Conforms to HazCom 2012/ United States

SAFETY DATA SHEET

LM 95-Part B (Activator)

Section 1. Identification

GHS product Identifier LM 85 SSL – Part B (Activator)
Other means of identification Not available

Relevant identified use of the substance or mixtures and uses advised against
Component of a Polyurethane System products.

Supplier's details
Polyguard Products, Inc.
3801 South I 45
Ennis, TX 75119
Tel: (214) 515-5000

Emergency telephone number) with hours of operation) CHEMTREC, US 1-800-424-9300 International 1-703-527-3887 (24/7)

Section 2. Hazards Identification

OSHA/HCS status This material is considered hazardous by the OSHA Hazardous Communications Standard (49CFR1910.1200) .

Classification of the substance or mixture
Acute toxicity: Inhalation- Category 4
Skin Irritation- Category 2
Eye Irritation- Category 2A.
Respiratory Sensitization- Category 1
Skin Sensitization- Category 1
Specific target organ toxicity (single exposure) (Respiratory system) – Category 3.
Specific target organ toxicity (repeated exposure) (Inhalation)- Category 2
Short-term (acute) aquatic hazard- Category 2

GHS label elements
Hazard pictogram

Signal word Danger
Hazard statement
Causes skin irritation
May cause an allergic skin reaction.
Causes serious eye irritation
Harmful if inhaled.
May cause allergy or asthma symptoms or breathing difficulties if inhaled.
May cause respiratory irritation.
May cause damage to organs though prolonged or repeated exposure.
Toxic to aquatic life.

Precautionary statements
Prevention
Do not breathe mist or vapors.
Wash skin thoroughly after handling.
Use only outdoors or in a well ventilated area.
Contaminated work clothing must not be allowed out of the work place.
Avoid release to the enviroment.
Wear protective gloves/eye protection/face protection.
In case of inadequate ventilation wear respiratory protection.

Section 2. Hazards Identification

Response IF ON SKIN: Wash with plenty of soap and water. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF IN EYES; Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If skin irritation or rash occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. If experiencing respiratory symptoms: Call a POISON CENTER or physician. Take off contaminated clothing and wash before reuse.

Storage Store in a well-ventilated place. Keep the container tightly closed.

Disposal Dispose of contents and container in accordance with all local, regional, national, and international regulations.

Hazards not otherwise classified None known

Section 3. Composition/Information on Ingredients

Substance/Mixture Mixture

Other means of identification Not available

Ingredient name	%	CAS Number
4,4'-Methylenediphenyl diisocyanate	50 - 70	101-68-8
Diphenylmethanediisocyanate	30 - 50	9016-87-9
Diphenylmethane-2,4'- diisocyanate	10 - 20	5873-54-1

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.

Section 4. First Aid Measures

Description of necessary first aid measures.

General advise Move out of dangerous area.
Do not leave the victim unattended.
Get medical attention immediately if symptoms occur.

Eye contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If easy to do, remove contact lens, if worn. Protect unharmed eye. Keep eyes wide open while rinsing. Seek medical attention.

Inhalation If breathed in, move person into fresh air. Call a physician or poison control center immediately. Keep patient warm and at rest. Keep respiratory tract clear. If breathing is difficult, give oxygen. If breathing is irregular or stopped, administer artificial respiration. If unconscious, place in recovery position and seek medical advice. Consult a physician immediately if symptoms such as shortness of breath or asthma are observed. A hyperactive response to even minimal concentrations of diisocyanates may develop in sensitized persons. LC50(rat): ca. 490 mg/m^3 (4 hours): using experimentally produced respirable aerosol having aerodynamic diameter < 5 microns.

Section 4. First Aid Measures

Skin contact

In case of contact, immediately flush skin with soap and plenty of water. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before reuse. Thoroughly clean shoes before reuse. Call a physician if irritation develops or persists. An MDI study has demonstrated that a polyglycol- based skin cleaner (such as D-TamTM PEG-400) or corn oil may be more effective than soap and water.

Ingestion

Gently wipe or rinse the inside of the mouth with water. DO NOT induce vomiting unless directed to do so by a physician or poison control center. Keep respiratory tract clear. Keep at rest. If a person vomits when lying on his back, place him in the recovery position. Never give anything by mouth to an unconscious person. If symptoms persist, call a physician. Take the victim immediately to hospital.

Most important symptoms/effects, acute and delayed

Severe allergic skin reactions, bronchospasms, and anaphylactic shock.
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 the 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.

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

Notes to physician:

Symptomatically treatment and supportive therapy as needed. Following severe exposure, medical follow-up should be monitored for at least 48 hours. The first aid procedure should be established in consultation with the doctor responsible for industrial medicine.

Protection of first aiders:

No action shall be taken involving any personal risk or without suitable training.
It may be dangerous to the person providing aid to give mouth to mouth resuscitation. If potential for exposure exists refer to Section 8 for specific personal protective equipment. First Aid responders should pay attention to self-protection and use the recommended protective clothing.

Section 5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use CO_2, foam, or dry powder.

Unsuitable extinguishing media

Water may be used if there is no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous.

Specific hazards arising from the chemical

Do not allow run-off from firefighting to enter drains or water courses. The pressure in sealed containers can increase under the influence of heat. Exposure to hazardous products may be hazardous to health.

Hazardous thermal decomposition products

Decomposition products may include the following materials: Carbon Monoxide, Carbon Dioxide, nitrogen oxides, hydrocarbons and HCN. In the event of extreme heat (> 500 degrees C), aniline is suspected of being formed.

Specific extinguishing methods

Cool containers/tanks with water spray.

Special protective equipment for fire fighters

Wear an approved positive pressure self-contained breathing apparatus (SCBA) apparatus in addition to standard firefighting gear.

Section 5. Fire-Fighting Measures

Remarks

Standard Procedure for chemical fires. Due to reaction with water producing CO_2 gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Prevent fire extinguishing water from contaminating surface water or the ground water system. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

Section 6. Accidental Release Measures

Personal precautions, protective measures, and emergency prOECDures

Immediately evacuate personnel to safe area. Use personal protective equipment. If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. Ensure adequate ventilation. Keep people away from and upwind if spill/leak. Only qualified personnel equipped with suitable protective equipment may intervene. For additional precautions and advice on safe handling, see Section 7. Never return spills to original containers for reuse. Make sure there is a sufficient amount of neutralizing/absorbent material near the storage area. The danger areas must be delimited and identified using relevant warning and safety signs. Treat recovered material as described in the section “Disposal considerations.” For disposal considerations, see Section 13.

Enviromental precautions

Do not allow uncontrolled discharge of product into the environment. Do not allow material to contaminate ground water system. Prevent product from entering drains. Prevent further leakage or spillage if safe to do so. Local authorities should be advised if significant spillages cannot be contained. If product contaminates rivers and lakes or drains inform respective authorities.

Methods and materials for containment and cleaning up

Clean- up methods- small spillage.

Contain spillage, soak up with non-combustible absorbent material, (e.g., sand, earth, diatomaceous earth, vermiculite) and transfer to a container and transfer to a container for disposal according to local/national regulations (See Section 13). Clean contaminated surfaces thoroughly. Sweep up or vacuum up spillage and collect in a suitable container for disposal. Neutralize small spillages with decontaminant. The compositions of liquid decontaminates are given in Section 16. Remove and dispose of residues.

Clean up methods- large spills

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: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, saw dust). Leave to react for at least 30 minutes. Shovel into open- top drums for further decontamination. Wash spillage area with water. Test atmosphere for MDI vapors. Keep in suitable, closed containers for disposal.

Section 7. Handling and Storage

Precautions for safe handling

Protective measures/Advice on general occupation hygiene

Ensure that eyewash stations and safety showers are close to the workstation location. Use only with adequate ventilation. Normal measures for preventive fire protection.

Section 7. Handling and Storage

Advice on safe handling

For personal protection see Section 8. Avoid formation of aerosol. Do not breathe vapors or spray mist. Do not breathe vapors/dust. Do not swallow. Do not get in eyes or in mouth or on skin. Do not get on skin or clothing. Avoid exposure-obtain special instruction before use. Smoking, eating, and drinking should be prohibited in the application area. Provide sufficient air exchange and/or exhaust in work rooms. Keep container closed when not in use. Open container carefully as contents may be under pressure. Dispose of rinse water in accordance with local and national regulations. Persons susceptible to 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. Industrial use of aprotic polar solvents for cleaning can release hazardous primary aromatic amines (>0.1%).

Conditions for safe storage

Keep container tightly closed in a cool, well-ventilated place. Keep in properly labeled containers. Observe label precautions. Protect from moisture. Electrical installations/working materials must comply with technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Materials to avoid

For incompatible materials please refer to Section 10 of this SDS.

Section 8. Exposure Controls/Personal Protection

Control parameters

Occupational exposure limits

Ingredient name	CAS #	Exposure limits
4,4'-Methylenediphenyl diisocyanate	101-68-8	**ACGIH** TWA: 0.05 mg/m^3 **NIOSH** TWA: 0.05 mg/m^3 CEIL: 0.2 mg/m^3 **OSHA** CEIL: 0.2 mg/m^3
Diphenylmethane diisocyanate, polymeric	9016-87-9	**NIOSH** TWA: 0.05 mg/m^3 CEIL: 0.2 mg/m^3 **OSHA** CEIL: 0.2 mg/m^3
2,4'-methylenediphenyl diisocyanate	5873-54-1	**NIOSH** TWA: 0.05 mg/m^3 CEIL: 0.2 mg/m^3 **OSHA** CEIL: 0.2 mg/m^3

Respiratory protection

Use a properly fitted, air purifying or supplied air 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.
In emergency, non-rotine and unknown exposure situations, including confind space entries, a NIOSH certified full facepiece pressure demand self-contained breathing apparatus(SCBA) or a full facepiece pressure demand self- contained air supply should be used.

Section 8. Exposure Controls/Personal Protection

Hand protection

The suitability for a specific workplace should be discussed with the producers of the protective gloves. 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.
Use chemical resistant gloves classified under Standard EN374: protective gloves against chemicals and microorganisms. Examples of gloves material that might prove 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 frequent repeated contact may occur, a glove with protection class 5 or higher (breakthrough time is greater than 240 minutes according to EN 374) is recommended.
When only brief contact is expected, a glove with protection class 3 or higher (breakthrough time greater than 60 minutes accroding to EN 374) is recommended.
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 as, but not limited to: other chemicals that may be handled, physical requirements (cut/puncture protection, dexeterity, thermal protection), as well as instructions/specifications provided by the glove supplier.
By industrial use of aprotic polar solvents for cleaning: Butyl rubber (0.7mm), Nitrile Rubber (0.4mm) , Chloroprene (0.5mm).

Eye/face protection

Safety eyewear complying with an approved standard should be used when risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases and dusts. Chemical splash goggles. Always wear eye protection when the potential for inadvertent eye contact with the product cannot be excluded. Please follow all applicable local/national requirements when selecting protective measures for a specific workplace. Ensure that eyewash stations and safety showers are close to the workstation location.

Skin and Body protection

Impervious clothing. Choose body protection according to the amount and concentration of the dangerous substance at the workplace. Recommended: Overall (preferably heavy cotton) or Tyvek-Pro Tech “C”, Tyvek-Pro “F” disposable coverall.

Protective measures

Personal protective equipment comprising suitable protective gloves, safety goggles and protective clothing. The type of protective clothing must be selected according to the concentration and amount of the dangerous substance at the specific workplace. Ensure that eye flushing systems and safety showers are located close to the working place.

Hygiene measure:

Handle in accordance with good industrial hygiene and safety practices.
Wash face, hands, and any exposed skin thoroughly after handling. Remove contaminated clothing and protective equipment before entering the eating area. When using do not eat, drink or smoke. Contaminated clothing should not be allowed outside the workplace. Wash hands before breaks and immediately after handling the product and at the end of the workday.

Section 9. Physical and Chemical Properties

Appearance	
Physical state	Liquid
Color	Light brown
Odor	Slight, musty
Odor threshold	No data is available on the product.
pH	No data is available on the product.
Melting point	No data is available on the product.
Boiling point	No data is available on the product.
Flash Point	Closed cup: >110 ˚C (>230 ˚F) [Seta closed cup]
Evaporation rate:	No data is available on the product.
Flammability (solid, gas)	No data is available on the product.
Lower & upper explosive (flammable) limits	No data is available on the product.
Vapor density	No data is available on the product.
Vapor pressure	No data is available on the product.
Relative density	1.23 (20 ºC/68 ºF)
Density	1.23 g/cm^3 (20 ºC/68 ºF)
Solubility-water	No data is available on the product.
Solubility-other solvents	No data is available on the product.
Partition coefficient: n-octanol/water	No data is available on the product.
Auto- ignition temperature	No data is available on the product.
Decomposition temperature	No data is available on the product.
Self-accelerating decomposition temperature (SADT)	No data is available on the product.
Viscosity	55 mPa*s (77 ºF/25 ºC)
Explosive properties	No data is available on the product.
Oxidizing properties	No data is available on the product.
Particle size	No data is available on the product.

Section 10. Stability and Reactivity

Reactivity	No dangerous reaction is known under conditions of normal use.
Chemical stability	Stable at room temperature.
Possibility of hazardous reactions	Reaction with water (moisture) produces CO_2 – gas. Exothermic reaction with materials containing active hydrogen groups. The reaction becomes progressively more vigorous and can be violent at higher temperatures if miscibility of the reaction partners is good or is supported 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 polyuria is formed at the interface by liberating carbon dioxide gas.
Conditions to avoid:	Extremes of temperature and direct sunlight. Exposure to air or moisture over prolonged periods.
Incompatible materials	Water, amines, metals, bases, and acids.
Hazardous decomposition products	Combustion products may include carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons, and HCN. In the event of extreme heat (>500 degrees C), aniline is suspected of being formed.

Section 11. Toxicological Information

Acute toxicity

Product
Acute inhalation toxicity

Assessment: the substance /mixture is not toxic on inhalation as defined by dangerous goods regulations.
Remarks: Methods used to generate the exposure concentrations in the animal studies use extreme laboratory conditions and does not represent the actual exposure conditions of the material in the workplace, storage, transportation or expected use on the market due to very low vapor pressure. Therefore, these test results cannot be used for hazard classification of the material. Rather, an acute toxicity estimate is calculated based on weight of evidence and expert judgement and is used to justify a modified classification for acute inhalation toxicity.
Acute Toxicity estimation: 10.24 mg/l
Exposure time: 4 hrs.
Test atmosphere: vapor
Method: Calculation

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	
Acute oral toxicity	LD50 (Rate, male & female) :>2,000 mg/kg Assessment: The substance or mixture has no acute oral toxicity. Remarks: Information given is based on data obtained from similar substances.
Acute inhalation toxicity:	LC50 (Rate, male & female) :431.18 mg/m^3 Exposure time- 4 hrs. Test atmosphere: dust/mist Method: OECD Test guideline 403 Assessment: The component/mixture is moderately toxic after short term inhalation
Acute dermal toxicity:	LD50 (Rabbit): >9,400 mg/kg Remarks: Information given is based on data obtained from similar substances.
Diphenylmethane diisocyanate, polymeric	
Acute oral toxicity	LD50 (Rate, male) :>10,000 mg/kg Method: OECD Test Guidance 401. Assessment: The substance or mixture has no acute oral toxicity.
Acute inhalation toxicity:	LC50 (Rate, male & female) :431.18 mg/m^3 Exposure time- 4 hrs. Test atmosphere: dust/mist Method: OECD Test guideline 403 Assessment: The component/mixture is moderately toxic after short term inhalation.
Acute dermal toxicity:	LD50 (Rabbit, male & female): >9,400 mg/kg Method: OECD Test guideline 402. Remarks: The substance or mixture has no acute dermal toxicity.
2,4'-methylenediphenyl diisocyanate	
Acute oral toxicity	LD50 (Rate, male) :>2,000 mg/kg Assessment: The substance or mixture has no acute oral toxicity. Remarks: Information given is based on data obtained from similar substances
Acute inhalation toxicity:	LC50 (Rate, male & female) :431.18 mg/m^3 Exposure time- 4 hrs. Test atmosphere: dust/mist Method: OECD Test guideline 403 Assessment: The component/mixture is moderately toxic after short term inhalation.
Acute dermal toxicity:	LD50 (Rabbit, male & female): >9,400 mg/kg Method: OECD Test guideline 402. GLP: no Remarks: Information given is based on data obtained from similar substances

Section 11. Toxicological Information

Irritation/Corrosion

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Species: Rabbit Assessment: Irritating skin. Method: OECD Test guideline 404. Result: Irritating skin.
Diphenylmethane diisocyanate, polymeric	Species: Rabbit Assessment: Irritating skin. Result: Irritating skin.
2,4'-methylenediphenyl diisocyanate	Species: Rabbit Assessment: Irritating skin. Method: OECD Test guideline 404. Result: Irritating skin.

Serious eye damage/eye irritation

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Species: Rabbit Result: Irritating to eyes. Assessment: Irritating to eyes Method: OECD Test guideline 405.
Diphenylmethane diisocyanate, polymeric	Species: Rabbit Result: Mild eye irritation. Method: OECD Test guideline 405. Remarks: largely based on human evidence.
2,4'-methylenediphenyl diisocyanate	Species: Rabbit Result: Eye Irritation. Method: OECD Test guideline 405. Remarks: Information given is based on data obtained from similar substances. Largely based on human evidence.

Respiratory or Skin Sensitization

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	**Skin Sensitization** Exposure route: Skin Species: Guinea pig Assessment: May cause sensitization by skin contact. Method: OECD Test Guideline 406 Result: May cause sensitization by skin contact. **Respiratory Sensitization** Test type: Lymph node assay (LLNA) Exposure routes: Respiratory Tract Species: Guinea pig Assessment: May cause sensitization by inhalation. Result: May cause sensitization by inhalation. Assessment: May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause an allergic skin reaction.

Section 11. Toxicological Information

Respiratory or Skin Sensitization (cont.)

Diphenylmethane diisocyanate, polymeric	**Skin Sensitization** Exposure route: Skin Assessment: The product is a skin sensitizer, sub- category 1B. Result: The product is a skin sensitizer, sub- category 1B. Remarks: Information given is based on data obtained from similar substances. **Respiratory Sensitization** Test type: Lymph node assay (LLNA) Exposure routes: Respiratory Tract Species: Rat Assessment: May cause sensitization by inhalation. Result: May cause sensitization by inhalation.
2,4'-methylenediphenyl diisocyanate	**Skin Sensitization** Exposure route: Skin Species: Guinea pig Assessment: May cause sensitization by skin contact. Method: OECD Test Guideline 406 Result: May cause sensitization by skin contact. **Respiratory Sensitization** Exposure routes: Respiratory Tract Species: Guinea pig Assessment: May cause sensitization by inhalation. Result: May cause sensitization by inhalation. Remarks: Information given is based on data obtained from similar substances.

Germ Cell mutagenicity

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	**Genotoxicity in vitro** Test type: Reverse mutation assay Test system: Salmonella typhimurium Metabolic activation: with and without metabolic activation. Method Directive 67/548/EEC, Annex, B. 13/14 Result: Negative. **Genotoxicity in vivo** Test type: Micronnucleus test Species: Rat (male) Cell type: Somatic Application route: Inhalation Exposure time: 3 weeks Method: OECD Test Guideline 474. Result: Negative. Test type: comet assay Species: Rat (male) Cell type: Liver Application route: Inhalation (dust/mist/fumes) Dose: 2.5/4.9/12 mg/m^3 Method: OECD Test Guideline 489. Result: Negative.

Section 11. Toxicological Information

Germ Cell mutagenicity (Cont.)

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	**Genotoxicity in vitro** Metabolic activation: with and without metabolic activation. Method: OECD Test Guideline 471. Result: Not classified due to inconclusive data. GLP: Yes Test type: Reverse mutation assay Test system: Salmonella typhimurium Concentration: 0-1200 μg/plate Metabolic activation: with and without metabolic activation. Method: Mutagenicity (Salmonella typhimurium- reverse mutation assay). Result: Negative. **Genotoxicity in vivo** Test type: Micronnucleus test Species: Rat (male) Cell type: Somatic Application route: Inhalation Exposure time: 3 weeks Dose: 113 mg/m^3 Method: OECD Test Guideline 474. Result: Negative. Remarks: Information given is based on data obtained from similar substances. Test type: comet assay Species: Rat (male) Cell type: Liver Application route: Inhalation (dust/mist/fumes) Dose: 2.5/4.9/12 mg/m^3 Method: OECD Test Guideline 489. Result: Negative. Remarks: Information given is based on data obtained from similar substances.
2,4'-methylenediphenyl diisocyanate	**Genotoxicity in vitro** Test type: Reverse mutation assay Test system: Salmonella typhimurium Metabolic activation: with and without metabolic activation. Method Directive 67/548/EEC, Annex, B. 13/14 Result: Negative. **Genotoxicity in vivo** Test type: Micronnucleus test Species: Rat (male) Cell type: Somatic Application route: Inhalation Exposure time: 3 weeks Method: OECD Test Guideline 474. Result: Negative. Remarks: Information given is based on data obtained from similar substances. Test type: comet assay Result: Negative. Remarks: Information given is based on data obtained from similar substances.

Section 11. Toxicological Information

Carcinogenicity

Product:

Remarks Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in a chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m^3), 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/m^3 and no effect at 0.2 mg/m^3 . Overall, the tumor incidence, both benign and malignant, and the number of animals with 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.

Remarks Industrial use of aprotic polar solvents for cleaningcan release hazardous primary aromatic amines (>0.1%). Based on animal studies, primary aromatic amines are considered as potential carcinogen to humans. Some of those chemicals are proven carcinogens to humans. Provided the recommended personal protective equipment and hygiene measures are applied, no adverse effects to human helath are to be expected.

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Species: Rat, female Application route: Inhalation Exposure time: 24 months Activity duration: 17 hrs. Dose: 0,0.2,0.7,2.1,3 mg/m^3 Frequency of treatment: 5 days/week NOEL: 0.7 mg/m^3 LOAEL: 0.23 mg/m^3 Result: Positive Target organs: lungs
Diphenylmethane diisocyanate, polymeric	Species: Rat, female Application route: Inhalation Exposure time: 24 months Dose: 0.7 mg/m^3 Frequency of treatment: 5 daily. Result: Negative Species: Rat, male & female Application route: Inhalation (dust/fume/mist) Exposure time: 24 months Activity duration: 6 hrs. Dose: 0,0.2,1.0, 6.0 mg/m^3 Frequency of treatment: 5 days/week NOEL: 1 mg/m^3 LOAEL: 6 mg/m^3 Method: OECD Test Guideline 453

Section 11. Toxicological Information

Carcinogenicity (Cont.)

Product/ingredient name	Test
2,4'-methylenediphenyl diisocyanate	Species: Rat, (Male and female) Application Route: Inhalation Exposure time: 24 months Dose 1 mg/m^3 Frequency of treatment: 5 daily Method: OECD Test Guideline 453 Target organs: lungs Remarks: Information given is based on data obtained from similar substances.

IARC No components of this product present at levels greater than or equal to 0.1% is identified as probable, possible, or confirmed human carcinogen by IARC.

OSHA No components of this product present at levels greater than or equal to 0.1% is identified as carcinogen or potential carcinogen by OSHA.

NTP No components of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive Toxicity

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	**Effect on fetal development** Test type: Pre-natal Application Route: Inhalation (dust/mist/fume) Dose 0/1/4/12 mg/m^3 General Toxicity Material: NOAEC: 4 mg/m^3 Method: OECD Test Guideline 414 Result: No teratogenic effects
2,4'-methylenediphenyl diisocyanate	**Effect on fetal development** Test type: Pre-natal Species: Rat, female Application Route: Inhalation General Toxicity Material: NOAEC: 4 mg/m^3 Developmental Toxicity: NOAEC: 4 mg/m^3 Result: No teratogenic effects Remarks: Information given is based on data obtained from similar substances

Section 11. Toxicological Information

STOT- Single exposure

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Exposure routes: Inhalation Target Organs: Respiratory system Assessment: May cause respiratory irritation. The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.
Diphenylmethane diisocyanate, polymeric	Exposure routes: Inhalation Target Organs: Respiratory tract Assessment: May cause respiratory irritation.
2,4'-methylenediphenyl diisocyanate	Exposure routes: Inhalation Target Organs: Respiratory tract Assessment: The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation. May cause respiratory irritation.

STOT- Repeated exposure

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Exposure routes: Inhalation Target Organs: Respiratory system Assessment: May cause damage to organs through prolonged or repeated exposure. The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.
Diphenylmethane diisocyanate, polymeric	Exposure routes: Inhalation (dust/mist/fume) Assessment: May cause damage to organs through prolonged or repeated exposure
2,4'-methylenediphenyl diisocyanate	Exposure routes: Inhalation Target Organs: Respiratory tract Assessment: May cause damage to organs through prolonged or repeated exposure. The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Repeated dose toxicity

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Species: Rat, female LOEC: 1 mg/m^3 Application route: Inhalation Test atmosphere: dust/mist Exposure time: 2 years, 17 hrs. Number of exposures: 5 days/week Dose: 0,0.2,0.7,2.1,mg/m^3 Method: chronic toxicity Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Section 11. Toxicological Information

Repeated dose toxicity(can't)

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	Species: Rat, female LOEC: 1 mg/m^3 Application route: Inhalation Test atmosphere: dust/mist Exposure time: 2 years, 17 hrs. Number of exposures: 5 days/week Dose: 0,0.2,0.7,2.1,mg/m^3 Method: chronic toxicity Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.
2,4'-methylenediphenyl diisocyanate	Species: Rat, female LOEC: 1 mg/m^3 Application route: Inhalation Test atmosphere: dust/mist Exposure time: 2 years, 17 hrs. Number of exposures: 5 days/week Dose: 0,0.2,0.7,2.1, mg/m^3 Method: chronic toxicity Assessment: The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2.

Aspiration Toxicity	No data available
Experience with human exposure	No data available
Toxicology, Metabolism, Distribution	No data available
Neurological effects	No data available
Further information	No data available

Section 12. Ecological Information

Ecotoxicity

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	**Toxicity to fish** LC50 (Brachydanio rerio (Zebrafish)): > 100 mg/l End point: mortality Exposure time: 96 hours Test Substance: Fresh water Method: OECD Test Guideline 203 **Toxicity to daphnia and other aquatic invertebrates** EL50 (Daphnia magma (Water flea)): 9 mg/l End point: immobilization Exposure time: 48 hours Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 202 **Toxicity to algae/aquatic plants** EC50 (Desmodesmus subspicatus (green algae): > 100 mg/l Exposure time: 72 hours Test type: static test Test substance: Fresh water Method: OECD Test Guideline 201 GLP: Yes **Toxicity to daphnia and other aquatic invertebrates (Chronic Toxicity)** NOEC (Daphnia magma (Water flea)): $\geq$ 10 mg/l Exposure time: 21 days Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 211 Remarks: Information given is based on data obtained from similar substances. **Toxicity to microorganisms** EC (activated sludge): > 1,000 mg/l Exposure time: 3 hrs. Test type: static test Method: OECD Test Guideline 209 **Toxicity to soil dwelling organisms** NOEC (Eisenia fetida (earthworms)): $\geq$ 1,000 mg/l Exposure time: 336 hrs. **Plant Toxicity** EC50 > 1,000 mg/kg Exposure time: 14 days Species: Avena sativa (oats) EC50 > 1,000 mg/kg Exposure time: 14 days Species: Lactuca sativa (lettuce)

Ecotoxicology Assessment

Acute aquatic toxicity Toxic to aquatic life

Section 12. Ecological Information

Ecotoxicity (con't)

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	**Toxicity to fish** LC50 (Brachydanio rerio (Zebrafish)): > 1,000 mg/l End point: mortality Exposure time: 96 hours Test type: Static Test Substance: Fresh water Method: OECD Test Guideline 203 **Toxicity to daphnia and other aquatic invertebrates** EL50 (Daphnia magma (Water flea)): 31.7 mg/l End point: immobilization Exposure time: 48 hours Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 202 GLP: Yes **Toxicity to algae/aquatic plants** EC50 (Desmodesmus subspicatus (green algae) :> 100 mg/l Exposure time: 72 hours Test substance: Fresh water Method: OECD Test Guideline 201 Remarks: Information given is based on data obtained from similar substances. EL10 (Desmodesmus subspicatus (green algae) :> 100 mg/l Exposure time: 72 hours Test substance: Fresh water Method: OECD Test Guideline 201 Remarks: Information given is based on data obtained from similar substances. **Toxicity to daphnia and other aquatic invertebrates (Chronic Toxicity)** NOEC (Daphnia magma (Water flea)): $\geq$ 10 mg/l Exposure time: 21 days Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 211 **Toxicity to microorganisms** EC50 (Activated sludge): > 100 mg/l Exposure time: 3 hours Test type: static test Test substance: Fresh water Method: OECD Test Guideline 209 Remarks: Information given is based on data obtained from similar substances. NOEC (Activated sludge): 250 mg/l Exposure time: 3 hours Test type: static test Test substance: Fresh water Method: OECD Test Guideline 209 Remarks: Information given is based on data obtained from similar substances **Toxicity to soil dwelling organisms** NOEC (Eisenia fetida (earthworms)): $\geq$ 1,000 mg/l Exposure time: 14 days Method: OECD Test Guideline 207

Section 12. Ecological Information

Ecotoxicity (con't)

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	**Plant Toxicity** EC50 > 1,000 mg/kg Exposure time: 14 days Species: Avena sativa (oats) Method: OECD Test guideline 208 NOEC50 ≥ 1,000 mg/kg Exposure time: 14 days Species: Avena sativa (oats) EC50 > 1,000 mg/kg Exposure time: 14 days Species: Lactuca sativa (lettuce) NOEC50 ≥ 1,000 mg/kg Exposure time: 14 days Species: Lactuca sativa (lettuce)) Method: OECD Test guideline 208
2,4'-methylenediphenyl diisocyanate	**Toxicity to fish** LL50 (Brachydanio rerio (Zebrafish)): > 100 mg/l End point: mortality Exposure time: 96 hours Test Substance: Fresh water Method: OECD Test Guideline 203 **Toxicity to daphnia and other aquatic invertebrates** EL50 (Daphnia magma (Water flea)): 3.7 mg/l End point: immobilization Exposure time: 48 hours Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 202 **Toxicity to algae/aquatic plants** EL10 (algae) :> 100 mg/l Exposure time: 72 hours Test substance: Fresh water Method: OECD Test Guideline 201 NOELR (algae) > 100 mg/l Exposure time: 72 hours Test substance: Fresh water Method: OECD Test Guideline 201 Toxicity to daphnia and aquatic invertebrates (Chronic toxicity) NOEC (Daphnia magma (Water flea)): ≥ 10 mg/l Exposure time: 21 days Test type: semi-static test Test substance: Fresh water Method: OECD Test Guideline 211 Remarks: Information given is based on data obtained from similar substances

Section 12. Ecological Information

Ecotoxicity (con't)

Product/ingredient name	Test
2,4'-methylenediphenyl diisocyanate	**Toxicity to microorganisms** EC50 (Activated sludge): > 1,000 mg/l Exposure time: 3 hours Test substance: Fresh water Method: OECD Test Guideline 209 Remarks: Information given is based on data obtained from similar substances. NOEC (Activated sludge): 250 mg/l Exposure time: 3 hours Test substance: Fresh water Method: OECD Test Guideline 209 Remarks: Information given is based on data obtained from similar substances
	Toxicity to soil dwelling organisms NOEC (Eisenia fetida (earthworms)): ≥ 1,000 mg/l Exposure time: 14 days Method: OECD Test Guideline 207 Remarks: Information given is based on data obtained from similar substances
	Plant Toxicity EC50 > 1,000 mg/kg Exposure time: 14 days Species: Avena sativa (oats) Method: OECD Test guideline 208 NOEC50 ≥ 1,000 mg/kg Exposure time: 14 days Species: Avena sativa (oats) EC50 > 1,000 mg/kg Exposure time: 14 days Species: Lactuca sativa (lettuce) NOEC50 ≥ 1,000 mg/kg Exposure time: 14 days Species: Lactuca sativa (lettuce)) Method: Terrestrial plants test: Seeding Emergence and Seedling Growth Test.

Persistence and degradability

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	**Biodegradability; Aerobic** Inoculum: Activated sludge, non-adapted Result: Not readily biodegradable Biodegradation: 0% Exposure time: 28 days Method: OECD Test Guideline 301F. Test substance: Fresh Water **Stability in Water: Degradation half-life (DT50): 20 hrs. (25 Deg C)** Remarks: Fresh Water
Diphenylmethane diisocyanate, polymeric	**Biodegradability; Aerobic** Inoculum: Domestic sewage Concentration: 30 mg/l Result: Not biodegradable Biodegradation: 0% Exposure time: 28 days Method: inherent Biodegradability: Modified MITI test (II) Test substance: Fresh Water

Section 12. Ecological Information

Persistence and degradability (cont.')

Product/ingredient name	Test
Diphenylmethane diisocyanate, polymeric	**Biochemical Oxygen Demand (BOD): 77 mg/l** Incubation time: 28 days Test substance: Fresh Water Method: OECD Test Guideline 302C **Stability in Water: Degradation half-life (DT50): 0.8 d (25 Deg C)** Method: No information available GLP: No Remarks: Fresh Water
2,4'-methylenediphenyl diisocyanate	**Biodegradability; Aerobic** Inoculum: Domestic sewage Concentration: 30 mg/l Result: Not biodegradable Biodegradation: 0% Exposure time: 28 days Method: inherent Biodegradability: Modified MITI test (II) Remarks: Information given is based on data obtained from similar substances **Biochemical Oxygen Demand (BOD): 77 mg/l**

Bioaccumulation potential

Product/ingredient name	Test
4,4'-Methylenediphenyl diisocyanate	Bioaccumulation Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF):200 Exposure time: 28 days Concentration: 0.08 µg/l Test method: OECD Test Guideline 305 Remarks: Bioaccumulation is unlikely Partition coefficient: n-octanol/water Log Pow: 4.51 (72 °F/ 22 °C) pH:7 Method: OECD Test Guideline 117
Diphenylmethane diisocyanate, polymeric	Bioaccumulation Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF):200 Exposure time: 28 days Concentration: 0.08 mg/l Test substance: Fresh water Remarks: based on data obtained from similar substances.
2,4'-methylenediphenyl diisocyanate	Bioaccumulation Species: Fish Concentration: 0.08 mg/l Method: OECD Test Guideline 305 GLP: Yes Remarks: Bioaccumulation is unlikely Partition coefficient: n-octanol/water Log Pow: 4.52 (68 °F/ 20 °C) pH:7 Method: OECD Test Guideline 117 GLP: No

Section 12. Ecological Information

Mobility in soil

4,4'-Methylenediphenyl diisocyanate	
Distribution among environmental compartments	Log $K_{OC:}$ 4.5 Method: QSAR
Stability in soil	Soil temperature: 72 °F/ 22 °C Dissipation time: 24 hrs. Method: OECD Test guideline 307

Diphenylmethane diisocyanate, polymeric	
Distribution among environmental compartments	Log $K_{OC:}$ 4.5 Method: QSAR

Other adverse effects

Ozone-Depletion Potential — Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone- CAA Section 602 Class I Substance.
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App. A + B).

Section 13. Disposal Considerations

Disposal methods

Waste from residues
Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container. Send to a licensed waste management company.
Contaminated Packaging
Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

Section 14. Transport Information

	Proper shipping name	UN/NA Number	Class	PG *	Additional information
DOT	Other Regulated Substance, Liquid, N.O.S. (Methylene Diphenyl Diisocyanate)	NA 3082	9 	III	Non bulk packaging does not require the class 9 labeling. Refer to current DOT regulations.
TDG	Not regulated	-	-	-	-
IMDG	Not regulated	-	-	-	-
IATA	Not regulated	-	-	-	-

PG*: Packing group, ERG code 171

Section 15. Regulatory Information

CERLA Reportable Quantities

Components	CAS#	Component RQ (Lbs.)
4,4'-Methylenediphenyl diisocyanate	101-68-8	5000 lbs.

Section 15. Regulatory Information

SARA 311/312

Acute toxicity (any route of exposure)
Respiratory or skin sensitization
Skin corrosion or irritation
Serious eye damage or eye irritation
Specific target organ toxicity (single or repeated exposure)

	Product name	CAS #	Concentrations %
SARA 313 Form R- Reporting requirements	4,4'-Methylenediphenyl diisocyanate	101-68-8	≥ 50 -< 70
	Diphenylmethane diisocyanate, polymeric	9016-87-9	≥ 30 -< 50

TSCA All components are listed on the TSCA registry.

State Regulations

California Prop 65 This product does not contain any chemicals known to the state of California to cause cancer, birth defects or other reproductive harm.

Section 16. Other Information

Hazardous Material Information System (USA)

Health -2* **Flammability-1** **Physical hazards 0**

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 CFR1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with fully implemented HMIS® program. HMIS® is a registered trademark of the National Paint & Coating Association (NPCA). HMIS® materials may be purchased exclusively from J.J. Keller.

National Fire Protection Association (USA) NFPA 704

Health -2 **Flammability-1** **Instability-0** **Special- N/A**

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

Liquid decontaminates (percentages by weight or volume)
Decontaminate 1: *- sodium carbonate: 5-10 % * - liquid detergent: 0.2-2% *- Water: to make up 100 %
Decontaminate 2: *- concentrated ammonia solution: 3-8 % * - liquid detergent: 0.2-2% *- Water: to make up 100 %
Decontaminate 1 reacts slower with diisocyanates but is more environmentally friendly that decontaminate 2.
Decontaminate 2 contains ammonia. Ammonia presents health hazards. (See supplier safety information).

Date of revision 10/29/24
Date of previous issue 1/18/24
Revisions Update GHS Hazard statements, & precautionary statements. Update information regarding spill response and toxicology information.
Version 6

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