



YAPI VE İZOLASYON MALZ.  
SAN. TİC. LTD. ŞTİ.

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## DUAYEN MS-954

### MATERIAL SAFETY DATA SHEET

#### 1. Identification of the substance/preparation and company/undertaking

**Product name:** DUAYEN MS-954 A-componenta

One component, solvent free, composition used as A component of MS-954.

**Use of the substance/preparation:** Polyurethane Prepolymer System

**Supplier:** DUAYEN YAPI VE İZOLASYON MALZ. SAN. TİC. LTD. ŞTİ.  
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#### 2. Hazards identification

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

**Classification** : Xn; R20  
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** : Harmful by 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
Diphenylmethanediisocyanate,	9016-87-9	30- 60	Xn; R20 Xi; R36/37/38 R42/43
isomers and homologues			
Isocyanates, reaction product of polyol		60- 100	Xn; R20 Xi; R36/37/38 R42/4
with methylenediphenyl diisocyanate			

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

#### 4. First aid measure

**Inhalation** : If inhaled, remove to fresh air. If not breathing, give artificial respiration. Obtain 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 soap and 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 or corn oil may be more effective than soap and water.

**Eye contact** : In case of contact, immediately flush eyes with a copious amount of water for at least 15 minutes. Obtain medical attention immediately.

**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 or wear gloves.

**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.

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

## 5. Fire-fighting measures

### Extinguishing media

**Suitable:** Foam, CO<sub>2</sub> 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.

**Hazardous thermaldecomposition products:** Combustion products may include: carbon oxides (CO, CO<sub>2</sub>) nitrogen oxides (NO, NO<sub>2</sub>...) 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 CO<sub>2</sub> -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 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

<b>Ingredient name</b>	: Diphenylmethane 4,4'- diisocyanate
<b>Occupational exposure limits:</b>	EH40-WEL (United Kingdom (UK), 9/2006). Notes: As NCO WEL 15 min limit: 0.07 mg/m <sup>3</sup> , (As NCO) 15 minute(s). WEL 8 hrs limit: 0.02 mg/m <sup>3</sup> , (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

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frequently repeated contact may occur, a glove with protection class of 5 or higher (breakthrough time greater than 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** : Yellowish.  
**Odour** : Slightly musty

#### Important health, safety and environmental information

**Boiling point** : >300°C decomposes  
**Flash point** : Closed cup: 230°C (446°F) Open cup: 186°C (366.8°F)  
**Explosion limits** : Not explosive  
**Relative density** : 1.10  
**Density** : 1.10 g /cm<sup>3</sup>  
**Solubility** : insoluble in water  
**Octanol/water partition Coefficient** : Not applicable. Reacts with water and octanol  
**Viscosity** : 25.00-32.00 poise (at 25 °C)  
**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 CO<sub>2</sub> -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<sub>2</sub>) nitrogen oxides (NO, NO<sub>2</sub>...) hydrocarbons and HCN.

## 11. Toxicological information

### Potential acute health effects Inhalation :

**Inhalation** : This product is a respiratory irritant and potential respiratory sensitizer: 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 sensitizers including diisocyanates. These results emphasize the need for protective clothing including gloves to be worn at all times when handling these chemicals or in maintenance work.

**Eye contact** : Irritating to eyes.

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Diphenylmethane 4,4'- diisocyanate	LD50 Dermal	Rabbit	>5000 mg/kg -	
	LD50 Oral	Rat	>5000 mg/kg -	
	LC50 Inhalation	Rat	0.49 mg/L	4 hours
	Dusts and mists			
	LC50 Inhalation	Rat	490 mg/m <sup>3</sup>	1 hours
	Vapour			
	LC50 Inhalation	Rat	>2240 mg/m <sup>3</sup>	1 hours

## Vapour

**Potential chronic health effects:**

**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/m<sup>3</sup>), 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/m<sup>3</sup> and no effects at 0,2 mg/m<sup>3</sup>. 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 :** No specific data.

**Ingestion :** No specific data.

**Skin :** No specific data.

**Eyes :** No specific data.

**Target organs :** Contains material which causes damage to the following organs: lungs, upper respiratory tract, skin.

**12. Ecological information****Aquatic ecotoxicity:**

Product/ingredient name	Test	Result	Species	Exposure
Diphenylmethane 4,4'- diisocyanate	-	Acute EC50 >1000 mg/L	Daphnia	48 hours
	-	Acute LC50 >1000 mg/L	Fish	96 hours

**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 hydrolysed 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. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers. 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.

**Hazardous waste:** The classification of the product may meet the criteria for a hazardous waste.

**14. Transport information**

**Transport over land(ADR/RID)** :not a hazardous material.

**Transport over inland waterways (ADN/ADNR)** :not a hazardous material.

**Transport over sea(IMDG)** : not a hazardous material.

**Transport by air(ICA/O/IATA)** : not a hazardous material.

**15. Regulatory information****EU Regulations**

**Hazard symbol or symbols:** Xn: Harmful

**Risk phrases :** R20- Harmful by 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.

S36/37- Wear suitable protective clothing and gloves.

S38- In case of insufficient ventilation, wear suitable respiratory equipment.

S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).



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**Contains :** diphenylmethane- 4,4'-diisocyanate

**Product use:** 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. - Industrial applications

**Additional warning phrases:** Contains isocyanates. See information supplied by the manufacturer. This information is provided by the present Safety Data Sheet.

#### 16. Other information

**Full text of R-phrases** : R20- Harmful by inhalation.  
referred to in sections 2 and R36/37/38- Irritating to eyes, respiratory system and skin  
**3 - United Kingdom (UK)** R42/43- May cause sensitisation by inhalation and skin contact.  
**Full text of classifications** : Xn - Harmful  
referred to in sections 2 and Xi - Irritant  
**3 - United Kingdom (UK)**

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*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.*

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#### DUAYEN A- 395

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 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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