MATERIAL SAFETY DATA SHEET

1. PRODUCT AND PREPARATION INFORMATION

Manufacturer/ Supplier…….Dominion Sure Seal Group of Companies
6175 Danville Road, Mississauga, Ontario
Canada, L5T 2H7
(905)670-5411
U.S.A. 1-800-265-0790
Emergency telephone numbers…….Dominion Sure Seal (8 AM TO 4 PM EST)
(905)670-5411
CANUTEC (24 HR) (613) 996 – 6666
Product Name……....SureMix Semi-Flexible Part-A
Product Code…….XSMAP
Chemical Family……...Aromatic Isocyanate Pre-polymer
Chemical Name….....Isocyanic Acid, Polymethylene Polyphenylene Ester
Synonyms……..Polymeric Diphenylmethane Diisocyanate (MDI)
CAS No…….....None Assigned; Mixture
Formula……..Not Applicable
Date……....June 1, 2014

II. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous Ingredients

Ingredient Name/CAS No.	**Exposure Limits**	**Concentration**
4,4 –Diphenylmethane Diisocyanate		Upper Bound 20%
101-68-8	OSHA: 0.02 ppm Ceiling 0.20 mg/m^3 Ceiling	
	ACGIH: 0.005 ppm TWA 0.051 mg/m^3 TWA	
Higher Oligomers of MDI		
9016-87-9	OSHA: Not Established ACGIH: Not Established	30-35%
Diphenylmethane Diisocyanate (2,2’; 2,4’)		
26447-40-5	OSHA: Not Established ACGIH: Not Established	0-5%

III. HAZARDS IDENTIFICATION

Emergency Overview

WARNING: Color: Dark Brown; Form: Liquid; Odor: Slightly Musty Odor; May cause eye, skin and respiratory tract irritation; Harmful if inhaled; May cause allergic skin reaction; May cause lung damage; Use cold water spray to cool fire-exposed containers to minimize the risk of rupture; Toxic gases/fumes are given off during burning or thermal decomposition; Closed container may explode under extreme heat.

POTENTIAL HEALTH EFFECTS:

Route(s) Of Entry **Skin:** Contact from liquid and aerosols (spray application).
Inhalation: Although MDI is low in volatility, an inhalation hazard can exist from MDI aerosols or vapors formed during heating, foaming or spraying.

Human Effects and Symptoms of Overexposure:

Acute Inhalation: MDI vapors or mist at concentrations above the TLV can irritate (burning sensation) the mucous membranes in the respiratory tract (nose throat, lungs) causing runny nose, sore throat, coughing, chest discomfort, shortness of breath and reduced lung function (breathing obstruction). Persons with a pre-existing, nonspecific bronchial hyperactivity can respond to concentrations below the TLV with similar symptoms as well as asthma attack. Exposure well above the TLV may lead to bronchitis, bronchial spasm and pulmonary edema (fluid in lungs). These effects are usually reversible. Chemical or hypersensitive pneumonitis, with flu-like symptoms (e.g., fever, chills) has also been reported. These symptoms can be delayed up to several hours after exposure.

Chronic Inhalation: As a result of previous repeated overexposures or a single large mist dose, certain individuals develop isocyanate sensitization (chemical asthma) which will cause them to react to a later exposure to isocyanate at levels well below the TLV. These symptoms, which can include chest tightness, wheezing, cough, shortness of breath or asthma attack, could be immediate or delayed (up to several hours after exposure). Similar to many non-specific asthmatic responses, there are reports that once sensitized an individual can experience these symptoms upon exposure to dust, cold air or other irritants. This increased lung sensitivity can persist for weeks and in severe cases for several years. Overexposure to isocyanates has also been reported to cause lung damage (including decrease in lung function) which may be permanent. Sensitization can either be temporary or permanent.

Acute Skin Contact: Isocyanates react with skin protein and moisture and can cause irritation which may include the following symptoms: reddening, swelling, rash, scaling or blistering. Cured material is difficult to remove.

Chronic Skin Contact: Prolonged contact can cause skin reddening, swelling, rash scaling, blistering and in some cases, skin sensitization. Individuals who have skin sensitization can develop these symptoms from contact with liquid or vapors. Animal tests have indicated that respiratory sensitizations can result from skin

contact with MDI. This data reinforces the need to prevent direct skin contact with MDI. (See Toxicological Information, Sensitization).

Acute Eye Contact: Liquid, aerosols or vapors are irritating and can cause tearing, reddening and swelling. If left untreated, corneal damage can occur and the injury is slow to heal. However, damage is usually reversible. See First Aid measures for treatment.

Chronic Eye Contact: None Found.

Acute Ingestion: Can result in irritation and corrosive action in the mouth, stomach tissue and digestive tract. Symptoms can include sore throat, abdominal pain, nausea, vomiting and diarrhea.

Chronic Ingestion: None Found.

Carcinogenicity: Neither MDI nor polymeric MDI are listed by the NTP, IARC or regulated by OSHA as carnicogens. See two year inhalation study in Toxicological Information, Carcinogenicity.

Medical Conditions Aggravated By Exposure: Asthma, other respiratory disorders (bronchitis, emphysema, bronchial hyperreactivity), skin allergies, eczema.

IV. FIRST AID MEASURES

First Aid For Eyes: Flush with copious amounts of water, preferably luke warm water for at least 15 minutes, holding eyelids open all the time. Refer individuals to physician or ophthalmologist for immediate follow-up.

First Aid For Skin: Remove contaminated clothing. Wash affected skin thoroughly with soap and water. Wash contaminated clothing thoroughly before re-use. For severe exposures, get under safety shower after removing clothing, then get medical attention. For lesser exposures, seek medical attention if irritation develops or persists after the area is washed.

First Aid For Inhalation: Move to an area free from risk of further exposure. Administer oxygen or artificial respiration as needed. Obtain medical attention. Asthmatic-type symptoms may develop and maybe immediate or delayed upto several hours. Consult physician should this occur.

First Aid For Ingestion: ***Do not induce vomiting***. Give 1 to 2 cups of milk or water to drink. ***Do not give anything by mouth to an unconscious person.*** Consult physician.

Note To Physician: *Eyes*. Stain for evidence of corneal injury. If cornea is burned, instill antibiotic steroid preparation frequently. Workplace vapors have produced reversible corneal epithelial edema impairing vision. *Skin.* This compound is a known skin sensitizer. Treat symptomatically as for contact dermatitis or thermal burn. *Ingestion*. Treat symptomatically. There is no specific antidote. Inducing vomiting is contraindicated because of the irritating nature of this compound. *Respiratory*. This compound is a known pulmonary sensitizer. Treatment is essentially symptomatic. An individual having a skin or pulmonary sensitization reaction to this material should be removed from exposure to any isocyanate.

V. FIRE FIGHTING MEASURES

Flash Point: 415^0 F (213^0 C) Pensky-Martens Closed Cup (ASTM D-93)
Extinguishing Media: Dry Chemical; Carbon Dioxide, Foam, Water Spray for large fires.
Special Fire Fighting Procedures: Full emergency equipment with self-contained breathing apparatus and full protective clothing should be worn by fire fighters. During a fire, MDI vapors and other irritating and highly toxic gases may be generated by thermal decomposition and combustion. (See Stability and Reactivity). At temperatures above 400^0 F (204^0 C), polymeric MDI can polymerize and decompose which can cause pressure build-up in closed containers. Explosive rupture is possible. Therefore, use cold water to cool fire-exposed containers.

VI. ACCIDENTAL RELEASE MEASURES

Spill or Leak Procedures: Evacuate and ventilate spill area; dike spill to prevent entry into water system; wear full protective equipment, including respiratory equipment during clean-up. (See Employee Protection Recommendations). Major Spill: If temporary control of isocyanate vapor is required, a blanket of protein foam (available at most fire departments) may be placed over the spill. Large quantities may be pumped into closed but not sealed, container for disposal. Minor Spill: Absorb isocyanates with sawdust or other absorbent, shovel into suitable unsealed containers, transport to well-ventilated area (outside) and treat with neutralizing solution: mixture of water (80%) with non-ionic surfactant Surfonic N-95 (20%), or ; water (90%), concentrated ammonia (3-8%), and detergent (2%). Add about 10 parts of neutralizer per part of isocyanate, with mixing. Allow to stand uncovered for 48 hours to let carbon dioxide escape. Clean-up: Decontaminate floor with decontamination solution letting stand for at least 15 minutes.

VII. HANDLING AND STORAGE

Storage Temperature (Min/Max): 64^0 F (18^0 C)/ 86^0 F (30^0 C)
Shelf Life: 6 months
Special Sensitivity: If container is exposed to high heat, 400^0 F (204^0 C) it can be pressurized and possibly rupture. MDI reacts slowly with water to form carbon dioxide gas. This gas can cause sealed containers to expand and possibly rupture.
Handling/Storage Precautions: Store in tightly closed containers to prevent moisture contamination. Do not reseal if contamination is suspected. Avoid contact with skin and eyes. Do not breathe aerosols or vapors. Warning properties (irritation of the eyes, nose and throat or odor) are not adequate to prevent chronic overexposure from inhalation. This material can produce asthmatic sensitization upon either single inhalation exposure to a relatively high concentration or upon repeated inhalation exposures to lower concentrations. Exposure to vapors of

heated MDI can be extremely dangerous. Employee education and training in the safe use and handling of this compound are required under the OSHA Hazard Communication Standard.

VIII. PERSONAL PROTECTION

Eye Protection Requirements: Liquid chemical goggles. Vapor resistant goggles should be worn when contact lenses are in use. In a splash hazard environment chemical goggles should be used in combination with a full face-shield.

Skin Protection Requirements: Permeation resistant gloves (butyl rubber, nitrile Rubber, polyvinyl alcohol). However, please note that PVA degrades in water. Cover as much of the exposed skin area as possible with appropriate clothing. If skin creams are used, keep the area covered by the cream to a minimum.

Ventilation Requirements: Local exhaust should be used to maintain levels below the TLV whenever MDI is processed, heated or spray applied. Standard reference sources regarding industrial ventilation (i.e., ACGIH Industrial Ventilation) should be consulted for guidance about adequate ventilation.

Respirator Requirements: Concentrations greater than the TLV can occur when MDI is sprayed, heated or used in a poorly ventilated area. In such cases, or whenever concentrations of MDI exceed the TLV or are not known, respiratory protection must be worn. A supplied air respirator (either positive pressure or continuous flow type) is required. In an emergency situation, a self-contained breathing apparatus may be used. MDI has poor warning properties, since the concentration at which MDI can be smelled is substantially higher than the maximum exposure limit. Observe OSHA regulations for respirator use (29 CFR 1910.134).

Monitoring: Isocyanate exposure levels must be monitored. Monitoring of airborne isocyanates in the breathing zone of individuals should become part of the overall employee exposure characterization program. Monitoring techniques have been developed by NIOSH, and OSHA.

Medical Surveillance: Medical supervision of all employees who handle or come in contact with isocyanate is recommended. These should include pre-employment and periodic medical examinations with pulmonary function tests (FEV, FVC as a minimum). Persons with asthmatic-type conditions, chronic bronchitis, other chronic respiratory diseases or recurrent skin eczema or sensitization should be excluded from working with isocyanates. Once a person is diagnosed as sensitized to an isocyanate, no further exposure can be permitted.

Additional Protective Measures: Safety showers and eyewash stations should be available. Educate and train employees in safe use of this product. Follow all label warnings and data sheet instructions.

IX. PHYSICAL AND CHEMICAL PROPERTIES

Physical Form…….: Liquid
Color…….……...: Dark Brown
Odor…….……: Slightly musty odor
Molecular weight……: Trade Secret
pH…….……... : Not Established
Boiling Point…….……...: 406^0 F (208^0 C) at 5 mmHg for MDI
Melting/Freezing Point……...: Below 32^0 F (0^0 C) for MDI
Solubility in Water……..: Not Soluble. Reacts slowly with water to liberate carbon dioxide gas.
Specific Gravity……..…..……..: 1.185 @ 77^0 F (25^0 C)
Bulk Density……..……..: 9.9 lbs/gal
% Volatile by Volume…….……: Negligible
Vapor Pressure……: Less than 10^{-5} mmHg at 77^0 F (25^0 C) for MDI
Vapor Density…….……: 8.2 (MDI) (Air = 1)

X. STABILITY AND REACTIVITY

Stability……...: This is a stable material
Hazardous Polymerization……....: May occur; Contact with moisture, other materials which react with isocyanates, or temperatures above 400^0 F (204^0 C), may cause polymerization.
Incompatibilities…….: Water, amines, strong bases, alcohols. Will cause some corrosion to copper alloys and aluminum.
Instability Conditions…….: Contamination with water.
Decompositions Products……..: By high heat and fire: carbon monoxide, oxides of Nitrogen, traces of HCN, MDI vapors or aerosols.

XI. TOXICOLOGICAL INFORMATION

Toxicity Data For: Diphenylmethane Diisocyanate (Monomeric and Polymeric)
Acute Toxicity
Oral LD50…….: Greater than 10,000 mg/kg (Rat)
Dermal LD50……...: Greater than 6,200 mg/kg (Rabbit)
Inhalation LC50……...: The 4-hour LC50 for Polymeric MDI in rats ranges from 370 to 490 mg/m^3. The 4-hour LC50 for monomeric MDI in rats was estimated to be between 172 and 187 mg/m^3.
Eye Effects……...: Slight to moderate irritation.
Skin Effects……..: Slight to moderate irritation.
Sensitization…….: MDI has been shown to produce dermal sensitization in laboratory animals. Evidence of respiratory sensitization has also been observed in guinea pigs. In addition, there is some evidence suggestive of cross-sensitization between different types of diisocyanates.
Chronic Toxicity……..…: In a combined chronic inhalation toxicity/oncogenicity study, rats were exposed to an aerosol of polymeric MDI for 6 hours per day, 5 days

per week for one or two years. The exposure concentrations were 0, 0.2, 1.0 and 6 mg/m^3. Microscopic examination of tissues revealed the effects of irritation to the nasal cavity and lungs in animals exposed to 1.0 and 6.0 mg/m^3. The No Observable Effect Level (NOEL) was 0.2 mg/m^3.

Carcinogenicity…….: In the study described above (See Chronic Toxicity), the occurrence of pulmonary adenomas and a single pulmonary adenocarcinoma was considered to be related to MDI. These tumors were observed only in rats exposed to the High concentration of 6.0 mg/m^3.

Mutagenicity……..: Positive (Salmonella microsome test with metabolic activation; cell transformation assay) as well as negative (mouse lymphoma specific locus mutation test with or without metabolic activation) results have been observed "in-vitro". The use of certain solvents which rapidly hydrolyze MDI is suspected of producing mutagenicity in some of these studies. MDI was negative in an "in-vivo" (mouse micronucleus) assay.

Developmental Toxicity…...: Rats were exposed to polymeric MDI at air concentrations of 0, 1, 4 and 12 mg/m^3 during days 6-15 of gestation. Maternal Toxicity (including mortality) was observed at the highest concentration of 12 mg/m^3 accompanied by embryo and fetal toxicity. However, no teratogenic effects were observed even at this lethal concentration.

XII. ECOLOGICAL INFORMATION

Ecology Data For: Diphenylmethane Diisocyanate (monomeric and Polymeric)

Aquatic Toxicity……..…: LC50 – 24 hr. (static): Greater than 500 mg/liter for Daphne magna, Limnea Stagnalis and Zebra fish (Brachydanio rerio) for both monomeric and polymeric MDI.

XIII. DISPOSAL CONSIDERATIONS

Waste Disposal Method……: Waste must be disposed of in accordance with federal, state and local environmental control regulations. Incineration is the preferred method.

Empty Container Precautions.: Empty containers must be handled with care due to product residue. Decontaminate containers prior to disposal. Empty decontaminated containers should be crushed to prevent reuse. ***Do not heat or cut empty container with electric or gas torch***. (See Fire Fighting Measures and Stability and Reactivity). Gases may be highly toxic.

XIV. TRANSPORTATION INFORMATION

Technical Shipping Name…..: Methylene diphenyl diisocyanate
Freight Class Bulk……..: Methylene diphenyl diisocyanate
Freight Class Package……: Chemicals, NOI (Isocyanate), NMFC 60000
Product Label……..: Product Label Established

DOT (Domestic Surface)
Proper Shipping Name……: Other Regulated Substances, Liquid, N.O.S.*
Hazard Class or Division…….: 9
UN/NA Number……..…..: NA 3082
Packing Group…….: III
Hazardous Substance……...: MDI, (Methylene diphenyl diisocyanate)
DOT Product RQ lbs (kgs)…..: 13888 lbs (6299.6 kgs)
Hazard Label (s)……..: Class 9
Hazard Placard(s)……: Class 9

* When in individual containers of less than the product RQ, this material ships as non-regulated.
IMO/IMDG CODE (Ocean)
Hazard Class Division Number….: Non-Regulated
ICAO/IATA (Air)
Hazard Class Division Number….: Non-Regulated

XV. REGULATORY INFORMATION

OSHA Status……..: This product is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1910.1200.
TSCA Status……...: On TSCA inventory.
CERCLA Reportable Quantity...: 5000 lbs for 4,4'- Diphenylmethane Diisocyanate, CAS # 101-68-8.
SARA Title III:
Section 302 Extremely Hazardous Substances…: NONE
Section 311/312 Hazard Categories……..: Immediate Health Hazard; Delayed Health Hazard.
Section 313 Toxic Chemicals……: Polymeric Diphenylmethane Diisocyanate, CAS # 9016-87-9, 100%;
Contained in this polymeric product is 4,4' – Diphenylmethane Diisocyanate, CAS # 101-68-8; Upper Bound 20%.
RCRA Status……: MDI is not listed as a hazardous waste. To the best of Our Knowledge, MDI does not meet the criteria of a hazardous waste if discarded in its purchased form. However, under RCRA, it is the responsibility of the user of the products to determine, at the time of the disposal, whether a product meets any of the criteria for a hazardous waste. This is because product uses, transformations, mixtures, processes, etc., may render the resulting material hazardous, under the criteria of ignitability, corrosivity, reactivity and toxicity

characteristics under the new Toxicity Characteristics Leaching Procedure (TCLP) 40 Code of Federal Regulations 261.20-24.

The following chemicals are specifically listed by individual states; other product specific health and safety data in other sections of the MSDS may also be applicable for state requirements. For details on your regulatory requirements you should contact the appropriate agency in your state.

Component Name/ CAS Number	Concentration	State Code
4,4' –Diphenylmethane Diisocyanate		
101-68-8	Upper Bound 20%	PA1, FL, IL, MA, RI, NJ1, CN2
Higher Oligomers of MDI		
9016-87-9	30-35%	PA3, NJ4
Diphenylmethane Diisocyanate (2,2'; 2,4')		
26447-40-5	0-5%	PA3, NJ4

FL = Florida substance List
IL = Illinois Toxic Substances List
MA = Massachusetts Hazardous Substance List
NJ1 = New Jersey Hazardous Substance List
NJ4 = New Jersey Other- included in 5 predominant ingredients > 1%
PA1 = Pennsylvania Hazardous Substance List
PA3 = Pennsylvania Non-hazardous present at 3% or greater.
RI = Rhode Island List of Designated substances.
CN2 = Canada WHMIS Ingredient Disclosure List over 0.1%.

XVI. OTHER INFORMATION

NFPA 704M Ratings:	Health	Flammability	Reactivity	Other
	3	1	1	0

0=Insignificant 1=Slight 2= Moderate 3= High 4=Extreme

HMIS Ratings:	Health	Flammability	Reactivity
	3*	1	1

0-Minimal 1=slight 2=Moderate 3= Serious 4= Severe
* Chronic Health Hazard

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