Result |
|--|---|-----------------|--------------------------|----------|------------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 201 Alga, growth inhibition test | Acute - EC50 | 72 hours Static | Algae | >1640 mg/l |
| | OECD 209 Activated sludge, respiration inhibition test | Acute - EC50 | 3 hours Static | Bacteria | >100 mg/l |
| | OECD 202 Daphnia sp. Acute immobilization test | Acute - EC50 | 24 hours Static | Daphnia | >1000 mg/l |
| | - | Acute - LC0 | 96 hours | Fish | >1000 mg/l |
| | OECD 203 Fish, acute toxicity test | Acute - EC50 | 96 hours Static | Fish | >1000 mg/l |
| | OECD 211 Daphnia Magna | Chronic - NOEC | 21 days Semi - static | Daphnia | >=10 mg/l |
| | OECD 201 Alga, growth inhibition test | Chronic - NOECr | 72 hours Static | Algae | 1640 mg/l |
| 4,4'-Methylenediphenyl diisocyanate | OECD 202 Daphnia sp. acute | Acute - EC50 | 24 hours Static | Daphnia | >1000 mg/l |
| | OECD 203 Fish, acute toxicity test | Acute - LC50 | 96 hours Static | Fish | >1000 mg/l |
| | OECD 211 Daphnia magna reproduction test | Chronic - NOEC | 21 days Semi - static | Daphnia | >=10 mg/l |
| | OECD 201 Alga, growth inhibition test | Chronic NOECr | 72 hours Static | Algae | 1640 mg/l |

12.2 Persistence and Degradability

| Product/ ingredient Name | Test | Period | Results |
|--|--|---------|---------|
| Isocyanic acid, polymethylenepolyphenylene ester | OECD 302C Inherent biodegradability: Modified MITI test (II) | 28 days | 0% |
| 4,4'-Methylenediphenyl diisocyanate | OECD 302C Inherent biodegradability: Modified MITI test (II) | 28 days | 0% |

Conclusion/Summary

| | |
|--|-------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | Not biodegradable |
| 4,4'-Methylenediphenyl diisocyanate | Not biodegradable |

| Product/ ingredient Name | Aquatic half-life | Photolysis | Biodegradability |
|--|-----------------------|------------|------------------|
| Isocyanic acid, polymethylenepolyphenylene ester | Fresh water 0.8 days | - | Not readily |
| 4,4'-Methylenediphenyl diisocyanate | Fresh water 0.83 days | - | Not readily |

12.3 Bioaccumulative potential

| Product/ ingredient Name | LogP | BCF | Potential |
|--|------|-----|-----------|
| Isocyanic acid, polymethylenepolyphenylene ester | - | 200 | Low |
| 4,4'-Methylenediphenyl diisocyanate | 4.51 | 200 | Low |

12.4 Mobility in soil

Mobility

By considering the production and use of the substance, it is unlikely that significant environmental exposure in the air or water will arise. Immiscible with water, but will react with water to produce inert and non-biodegradable solids. Conversion to soluble products, including diamino- diphenylmethane (MDA), is very low under the optimal laboratory conditions of good dispersion and low concentration. In air, the predominant degradation process is predicted to be a relatively rapid OH radical attack, by calculation and by analogy with related diisocyanates.

Other adverse effects

No known significant effects or critical hazards.

12.5 Other ecological information

BOD5: Not Determined

COD: Not Determined

TOC: Not Determined

Section 13. Disposal Consideration

13.1 Disposal Methods

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, water, ways, drains and sewers.

13.2 Disposal should be in accordance with applicable regional, national and local laws and regulation

Section 14. Transport information

14.1 Proper shipping name

DOT

OTHER REGULATED SUBSTANCES, LIQUID, N.O.S. (Methylene Diphenyl Diisocyanate)

TDG

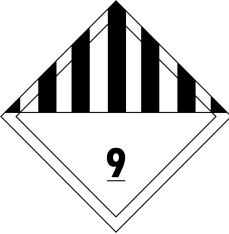
Not regulated.

IMDG

Not regulated.

IATA

Not regulated

| Regulatory Information | UN Number | Classes | PG* | Label | Additional Information |
|------------------------|---------------|---------|-----|--|---|
| DOT Classification | NA3082 | 9 | III |  | <u>Reportable quantity 5000 lbs, (2270 kg)</u> Single containers Less than 5,000 lbs. Are not regulated. |
| TDG Classification | Not Regulated | - | - | | - |
| IMDG Classification | Not Regulated | - | - | | - |
| IATA Classification | Not Regulated | - | - | | - |

PG*: Packing Group

Section 15. Regulatory information

15.1 Safety, health and environmental regulations specific for the product

United States Regulations

| | |
|---|--|
| TSCA 8(b) Inventory | All components are listed or exempted. |
| TSCA 5(a)2 final significant new use rule (SNUR) | No ingredients listed. |
| TSCA 5(e) substance consent order | No ingredients listed. |
| TSCA 12(b) export notification | No ingredients listed. |
| SARA 311/312 | Immediate (acute) health hazard |

| | Product name | Concentration percent |
|---|---|------------------------------|
| Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) | 4,4'-Methylenediphenyl diisocyanate | 36% - 42% |
| | This product does not contain nor is it manufactured with ozone depleting substances. | |
| SARA 313 Form R - Reporting requirements | Product name | Concentration percent |
| | Methylenediphenyl diisocyanate, isomers and homologues | 51.5% - 62% |
| | Diphenylmethane 4,4'-diisocyanate | 36% - 42% |

| CERCLA Hazardous substances | Ingredients name | % | SECTION 304 CERCLA Hazardous Substance | CERCLA Reportable Quantity (lbs) | Product Reportable Quantity (lbs) |
|------------------------------------|-----------------------------------|----------|---|---|--|
| | Diphenylmethane 4,4' diisocyanate | 42% | Listed | 5,000 | 11,905 |

State Regulations

| | |
|---------------------------|--|
| PENNSYLVANIA - RTK | 4,4'-Methylenediphenyl diisocyanate |
| California Prop 65 | This product contains no listed substance known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute. |

Canada Regulations

| | |
|----------------------|---|
| CEPA DSL | All components are listed or exempted. |
| WHMIS Classes | WHMIS Class D-2A: Material causing other toxic effects (Very toxic). WHMIS Class D-2B: Material causing other toxic effects (Toxic). |

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and MSDS contains all the information required by the Controlled Products Regulations.

Brazil Regulations

| | |
|----------------------|---|
| CEPA DSL | All components are listed or exempted. |
| WHMIS Classes | WHMIS Class D-2A: Material causing other toxic effects (Very toxic). WHMIS Class D-2B: Material causing other toxic effects (Toxic). |

International Lists

| | |
|---|--|
| Australia Inventory (AICS) | All components are listed or exempted. |
| China Inventory (IECSC) | All components are listed or exempted. |
| Japan Inventory | All components are listed or exempted. |
| Korea Inventory | All components are listed or exempted. |
| Malaysia Inventory (EHS Register) | All components are listed or exempted. |
| New Zealand Inventory of Chemicals (NZIoC) | All components are listed or exempted. |
| Philippines Inventory (PICCS) | All components are listed or exempted. |
| Taiwan Inventory (CSNN) | All components are listed or exempted. |

Section 16. Other Information

16.1 Hazardous Materials Information System (U.S.A.)

| | | |
|----------------------------|---|----------|
| Health | * | 2 |
| Flammability | | 1 |
| Physical Hazards | | 1 |
| Personal Protection | | |

The customer is responsible for determining the PPE code for this material.

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J.J. Keller (800)327-6868.

16.2 National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to a certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

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-

Version

1



Indicates information that has changed from previously issued versions.

Liquid decontaminants (percentages by weight or volume):

Decontaminant 1 : *- sodium carbonate : 5 - 10 % : *- liquid detergent : 0.2 - 2 % *-

water : to make up to 100 % Decontaminant 2 : *- concentrated ammonia solution : 3 - 8

% *- liquid detergent : 0.2 - 2 % *- water : to make up to 100 % `

Decontaminant 1 reacts slower with diisocyanates; but is more environmentally friendly than decontaminant 2. Decontaminant 2 contains ammonia. Ammonia presents health hazards. (See supplier safety information.) Literature reference: PU 193-1 : 'MDI-Based Compositions: Hazards and Safe Handling Procedures.'

PU 181-15 : Recommended melting procedures for MDI-based isocyanates.

ISOPA Guidelines for safe Loading/Unloading, Transportation, Storage of TDI and MDI , Ref.03-96 PSC-0005-GUIDL. SPI PMDI User Guidelines for the Chemical Protective Clothing Selection.

References of methods used in the Physico-Chemical Properties section are reported in Annex V part A to Commission Directive 92/69/EEC of 31 July 1992 adapting to technical progress for the Seventeenth time Council Directive 67/548/EEC.'

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THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behavior of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behavior should be determined by the user and made known to handlers, processors and end users.

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