TADCO

T. A. DAVIES CO.

Specialty Urethane Chemicals

SAFETY DATA SHEET
11X10-220A

1 IDENTIFICATION

GHS Product Identifier: **Tadco Formula 11X10-220A** Polyurethane Isocyanate
Product Type: Liquid
Material Use: Component of a Polyurethane System
Supplier/Manufacturer: T. A. DAVIES CO.
19500 S Alameda St, Rancho Dominguez CA 90221
e-mail address of person responsible for this SDS SDS@tadavies.com
Emergency Phone: 888 506-0333

2 HAZARDS IDENTIFICATION

OSHA/HCS Status: This material is classified as hazardous under OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the: substance or mixture
ACUTE TOXICITY: INHALATION - Category 4
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2B
RESPIRATORY SENSITIZATION - Category 1
SKIN SENSITIZATION - Category 1
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) [Respiratory tract irritation] - Category 3

GHS label elements
Hazard pictograms :

Signal word: Danger
Hazard statements: Harmful if inhaled.
Causes skin and eye irritation.
May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.
May cause respiratory irritation

Precautionary statements: Wear protective gloves: > 8 hours (breakthrough time): butyl rubber, Ethyl Vinyl Alcohol Laminate (EVAL). Wear eye or face protection. In case of inadequate ventilation wear respiratory protection. Use only outdoors or in a well-ventilated area. Avoid breathing vapor. Wash hands thoroughly after handling. Contaminated work clothing should not be allowed out of the workplace. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. If experiencing respiratory symptoms: Call a POISON CENTER or physician. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. Wash contaminated clothing before reuse. If skin irritation or rash occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention. Store locked up. Dispose of contents and container in accordance with all local, regional, national and international regulations

3 COMPOSITION / INFORMATION ON INGREDIENTS

Substance/mixture: Mixture

Ingredient Name	%	CAS number
Methylenediphenyldiisocyanate, isomers and homologues	37 – 62	9016-87-9
Diphenylmethane 4,4'-diisocyanate	19 – 37	101-68-8
High Molecular Weight Plasticizer	38	6846-50-0

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 8.

4 FIRST AID MEASURES

Description of necessary first aid measures

Eye Contact: In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention immediately.

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-TamTM, PEG-400) or corn oil may be more effective than soap and water. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Inhalation: Move exposed person to fresh air. Get medical attention immediately. Treatment is symptomatic for primary irritation or bronchospasm. If breathing is laboured, oxygen should be administered by qualified personnel.

Ingestion: Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Provided the patient is conscious, wash out mouth with water. Get medical attention if symptoms appear.

Over-exposure signs/symptoms

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

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)

5. FIRE FIGHTING MEASURES

Flash point	Closed cup: >136°C
Extinguishing media	
Suitable extinguishing media	Foam, CO2 or dry powder
Unsuitable extinguishing media	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
Specific hazards arising from the chemical	In a fire or if heated, a pressure increase will occur and the container may burst
Hazardous thermal decomposition products	Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN
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.
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.
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

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 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 appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8)
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 "For 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 materialsfor containment and clean 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

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 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 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 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.

7. HANDLING AND STORAGE

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 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 in accordance with local regulations. Keep container tightly closed in a cool well-ventilated place. Keep away from moisture. Due to 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 under a nitrogen blanket. Do not store 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.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Control Parameters
Occupational exposure limits

Ingredient	Exposure Limits
4,4'-Methylenediphenyl diisocyanate	**ACGIH TLV (United States, 06/2013).** TWA: 0.005 ppm 8 hour(s). **OSHA PEL (United States, 02/2013).** CEIL: 0.02 ppm CEIL: 0.2 mg/m³

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 sensitisers is recommended. Personnel with a history of asthma-type conditions, bronchitis or skin sensitisation conditions should not work with MDI based products. The Occupational Exposure Limits listed do not apply to previously sensitised individuals. Sensitised individuals should be removed from any further exposure.

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 eyewash stations and safety showers are close to the workstation location.

Personal Protection Respiratory: When the product is sprayed or heated without adequate ventilation, an approved MSHA/NIOSH positive-pressure, supplied-air respirator may be required. Air purifying respirators equipped with organic vapor cartridges and a HEPA (P100) particulate filter may be used under certain conditions when a cartridge change-out schedule has been developed in accordance with the OSHA respiratory protection standard (29 C.F.R. 1910.134).

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

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 dusts.

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"), Fluoroelastomer (Viton*).
When prolonged or frequently repeated contact may occur, a glove with protection class of 5 or higher (breakthrough time greater then 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 take into account 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: Not available

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9. PHYSICAL AND CHEMICAL PROPERTIES

General Information

Appearance

Physical State:	Liquid.
Color:	Not available
Odor:	Not available
Odor threshold:	Not available
pH:	Not applicable
Boiling/condensation point:	>300°C decomposes
Melting/freezing point:	Not available
Flash point:	Closed cup: >136°C (>276°F)
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Lower and upper explosive (flammable) limits:	Not available
Vapor pressure:	Not available
Vapor Density:	Not available
Relative Density:	1.17 g/cm$_3$ [25°C (77°F)
Solubility in water:	Not available

9. PHYSICAL AND CHEMICAL PROPERTIES

Partition coefficient: noctanol/ water (log Kow): Not available
Auto-ignition temperature: >400°C
Decomposition temperature: Not available
Viscosity: Dynamic: 150 to 200 mPas (180 to 240 cP)

10. STABILITY AND REACTIVITY

Reactivity: No specific test data related to reactivity available for this product or its ingredients.
Chemical Stability: Stable at room temperature.
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.
Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid: Avoid high temperatures
Materials to avoid Water, alcohols, amines, bases, and acids.
Hazardous decomposition Products: Carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN.

11. TOXICOLOGICAL INFORMATION

Information on toxicological effects

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	LD50 Oral	Rat - Male	>10000 mg/kg

Conclusion/Summary 4,4'-Methylenediphenyl diisocyanate Irritating to respiratory system.

11. TOXICOLOGICAL INFORMATION

Irritation/Corrosion

Product/ingredient name	Test	Species	Result
Isocyanic acid, polymethylenepolyphenylene ester	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin - Mild irritant
	OECD 405 Acute Eye Irritation/ Corrosion	Rabbit	Eyes - Non-irritant.
Diphenylmethane 4,4'-diisocyanate	OECD 404 Acute 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
	Diphenylmethane 4,4'-diisocyanate	Irritating to skin
Eyes	Isocyanic acid, Polymethylenepolyphenylene ester	Based on the human occupational exposure data, this substance is considered as irritating to eyes
	Diphenylmethane 4,4'-Diisocyanate	Based on the human occupational exposure data, this substance is considered as irritating to eyes.
Respiratory	Isocyanic acid, polymethylenepolyphenylene ester	No additional information
	Diphenylmethane 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
Diphenylmethane 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

11. TOXICOLOGICAL INFORMATION

Mutagenicity

Product/ingredient name	Test	Result
Isocyanic acid, polymethylenepolyphenylene ester	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	Experiment: In vivo Subject: Mammalian-Animal	Negative
	Experiment: In vivo Subject: Mammalian-Human	Equivocal
Diphenylmethane 4,4'-diisocyanate	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	Experiment: In vivo Subject: Mammalian-Animal	Negative

Conclusion/Summary

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

Carcinogenicity

Product/ingredient name	Test	Species	Dose	Exposure	Result/Result type
Isocyanic acid, polymethylenepolyphenylene ester	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Rat - Male, Female	1 mg/m³	2 years; 5 days per week	Negative - Inhalation - NOAEL
4,4'-Methylenediphenyl diisocyanate	OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies	Rat - Male, Female	1 mg/m³	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	Negative	Negative	Negative

11. TOXICOLOGICAL INFORMATION

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/Result type
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.

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 vapour 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 sensitised persons. LC50 (rat) : ca. 490 mg/m³ (4 hours) : using experimentally produced respirable aerosol having aerodynamic diameter <5microns

Skin: 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. Ingestion may cause irritation of the gastrointestinal tract.

11. TOXICOLOGICAL INFORMATION

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.

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

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/m³

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 tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours 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 tumours were not different from controls. The increased incidence of lung tumours 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 tumour 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 independant 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. TOXICOLOGICAL INFORMATION

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Inhalation (dusts and mists)	1.5 mg/l

Other information Not available.

12. ECOLOGICAL INFORMATION

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 Immobilisation 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	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
4,4'-Methylenediphenyl diisocyanate	OECD 202 *Daphnia* sp. Acute Immobilisation Test	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. ECOLOGICAL INFORMATION

Persistence and degradability

Product/ingredient name	Test	Period	Result
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
Diphenylmethane 4,4'-diisocyanate	Fresh water 0.83 days	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isocyanic acid, polymethylenepolyphenylene ester	-	200	low
Diphenylmethane 4,4'-diisocyanate	4.51	200	low

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.

Other ecological information

BOD5 Not determined
COD Not determined
TOC Not determined

13. Disposal Considerations

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, waterways, drains and sewers

Disposal should be in accordance with applicable regional, national and local laws and regulations.

14. TRANSPORT INFORMATION

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		**Reportable quantity5000 lbs. (2270 kg)** Single containers less than 5,000 lbs. are not regulated.
TDG Classification	Not regulated.	-	-		-
IMDG Classification	Not regulated.	-	-		-
IATA Classification	Not regulated.	-	-		-

15. REGULATORY INFORMATION

Safety, health and environmental regulations specific for the product

U.S. Federal 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

15. REGULATORY INFORMATION

	Product name	Concentration
Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs):	4,4'-Methylenediphenyl diisocyanate	19 – 37

Clean Air Act - Ozone Depleting Substances (ODS) This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313	Product name	Concentration
Form R - Reporting requirements	Methylenediphenyldiisocyanate, isomers and homologues	37 - 62%
	Diphenylmethane 4,4'-diisocyanate	19 - 37

CERCLA: Hazardous substances.

Components	Concentration %	Section 304 CERCLA Hazardous Substance	CERCLA Reportable Quantity (Lbs)	Product Reportable Quantity
Diphenylmethane 4,4'-diisocyanate	26	Listed	5000	19231

STATE REGULATIONS:

PENNSYLVANIA - RTK: 4,4'-Methylenediphenyl diisocyanate

California Prop 65 : This product contains no listed substances 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

WHMIS (Canada) : WHMIS Class D-2A: Material causing other toxic effects (Very toxic).
WHMIS Class D-2B: Material causing other toxic effects (Toxic).

CEPA DSL All components are listed or exempted

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

Brazil Regulations

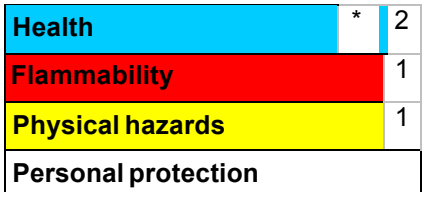
Classification system used: **Norma ABNT-NBR 14725-2:2012**

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

16. OTHER INFORMATION

Hazardous Material Information System (U.S.A.)



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® program. 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. OTHER INFORMATION

National Fire Protection Association (U.S.A.) **Health**

Flammability
Instability
Special

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