SAFETY DATA SHEET

SUPRASEC® 2456

HUNTSMAN
Enriching lives through innovation

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Identification of the substance or mixture

Product name : SUPRASEC® 2456

Use of the substance/mixture : Component of a Polyurethane System

Company/undertaking identification

Supplier : Huntsman Holland BV
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Rotterdam
The Netherlands
Tel +31 181 29 91 11

Emergency telephone number: (24h/24h) EUROPE: +32 35 75 1234
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Local contact address : if available, see section 16.

2. HAZARDS IDENTIFICATION

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : Carc. Cat. 3; R40
Xn; R20, R48/20
Xi; R36/37/38
R42/43

Physical/chemical hazards : Reacts slowly with water to produce carbon dioxide which may rupture closed containers. This reaction accelerates at higher temperatures.

Human health hazards : Limited evidence of a carcinogenic effect.
Harmful by inhalation.
Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Irritating to eyes, respiratory system and skin.
May cause sensitisation by inhalation and skin contact.
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. A hyper-reactive response to even minimal concentrations of MDI may develop in sensitised persons. The onset of the respiratory symptoms may be delayed for several hours after exposure.

See Section 11 for more detailed information on health effects and symptoms.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance/preparation : Preparation

Ingredient name	CAS number	%	EC number	Classification
Isocyanic acid, polymethylenepolyphenylene ester	9016-87-9	60 - 100	Polymer	Carc. Cat. 3; R40 Xn; R20, R48/20 Xi; R36/37/38 R42/43
Isocyanates, reaction product of polyol with methylenediphenyl diisocyanate		13 - 30	Not available	Carc. Cat. 3; R40 Xn; R20, R48/20 Xi; R36/37/38

See section 16 for the full text of the R-phrases declared above				R42/43

Occupational exposure limits, if available, are listed in Section 8.

4. FIRST AID MEASURES

First-aid measures

Inhalation : If inhaled, remove to fresh air. If not breathing, give artificial respiration. 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.

Skin contact : After contact with skin, wash immediately with plenty of warm soapy water. Get medical attention if irritation develops. Wash clothing before reuse. Clean shoes thoroughly before reuse. 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.

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

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

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.

See Section 11 for more detailed information on health effects and symptoms.

5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable : Foam, CO2 or dry powder.

Not suitable : 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.

Special exposure hazards : No specific hazard.

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.

Hazardous thermal decomposition products : Combustion products may include: carbon oxides (CO, CO_2) nitrogen oxides (NO, NO_2 etc.) hydrocarbons and HCN.

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 : Immediately contact emergency personnel. Evacuate the area. Keep upwind to avoid inhalation of vapours. Clean-up should only be performed by trained personnel. People dealing with major spillages should wear full protective clothing including respiratory protection. Use suitable protective equipment (section 8).

Environmental precautions : Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : If the product is in its solid form: Spilled MDI flakes should be picked up carefully. The area should be vacuum cleaned to remove remaining dust particles completely. If the product is in its liquid form: Absorb spillages onto sand, earth or any suitable adsorbent material. Leave to react for at least 30 minutes. Do not absorb onto sawdust or other combustible materials. Shovel into open-top drums for further decontamination. Wash the spillage area with water. Test atmosphere for MDI vapour. Neutralise small spillages with decontaminant. Remove and dispose of residues. The compositions of liquid decontaminants are given in Section 16. See also brochure PU 193-1 (see section 16).

7. HANDLING AND STORAGE

Handling : Do not breathe vapour/spray. Avoid contact with skin and eyes. Atmospheric concentrations should be minimised and kept as low as reasonably practicable below the occupational exposure limit. The efficiency of the ventilation system must be monitored regularly because of the possibility of blockage. When the product is sprayed or heated, suitable respiratory protection equipment with positive air supply is required. Keep equipment clean.
A basic essential in sampling, handling and storage is the prevention of contact with water. Keep stocks of decontaminant readily available. The compositions of liquid decontaminants are given in Section 16. See also brochure PU 193-1 (see section 16).

Storage : Store between the following temperatures: 16 to 38°C (60.8 to 100.4°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Packaging materials

Recommended : Suitable containers: Steel. Stainless steel.
Unsuitable containers: Copper., copper alloy and galvanised surfaces

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredient name	Occupational exposure limits
United Kingdom (UK)	
Diphenylmethane 4,4'- diisocyanate	**EH40/2005 WELs (United Kingdom (UK), 8/2007). Skin sensitiser.** STEL: 0.07 mg/m³, (as NCO) 15 minute(s). TWA: 0.02 mg/m³, (as NCO) 8 hour(s).

Recommended monitoring procedures : 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.

Exposure controls

Occupational exposure controls : Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective occupational exposure limits. MDI can only be smelled if the occupational exposure limit has been exceeded considerably.

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.

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.

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.

When only brief contact is expected, a glove with protection class of 3 or higher (breakthrough time greater than 60 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.

Eye 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.

Skin 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.
Body: Recommended: Overall (preferably heavy cotton) or Tyvek-Pro Tech 'C' , Tyvek-Pro 'F' disposable coverall.

Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9. PHYSICAL AND CHEMICAL PROPERTIES

General information

Appearance

Physical state : Liquid.

Colour : Brown.

Odour : slightly musty

Important health, safety and environmental information

Boiling point : >300°C decomposes

Flash point : Closed cup: >110°C (>230°F)
Open cup: 202°C (395.6°F)

Explosion limits : Not explosive

Relative density : 1.2

Density : 1.2 g/cm^3 [25°C (77°F)]

Solubility : insoluble in water.

Partition coefficient (LogKow) : Not applicable. Reacts with water and octanol.

Viscosity : Dynamic: 60 to 90 mPa·s (60 to 90 cP)

Vapour density : 8.5

Other information

Auto-ignition temperature : >600°C

10. STABILITY AND REACTIVITY

Stability : Stable at room temperature. 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.

Conditions to avoid : Avoid high temperatures.

Materials to avoid : water, alcohols, amines, bases, and acids

Hazardous decomposition products : Combustion products may include: carbon oxides (CO, CO_2) nitrogen oxides (NO, NO_2 etc.) hydrocarbons and HCN.

11. TOXICOLOGICAL INFORMATION

Potential acute health effects

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

Ingestion : Low oral toxicity. Ingestion may cause irritation of the gastrointestinal tract.

Skin contact : Irritating to skin. May cause sensitisation 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.

Eye contact : Irritating to eyes.

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Diphenylmethane 4,4'- diisocyanate	LC50 Inhalation Dusts and mists	Rat	0.49 mg/L	4 hours

Sensitiser

Product/ingredient name	Route of exposure	Species	Result
Diphenylmethane 4,4'- diisocyanate	skin	Guinea pig	Not sensitizing
	Respiratory	Guinea pig	Sensitising

Potential chronic health effects

Carcinogenicity

Product/ingredient name	Result	Species	Dose	Exposure
Diphenylmethane 4,4'- diisocyanate	Positive - Inhalation - NOAEL	Rat - Male, Female	1 mg/m3	2 years; 5 days per week

Mutagenicity

Product/ingredient name	Test	Experiment	Result
Diphenylmethane 4,4'- diisocyanate	EU	Experiment: In vitro Subject: Bacteria Metabolic activation: +/-	Negative
	OECD 474 Mammalian Erythrocyte Micronucleus Test	Experiment: In vivo Subject: Mammalian-Animal	Negative

Teratogenicity

Product/ingredient name	Result	Species	Dose	Exposure

Diphenylmethane 4,4'- diisocyanate	Negative - Inhalation	Rat - Male, Female	12 mg/m3 NOAEL	20 days

Chronic effects : Harmful: danger of serious damage to health by prolonged exposure through inhalation. 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 tumour 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 independent animal (rat) studies. Fetotoxicity was observed at doses that were extremely toxic (including lethal) to the mother. Fetotoxicity was not observed at doses that were not maternally toxic. The doses used in these studies were maximal, respirable concentrations, which are well in excess of defined occupational exposure limits.

Over-exposure signs/symptoms

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

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

Eyes : Adverse symptoms may include the following:
irritation
watering
redness

Target organs : Contains material which causes damage to the following organs: upper respiratory tract.

12. ECOLOGICAL INFORMATION

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Diphenylmethane 4,4'- diisocyanate	OECD 202 *Daphnia* sp. Acute Immobilisation Test	Acute EC50 >1000 mg/L Fresh water	Daphnia	24 hours Static
	OECD 209 Activated Sludge, Respiration Inhibition Test	Acute EC50 >100 mg/L Fresh water	Bacteria	3 hours Static
	OECD 203 Fish, Acute Toxicity Test	Acute LC50 >1000 mg/L	Fish	96 hours Static
	OECD 211 Daphnia Magna Reproduction Test	Chronic NOEC >10 mg/L Fresh water	Daphnia	21 days Semi-static

Biodegradability

Product/ingredient name	Test	Result	Dose	Inoculum

Diphenylmethane 4,4'- diisocyanate	OECD 302C Inherent Biodegradability: Modified MITI Test (II)	0 % - Not readily - 28 days	30 mg/L	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Diphenylmethane 4,4'- diisocyanate	-	-	Not readily

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Diphenylmethane 4,4'- diisocyanate	-	200	high

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.

Environmental effects : By comparison with an analogous product, the following values are anticipated. The measured ecotoxicity is that of the hydrolised product, generally under conditions maximising production of soluble species. Even so, the observed ecotoxicity is low/very low. A pond study showed gross contamination caused no significant toxic effects on a wide variety of flora in all trophic levels (including fish), no detectable diaminodiphenylmethane (MDA), and no evidence of bioaccumulation of MDI or MDA.

13. DISPOSAL CONSIDERATIONS

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. 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.

European waste catalogue (EWC) : The relevant EU Directives and local, regional and national regulations must be complied with. It is among the tasks of the end user to assign the waste to waste codes specific to industrial sectors and processes according to the European Waste catalogue. It is recommended that the details be agreed with the waste disposer responsible.

Europe - Waste code : 08 05 01*
16 03 05*

Hazardous waste : Yes.

14. TRANSPORT INFORMATION

International transport regulations

IMDG

Regulatory information	UN number	Classes	Packing group	Label	Additional information
ADR/RID Class	Not regulated.	-	-		-
IMDG Class	Not regulated.	-	-		-
IATA Class	Not regulated.	-	-		-

15. REGULATORY INFORMATION

EU regulations

Classification and labeling have been determined according to EU Directives 67/548/EEC and 1999/45/EC (including amendments) and take into account the intended product use.

Hazard symbol or symbols :

Xn Harmful

Risk phrases : R40- Limited evidence of a carcinogenic effect.
R20- Harmful by inhalation.
R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R36/37/38- Irritating to eyes, respiratory system and skin.
R42/43- May cause sensitisation by inhalation and skin contact.

Safety phrases : S23- Do not breathe vapour or spray.
S38- In case of insufficient ventilation, wear suitable respiratory equipment.
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Contains : 4,4'-methylenediphenyl diisocyanate

Product use : Industrial applications.

Additional warning phrases : Contains isocyanates. See information supplied by the manufacturer.

16. OTHER INFORMATION

Full text of R-phrases referred to in sections 2 and 3 - United Kingdom (UK) : R40- Limited evidence of a carcinogenic effect.
R20- Harmful by inhalation.
R48/20- Harmful: danger of serious damage to health by prolonged exposure through inhalation.
R36/37/38- Irritating to eyes, respiratory system and skin.
R42/43- May cause sensitisation by inhalation and skin contact.

Full text of classifications referred to in sections 2 and 3 - United Kingdom (UK) : Carc. Cat. 3 - Carcinogen category 3
Xn - Harmful
Xi - Irritant

History

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Notice to reader

While the information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

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

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

Liquid decontaminants (percentages by weight or volume) :
Decontaminant 1 : *- sodium carbonate : 5 - 10 % *- liquid detergent : 0.2 - 2 % *- water : to make up to 100 %
Decontaminant 2 : *- concentrated ammonia solution : 3 - 8 % *- liquid detergent : 0.2 - 2 % *- water : to make up to 100 %
Decontaminant 1 reacts slower with diisocyanates but is more environmentally friendly than decontaminant 2.
Decontaminant 2 contains ammonia. Ammonia presents health hazards. (See supplier safety information.)
Literature reference: PU 193-1 : 'MDI-Based Compositions : Hazards and Safe Handling Procedures.'
PU 181-15 : Recommended melting procedures for MDI-based isocyanates.
ISOPA Guidelines for safe Loading/Unloading, Transportation, Storage of TDI and MDI , Ref.03-96 PSC-0005-GUIDL.
SPI PMDI User Guidelines for the Chemical Protective Clothing Selection.
References of methods used in the Physico-Chemical Properties section are reported in Annex V part A to Commission Directive 92/69/EEC of 31 July 1992 adapting to technical progress for the Seventeenth time Council Directive 67/548/EEC.

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