

# SAFETY DATA SHEET

According to EC No 1907/2006 as amended as at the date of this SDS

## CARADATE 80 (TDI)

Version	Revision Date:	SDS Number:	Date of last issue: 12.03.2019
6.0	09.09.2022	800001001005	Print Date 14.09.2022

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### SECTION 1: Identification of the substance/mixture and of the company/undertaking

#### 1.1 Product identifier

Trade name	: CARADATE 80 (TDI)
Product code	: U3713
Registration number EU	: 01-2119454791-34
Synonyms	: Methyl phenylene diisocyanate, TDI 80:20, Toluene 2,4- and 2,6-diisocyanate mixture
CAS-No.	: 26471-62-5

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Use of the Substance/Mixture	: Use for the manufacture of polyurethane products. Please refer to section 16 and/or the annexes for the registered uses under REACH.
Uses advised against	: This product must not be used in applications other than the above without first seeking the advice of the supplier., Restricted to professional users.

#### 1.3 Details of the supplier of the safety data sheet

Manufacturer/Supplier	: <b>Shell Chemicals Europe B.V.</b> PO Box 2334 3000 CH Rotterdam Netherlands
Telephone	: +31 (0)10 441 5137 / +31 (0)10 441 5191
Telefax	: +31 (0)20 716 8316/ +31 (0)20 713 9230
Contact for Safety Data Sheet	: sccmsds@shell.com

#### 1.4 Emergency telephone number

+44 (0) 1235 239 670 (This telephone number is available 24 hours per day, 7 days per week)

Other information	: CARADATE is a trademark owned by Shell Trademark Management B.V. and Shell Brands Inc. and used by affiliates of Royal Dutch Shell plc.
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### SECTION 2: Hazards identification

#### 2.1 Classification of the substance or mixture

##### Classification (REGULATION (EC) No 1272/2008)

Skin irritation, Category 2	H315: Causes skin irritation.
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Skin sensitisation, Category 1	H317: May cause an allergic skin reaction.
Eye irritation, Category 2	H319: Causes serious eye irritation.
Acute toxicity, Category 1, Inhalation	H330: Fatal if inhaled.
Respiratory sensitisation, Category 1	H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Specific target organ toxicity - single exposure, Category 3, Respiratory system	H335: May cause respiratory irritation.
Carcinogenicity, Category 2	H351: Suspected of causing cancer.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

### 2.2 Label elements

#### Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

Hazard statements :  
PHYSICAL HAZARDS:  
Not classified as a physical hazard according to CLP criteria.  
HEALTH HAZARDS:  
H315 Causes skin irritation.  
H317 May cause an allergic skin reaction.  
H319 Causes serious eye irritation.  
H330 Fatal if inhaled.  
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.  
H335 May cause respiratory irritation.  
H351 Suspected of causing cancer.  
ENVIRONMENTAL HAZARDS:  
H412 Harmful to aquatic life with long lasting effects.

Precautionary statements :  
**Prevention:**  
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.  
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.  
P273 Avoid release to the environment.  
**Response:**  
P302 + P352 IF ON SKIN: Wash with plenty of water and

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soap.

P304 + P340 + P310 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

### Storage:

No precautionary phrases.

### Disposal:

P501 Dispose of contents/ container to an approved waste disposal plant.

### 2.3 Other hazards

This material reacts with water to produce a violent chemical reaction.

This material is a static accumulator.

Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.

If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

#### Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)
m-tolylidene diisocyanate	26471-62-5 247-722-4	<= 100

#### Further information

Contains:

Chemical name	Identification number	Classification	Concentration (% w/w)
4-methyl-m-phenylene diisocyanate	584-84-9, 209-544-5	Carc.2; H351 Acute Tox.2; H330 Eye Irrit.2; H319 Skin Irrit.2; H315 STOT SE2; H335 Resp. Sens.1; H334 Skin Sens.1; H317 Aquatic Chronic3; H412	>= 80
2-methyl-m-phenylene	91-08-7, 202-039-0	Carc.2; H351 Acute Tox.2; H330	<= 20

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diisocyanate		Eye Irrit.2; H319 Skin Irrit.2; H315 STOT SE2; H335 Resp. Sens.1; H334 Skin Sens.1; H317 Aquatic Chronic2; H412	
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### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

- General advice : DO NOT DELAY.  
Keep victim calm. Obtain medical treatment immediately.
- Protection of first-aiders : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
- If inhaled : Call emergency number for your location / facility.  
Remove to fresh air. Do not attempt to rescue the victim unless proper respiratory protection is worn. If the victim has difficulty breathing or tightness of the chest, is dizzy, vomiting, or unresponsive, give 100% oxygen with rescue breathing or Cardio-Pulmonary Resuscitation as required and transport to the nearest medical facility.
- In case of skin contact : Remove contaminated clothing. Immediately flush skin with large amounts of water for at least 15 minutes, and follow by washing with soap and water if available. If redness, swelling, pain and/or blisters occur, transport to the nearest medical facility for additional treatment.
- In case of eye contact : Immediately flush eye(s) with plenty of water.  
Remove contact lenses, if present and easy to do. Continue rinsing.  
Transport to the nearest medical facility for additional treatment.
- If swallowed : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. Rinse mouth.

#### 4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing.  
Breathing of high vapour concentrations may cause central

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nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of coordination. Continued inhalation may result in unconsciousness and death.

Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters.

Skin sensitisation (allergic skin reaction) signs and symptoms may include itching and/or a rash.

Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision.

Respiratory sensitisation signs and symptoms are asthma-like and may include difficulty breathing, sneezing, wheezing and/or collapse due to inability to breathe.

No specific hazards under normal use conditions.

Ingestion may result in nausea, vomiting and/or diarrhoea.

### 4.3 Indication of any immediate medical attention and special treatment needed

Treatment : IMMEDIATE TREATMENT IS EXTREMELY IMPORTANT!  
Artificial respiration and/or oxygen may be necessary.  
Treat symptomatically. Following cases of gross over-exposure, investigation of liver, kidney and eye function may be advisable. Records of such incidents should be maintained for future reference.  
Product is a respiratory irritant and potential respiratory sensitizer. Treatment is essentially symptomatic for primary irritation or bronchospasm.  
Exposed persons may be kept under medical observation for at least 48 hours because delayed effects may occur.  
If skin sensitisation has developed and a causal relationship has been confirmed, further exposure should not be allowed.  
Call a doctor or poison control center for guidance.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Large fires should only be fought by properly trained fire fighters.  
Dry chemical powder, carbon dioxide or protein based foam. If water has to be used it must only be sprayed in large quantities. Do not discharge extinguishing waters into the aquatic environment.  
Foam. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only.  
Dry sand

Unsuitable extinguishing media : Do not use water in a jet.

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### 5.2 Special hazards arising from the substance or mixture

Specific hazards during fire-fighting : Will only burn if enveloped in a pre-existing fire.  
Reacts violently with water.  
Water reacts vigorously with hot product forming insoluble solids which block drains.  
Hazardous combustion products may include:  
Amines.  
Carbon dioxide  
Hydrogen cyanide  
Organic nitrogen compounds.  
Unidentified organic and inorganic compounds.  
Toxic gases  
TDI  
Carbon monoxide.

### 5.3 Advice for firefighters

Special protective equipment for firefighters : Proper protective equipment including chemical resistant gloves are to be worn; chemical resistant suit is indicated if large contact with spilled product is expected. Self-Contained Breathing Apparatus must be worn when approaching a fire in a confined space. Select fire fighter's clothing approved to relevant Standards (e.g. Europe: EN469).

Specific extinguishing methods : Standard procedure for chemical fires.

Further information : Clear fire area of all non-emergency personnel.  
All storage areas should be provided with adequate fire fighting facilities.  
Keep adjacent containers cool by spraying with water.

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## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Observe all relevant local and international regulations.  
Notify authorities if any exposure to the general public or the environment occurs or is likely to occur.  
Local authorities should be advised if significant spillages cannot be contained.

6.1.1 For non emergency personnel:  
Avoid inhaling vapour and/or mists.  
Stay upwind and keep out of low areas.  
Avoid contact with the skin.  
Isolate hazard area and deny entry to unnecessary or unprotected personnel.  
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.

6.1.2 For emergency responders:  
Avoid inhaling vapour and/or mists.  
Stay upwind and keep out of low areas.

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Avoid contact with the skin.  
Isolate hazard area and deny entry to unnecessary or unprotected personnel.  
Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks.

### 6.2 Environmental precautions

Environmental precautions : Use appropriate containment to avoid environmental contamination.  
Prevent from spreading or entering into drains, ditches or rivers by using sand, earth, or other appropriate barriers.  
Ventilate contaminated area thoroughly.

### 6.3 Methods and material for containment and cleaning up

Methods for cleaning up : Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays.  
Large spillage:  
Prevent from spreading by making a barrier with sand, earth or other containment material.  
Transfer to a labelled, sealable container for product recovery or safe disposal.  
Do not flush away residues with water. Retain as contaminated waste.  
Decontaminate residues as for small spillage.  
Small spillage:  
Contain and cover the spillage with decontaminant, wet earth or wet sand and leave to react for at least 30 minutes.  
Shovel residues into open-top drums and remove for further decontamination, where necessary. Wash area well with water and inspect.  
Retain washings as contaminated waste.  
Put leaking containers in a labelled drum or overdrum.

### 6.4 Reference to other sections

For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.,For guidance on disposal of spilled material see Section 13 of this Safety Data Sheet.,DO NOT dispose of unreacted product.,Proper disposal should be evaluated based on regulatory status of this material (refer to Section 13), potential contamination from subsequent use and spillage, and regulations governing disposal in the local area.,Highly Toxic.,Keep animals off contaminated vegetation.,May burn although not readily ignitable.,Reaction with water produces insoluble solids which block drains.,Suitable decontaminant solutions:,Sodium carbonate 5-10%, Liquid Detergent 0.2-2%, Water to make up 100%,Concentrated ammonia solution (0.880) 3 - 8 %; Liquid detergent 0.2 - 2 %.; Water 90 - 95%,The decontaminant made of concentrated ammonia is regarded as an alternative only to be used if appropriate personal and environmental measures are taken i.e. full mask respirators and gloves should be worn and the solution should be prevented from entering the drains.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

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- |                         |   |
|-------------------------|---|
| Technical measures      | : <ul style="list-style-type: none"><li>Avoid breathing of or direct contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Section 8 of this Safety Data Sheet.</li><li>Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.</li><li>Ensure that all local regulations regarding handling and storage facilities are followed.</li></ul>   |
| Advice on safe handling | : <ul style="list-style-type: none"><li>Avoid exposure. Obtain special instructions before use.</li><li>Avoid inhaling vapour and/or mists.</li><li>Monitor concentrations in air at regular intervals.</li><li>Ventilate workplace in such a way that the Occupational Exposure Limit (OEL) is not exceeded.</li><li>Use local exhaust extraction over processing area.</li><li>Avoid unintentional contact with isocyanates to prevent uncontrolled polymerisation.</li><li>For lines and fittings, avoid copper, copper alloys, zinc.</li><li>Avoid contact with skin, eyes and clothing.</li><li>It is recommended that the product be handled in a closed system. If this is not practicable use local exhaust extraction or wear respiratory protection.</li><li>To avoid uncontrolled polymerisation, avoid unintentional mixing with water, alcohols and polyols.</li><li>Do not empty into drains.</li><li>Handling Temperature:<br/>Ambient.</li><li>Agitate product whilst heating.</li><li>When handling product in drums, safety footwear should be worn and proper handling equipment should be used.</li><li>Decontaminant should be readily available.</li><li>Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.</li><li>Bulk storage tanks should be diked (bunded).</li><li>Properly dispose of any contaminated rags or cleaning materials in order to prevent fires.</li><li>Even with proper grounding and bonding, this material can still accumulate an electrostatic charge.</li><li>If sufficient charge is allowed to accumulate, electrostatic discharge and ignition of flammable air-vapour mixtures can occur.</li><li>Even when the product is not itself flammable, such vapours may be present as a result of operations involving a previously handled product, or faulty vapour recovery systems.</li><li>Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<math>\leq 1</math> m/s until fill pipe submerged to twice its diameter, then <math>\leq 7</math> m/s). Avoid splash filling.</li><li>Do NOT use compressed air for filling, discharging, or handling operations.</li></ul> |
| Product Transfer        | : <ul style="list-style-type: none"><li>If positive displacement pumps are used, these must be fitted</li></ul>   |



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with a non-integral pressure relief valve. Lines should be purged with nitrogen before and after product transfer. Refer to supplier for further product transfer instructions if required. Refer to guidance under Handling section.

Hygiene measures : Wash hands before eating, drinking, smoking and using the toilet. Launder contaminated clothing before re-use.

### 7.2 Conditions for safe storage, including any incompatibilities

Storage period : 6 Months

Recommended storage temperature : 18 - 25 °C

64 - 77 °F

Further information on storage stability : Prevent all contact with water and moist atmosphere because CO<sub>2</sub> may be liberated leading to excessive pressure in closed containers and formation of solid insoluble polymers, which can block pipes, valves, etc.  
Keep away from aerosols, flammables, oxidizing agents, corrosives and from other flammable products which are not harmful or toxic to man or to the environment.  
A reliable fixed sprinkler/deluge system should be installed.  
Prevent all contact with water and with moist atmosphere.  
Pressurization of drums to empty may result in a potentially hazardous container failure.  
Keep container tightly closed.  
Tanks must be clean, dry and rust-free.  
Prevent ingress of water.  
Must be stored in a diked (bunded) well-ventilated area, away from sunlight, ignition sources and other sources of heat.  
Tanks should be fitted with a vapour recovery system.  
Vapours from tanks should not be released to atmosphere.  
Breathing losses during storage should be controlled by a suitable vapour treatment system.  
Fit silica gel driers in small tanks if not nitrogen blanketed.  
Drums should be stacked to a maximum of 3 high.  
Storage Period:  
6 months  
Storage Temperature:  
18°C / 64 °F minimum  
25 °C / 77 °F maximum.  
Tanks should be fitted with heating coils in areas where ambient conditions can result in handling temperatures below the freezing point/pour point of the product.  
Potential exists for runaway reaction at elevated temperatures in the presence of strong bases and salts of strong bases.  
Temperatures above 43 °C: product dimerization might occur above this temperature.  
Electrostatic charges will be generated during pumping.  
Electrostatic discharge may cause fire. Ensure electrical con-

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Packaging material : tinuity by bonding and grounding (earthing) all equipment to reduce the risk.  
: Suitable material: For lines and fittings, use mild steel, stainless steel.  
Unsuitable material: Copper., Copper alloys., Zinc.

### 7.3 Specific end use(s)

Specific use(s) : Please refer to section 16 and/or the annexes for the registered uses under REACH.

Ensure that all local regulations regarding handling and storage facilities are followed.  
Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material.  
Polymerisation may cause violent rupture of cargo tanks or piping.  
See additional references that provide safe handling practices for liquids that are determined to be static accumulators:  
American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or  
National Fire Protection Agency 77 (Recommended Practices on Static Electricity).  
IEC/TS 60079-32-1: Electrostatic hazards, guidance

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

Components	CAS-No.	Value type (Form of exposure)	Control parameters	Basis
m-tolylidene diisocyanate	26471-62-5	TWA	0.02 mg/m3 (NCO)	GB EH40
	Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers. Further information can be found in the HSE publication Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma., Wherever it is reasonably practi-			

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	<p>cable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced to as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma in the categories shown in Table 1. It should be remembered that other substances not in these tables may cause occupational asthma. HSE's asthma web pages (<a href="http://www.hse.gov.uk/asthma">www.hse.gov.uk/asthma</a>) provide further information.</p>			
m-tolylidene diisocyanate		STEL	0.07 mg/m3 (NCO)	GB EH40
	<p>Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers. Further information can be found in the HSE publication Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced to as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma in the categories shown in Table 1. It should be remembered that other substances not in these tables may cause occupational asthma. HSE's asthma web pages (<a href="http://www.hse.gov.uk/asthma">www.hse.gov.uk/asthma</a>) provide further information.</p>			
m-tolylidene diisocyanate		TWA (Inhalable fraction and vapor)	0.001 ppm	ACGIH

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m-tolylidene diisocyanate		STEL (Inhalable fraction and vapor)	0.005 ppm	ACGIH
4-methyl-m-phenylene diisocyanate	584-84-9	TWA	0.02 mg/m3 (NCO)	GB EH40
	<p>Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers. Further information can be found in the HSE publication Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced to as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma in the categories shown in Table 1. It should be remembered that other substances not in these tables may cause occupational asthma. HSE's asthma web pages (<a href="http://www.hse.gov.uk/asthma">www.hse.gov.uk/asthma</a>) provide further information.</p>			
4-methyl-m-phenylene diisocyanate		STEL	0.07 mg/m3 (NCO)	GB EH40
	<p>Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified</p>			

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4-methyl-m-phenylene diisocyanate		TWA (Inhalable fraction and vapor)	0.001 ppm	ACGIH
4-methyl-m-phenylene diisocyanate		STEL (Inhalable fraction and vapor)	0.005 ppm	ACGIH
2-methyl-m-phenylene diisocyanate	91-08-7	TWA	0.02 mg/m3 (NCO)	GB EH40
	<p>Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers. Further information can be found in the HSE publication Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced to as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an</p>			

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	occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma in the categories shown in Table 1. It should be remembered that other substances not in these tables may cause occupational asthma. HSE's asthma web pages ( <a href="http://www.hse.gov.uk/asthma">www.hse.gov.uk/asthma</a> ) provide further information.			
2-methyl-m-phenylene diisocyanate		STEL	0.07 mg/m <sup>3</sup> (NCO)	GB EH40
	Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even in tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified as asthmagens or respiratory sensitisers. Further information can be found in the HSE publication Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced to as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma in the categories shown in Table 1. It should be remembered that other substances not in these tables may cause occupational asthma. HSE's asthma web pages ( <a href="http://www.hse.gov.uk/asthma">www.hse.gov.uk/asthma</a> ) provide further information.			
2-methyl-m-phenylene diisocyanate		TWA (Inhalable fraction and vapor)	0.001 ppm	ACGIH
2-methyl-m-phenylene diisocyanate		STEL (Inhalable fraction and vapor)	0.005 ppm	ACGIH

### Biological occupational exposure limits

Substance name	CAS-No.	Control parameters	Sampling time	Basis
m-tolylidene diisocyanate	26471-62-5	isocyanate-derived diamine (Isocya-	At the end of the period of exposure	GB EH40 BAT

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		nates): 1 µmol/mol creatinine (Urine)		
		toluene diamine: 5 µg/g creatinine (Urine)	End of shift	ACGIH BEI
4-methyl-m-phenylene diisocyanate	584-84-9	isocyanate-derived diamine (Isocyanates): 1 µmol/mol creatinine (Urine)	At the end of the period of exposure	GB EH40 BAT
		toluene diamine: 5 µg/g creatinine (Urine)	End of shift	ACGIH BEI
2-methyl-m-phenylene diisocyanate	91-08-7	isocyanate-derived diamine (Isocyanates): 1 µmol/mol creatinine (Urine)	At the end of the period of exposure	GB EH40 BAT
		toluene diamine: 5 µg/g creatinine (Urine)	End of shift	ACGIH BEI

### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

Substance name	End Use	Exposure routes	Potential health effects	Value
CARADATE 80 (TDI), 26471-62-5	Workers	Inhalation	Acute systemic effects	0.14 mg/m3
CARADATE 80 (TDI), 26471-62-5	Workers	Inhalation	Acute local effects	0.14 mg/m3
CARADATE 80 (TDI), 26471-62-5	Workers	Inhalation	Long-term systemic effects	0.035 mg/m3
CARADATE 80 (TDI), 26471-62-5	Workers	Inhalation	Long-term local effects	0.035 mg/m3

### Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:

Substance name	Environmental Compartment	Value
CARADATE 80 (TDI), 26471-62-5	Fresh water	0.013 mg/l
CARADATE 80 (TDI), 26471-62-5	Marine water	0.00125 mg/l
CARADATE 80 (TDI), 26471-62-5	Soil	> 1 mg/kg
CARADATE 80 (TDI), 26471-62-5	Sewage treatment plant	> 1 mg/l

## 8.2 Exposure controls

### Engineering measures

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.  
Use sealed systems as far as possible.  
Adequate ventilation to control airborne concentrations below the exposure guidelines/limits.  
Local exhaust ventilation is recommended.

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Eye washes and showers for emergency use.

Items that cannot be decontaminated should be destroyed (see Chapter 13).

Where material is heated, sprayed or mist formed, there is greater potential for airborne concentrations to be generated.

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include:

General Information:

Consider technical advances and process upgrades (including automation) for the elimination of releases. Minimise exposure using measures such as closed systems, dedicated facilities and suitable general/local exhaust ventilation. Drain down systems and clear transfer lines prior to breaking containment. Clean/flush equipment, where possible, prior to maintenance. Where there is potential for exposure: restrict access to authorised persons; provide specific activity training to operators to minimise exposures; wear suitable gloves and coveralls to prevent skin contamination; wear respiratory protection when there is potential for inhalation; clear up spills immediately and dispose of wastes safely. Ensure safe systems of work or equivalent arrangements are in place to manage risks. Regularly inspect, test and maintain all control measures. Consider the need for risk based health surveillance.

### Personal protective equipment

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex. The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.

Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Eye protection : Wear goggles for use against liquids and gas.  
Wear full face shield if splashes are likely to occur.

Approved to EU Standard EN166.

Hand protection

Remarks : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection. When prolonged or frequent repeated contact occurs. PVC. Nitrile rubber. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same but recognize that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time maybe acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Al-



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ways seek advice from glove suppliers. Contaminated gloves should be replaced. Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended.

**Skin and body protection** : Wear chemical resistant gloves/gauntlets and boots. Where risk of splashing, also wear an apron.  
Protective clothing approved to EU Standard EN14605.

**Respiratory protection** : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.

Select a filter suitable for the combination of organic gases and vapours and particles meeting EN14387 and EN143 [Filter type A/P for use against certain organic gases and vapours with a boiling point >65°C (149°F) and for use against particles].

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

**Physical state** : Liquid.

**Colour** : Pale yellow

**Odour** : Sharp, pungent

**Odour Threshold** : 0.2 ppm

**Melting / freezing point** : 10 °C

**Boiling point/boiling range** : 252 - 254 °C (1013.0 hPa)

#### Flammability

**Flammability (solid, gas)** : Not applicable

#### Lower explosion limit and upper explosion limit / flammability limit

**Upper explosion limit /** : 9.5 %(V)

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upper flammability limit	( 150 °C)
Lower explosion limit / Lower flammability limit	: 0.9 %(V) ( 118 °C)
Flash point	: 132 °C
Auto-ignition temperature	: > 595 °C
Decomposition temperature Decomposition temperature	: Data not available
pH	: Not applicable
Viscosity Viscosity, dynamic	: 2,200 mPa.s (estimated value(s) 20 °C) Method: ASTM D445
Viscosity, kinematic	: Data not available
Solubility(ies) Water solubility	: insoluble, Reacts with water to form carbon dioxide and insoluble polyureas.
Solubility in other solvents	: Data not available
Partition coefficient: n-octanol/water	: log Pow: 3.4
Vapour pressure	: 0.015 hPa (20 °C)
Relative density	: Data not available
Density	: 1,220 kg/m <sup>3</sup> (20 °C) Method: ASTM D4052
Relative vapour density	: 6 (25 °C)
Particle characteristics Particle size	: Data not available

### 9.2 Other information

Explosives	: Not applicable
Oxidizing properties	: Data not available
Evaporation rate	: Data not available
Conductivity	: Low conductivity: < 100 pS/m, The conductivity of this material makes it a static accumulator., A liquid is typically considered nonconductive if its conductivity is below 100 pS/m and is

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considered semi-conductive if its conductivity is below 10,000 pS/m., Whether a liquid is nonconductive or semiconductive, the precautions are the same., A number of factors, for example liquid temperature, presence of contaminants, and anti-static additives can greatly influence the conductivity of a liquid

Surface tension : Data not available

Molecular weight : Data not available

### SECTION 10: Stability and reactivity

#### 10.1 Reactivity

The product does not pose any further reactivity hazards in addition to those listed in the following sub-paragraph.

#### 10.2 Chemical stability

Stable under ambient conditions.

Reacts exothermically with bases (eg caustic soda), ammonia, primary and secondary amines, alcohols, water and acids.

Hygroscopic.

Reacts with water to form carbon dioxide and insoluble polyureas.

The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of reaction partners is good or is supported by stirring or by the presence of solvents.

Material will start to polymerize at elevated temperatures above 43 °C or if contaminated with water.

#### 10.3 Possibility of hazardous reactions

Hazardous reactions : Hygroscopic.

#### 10.4 Conditions to avoid

Conditions to avoid : Heat, flames, and sparks.  
Exposure to water vapour.  
Extended periods above 35 deg. C  
In certain circumstances product can ignite due to static electricity.

#### 10.5 Incompatible materials

Materials to avoid : Avoid contact with strong oxidizing agents, copper and copper alloys.

#### 10.6 Hazardous decomposition products

Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases including carbon monoxide, carbon dioxide, sulphur oxides and unidentified organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation.

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### SECTION 11: Toxicological information

#### 11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Information on likely routes of exposure : Exposure may occur via inhalation, ingestion, skin absorption, skin or eye contact, and accidental ingestion.

##### Acute toxicity

###### Components:

###### **m-tolylidene diisocyanate:**

Acute oral toxicity : LD50: > 5,000 mg/kg  
Remarks: Low toxicity:

Acute inhalation toxicity : LC50: <= 0.5 mg/l  
Remarks: Fatal if inhaled.

Acute dermal toxicity : LD50: > 5,000 mg/kg  
Remarks: Low toxicity:

##### Skin corrosion/irritation

###### Components:

###### **m-tolylidene diisocyanate:**

Remarks : Causes skin irritation.

##### Serious eye damage/eye irritation

###### Components:

###### **m-tolylidene diisocyanate:**

Remarks : Causes eye irritation.

##### Respiratory or skin sensitisation

###### Components:

###### **m-tolylidene diisocyanate:**

Remarks : May cause sensitisation by inhalation.  
May cause sensitization by skin contact.

##### Germ cell mutagenicity

###### Components:

###### **m-tolylidene diisocyanate:**

Genotoxicity in vivo : Remarks: Non mutagenic  
Based on available data, the classification criteria are not met.

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Germ cell mutagenicity- Assessment : This product does not meet the criteria for classification in categories 1A/1B.

### Carcinogenicity

#### Components:

##### **m-tolylidene diisocyanate:**

Remarks : Suspected of causing cancer.

Carcinogenicity - Assessment : May cause cancer.

Material	GHS/CLP Carcinogenicity Classification
m-tolylidene diisocyanate	Carcinogenicity Category 2
4-methyl-m-phenylene diisocyanate	Carcinogenicity Category 2
2-methyl-m-phenylene diisocyanate	Carcinogenicity Category 2

Material	Other Carcinogenicity Classification
m-tolylidene diisocyanate	IARC: Group 2B: Possibly carcinogenic to humans
4-methyl-m-phenylene diisocyanate	IARC: Group 2B: Possibly carcinogenic to humans
2-methyl-m-phenylene diisocyanate	IARC: Group 2B: Possibly carcinogenic to humans

### Reproductive toxicity

#### Components:

##### **m-tolylidene diisocyanate:**

Effects on fertility :  
Remarks: Not a developmental toxicant., Based on available data, the classification criteria are not met., Does not impair fertility.

Reproductive toxicity - Assessment : This product does not meet the criteria for classification in categories 1A/1B.

### STOT - single exposure

#### Components:

##### **m-tolylidene diisocyanate:**

Remarks : May cause respiratory irritation.

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### STOT - repeated exposure

#### Components:

##### **m-tolylidene diisocyanate:**

Remarks : Based on available data, the classification criteria are not met.

### Aspiration toxicity

#### Components:

##### **m-tolylidene diisocyanate:**

Not an aspiration hazard., Based on available data, the classification criteria are not met.

## 11.2 Information on other hazards

### Further information

#### Components:

##### **m-tolylidene diisocyanate:**

Remarks : Classifications by other authorities under varying regulatory frameworks may exist.

---

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

##### **m-tolylidene diisocyanate:**

Toxicity to fish : LC50 : > 100 mg/l  
Remarks: Practically non toxic:

Toxicity to daphnia and other aquatic invertebrates : EC50 : > 10 - 100 mg/l  
Remarks: Harmful

Toxicity to algae/aquatic plants : EC50 : > 100 mg/l  
Remarks: Practically non toxic:

Toxicity to microorganisms : IC50 : > 100 mg/l  
Remarks: Practically non toxic:

Toxicity to fish (Chronic toxicity) : Remarks: Data not available

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : Remarks: NOEC/NOEL > 1.0 - <=10 mg/l (based on test data)

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### 12.2 Persistence and degradability

#### Components:

##### **m-tolylidene diisocyanate:**

Biodegradability : Remarks: Not readily biodegradable.

### 12.3 Bioaccumulative potential

#### Components:

##### **m-tolylidene diisocyanate:**

Bioaccumulation : Remarks: Does not bioaccumulate significantly.

### 12.4 Mobility in soil

#### Components:

##### **m-tolylidene diisocyanate:**

Mobility : Remarks: If it enters soil, it will adsorb to soil particles and will not be mobile.

### 12.5 Results of PBT and vPvB assessment

#### Components:

##### **m-tolylidene diisocyanate:**

Assessment : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB..

### 12.6 Endocrine disrupting properties

no data available

### 12.7 Other adverse effects

no data available

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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Product : Recover or recycle if possible.  
It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations.

Do not dispose into the environment, in drains or in water courses  
Waste product should not be allowed to contaminate soil or

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water.

Disposal should be in accordance with applicable regional, national, and local laws and regulations.  
Local regulations may be more stringent than regional or national requirements and must be complied with.

Contaminated packaging : Drain container thoroughly.  
After draining, vent in a safe place away from sparks and fire.  
Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums.  
Send to drum recoverer or metal reclaimer.

Local legislation  
Remarks : Hazardous Waste (England and Wales) Regulations 2005.

### SECTION 14: Transport information

#### 14.1 UN number or ID number

ADR	: 2078
RID	: 2078
IMDG	: 2078
IATA	: 2078

#### 14.2 UN proper shipping name

ADR	: TOLUENE DIISOCYANATE
RID	: TOLUENE DIISOCYANATE
IMDG	: TOLUENE DIISOCYANATE
IATA	: Toluene diisocyanate

#### 14.3 Transport hazard class(es)

ADR	: 6.1
RID	: 6.1
IMDG	: 6.1
IATA	: 6.1

#### 14.4 Packing group

ADR	
Packing group	: II
Classification Code	: T1
Hazard Identification Number	: 60
Labels	: 6.1
RID	
Packing group	: II



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Classification Code : T1  
Hazard Identification Number : 60  
Labels : 6.1

### IMDG

Packing group : II  
Labels : 6.1

### IATA

Packing group : II  
Labels : 6.1

## 14.5 Environmental hazards

### ADR

Environmentally hazardous : no

### RID

Environmentally hazardous : no

### IMDG

Marine pollutant : no

## 14.6 Special precautions for user

Remarks : Special Precautions: Refer to Section 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

## 14.7 Maritime transport in bulk according to IMO instruments

Pollution category : Y  
Ship type : 2  
Product name : Toluene diisocyanate

**Additional Information** : This product may be transported under nitrogen blanketing. Nitrogen is an odourless and invisible gas. Exposure to nitrogen enriched atmospheres displaces available oxygen which may cause asphyxiation or death. Personnel must observe strict safety precautions when involved with a confined space entry.

Transport in bulk according to Annex II of Marpol and the IBC Code

## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

REACH - List of substances subject to authorisation (Annex XIV) : Product is not subject to Authorisation under REACH.

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern (Regu-

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lation (EC) No 1907/2006 (REACH),  
Article 57).

### Other regulations:

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

Environmental Protection Act 1990 (as amended). Health and Safety at Work etc. Act 1974. Consumers Protection Act 1987. Pollution Prevention and Control Act 1999. Environment Act 1995. Factories Act 1961. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment (Amendment) Regulations 2011. Chemicals (Hazard Information and Packaging for Supply) Regulations 2009. Control of Substances Hazardous to Health Regulations 2002 (as amended). Merchant Shipping (Dangerous Goods and Marine Pollutants) Regulations 1997. Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (as amended). Personal Protective Equipment Regulations 2002. Personal Protective Equipment at Work Regulations 1992. Hazardous Waste (England and Wales) Regulations 2005(as amended). Control of Major Accident Hazards Regulations 1999 (as amended). Renewable Transport Fuel Obligations Order 2007 (as amended). Energy Act 2011. Environmental Permitting (England and Wales) Regulations 2010 (as amended). Waste (England and Wales) Regulations 2011 (as amended). Planning (Hazardous Substances) Act 1990 and associated regulations. The Environmental Protection (Controls on Ozone-Depleting Substances) Regulations 2011.

Product is subject to the Control of Major Accident Hazards Regulations 2015 (2015 No. 483) based on Seveso III directive (2012/18/EU).

### The components of this product are reported in the following inventories:

AIIC	: Listed
DSL	: Listed
IECSC	: Listed
ENCS	: Listed
KECI	: Listed
NZIoC	: Listed
PICCS	: Listed
TSCA	: Listed
TCSI	: Listed

### 15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

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### SECTION 16: Other information

#### Full text of other abbreviations

ACGIH	: USA. ACGIH Threshold Limit Values (TLV)
ACGIH BEI	: ACGIH - Biological Exposure Indices (BEI)
GB EH40	: UK. EH40 WEL - Workplace Exposure Limits
GB EH40 BAT	: UK. Biological monitoring guidance values
ACGIH / TWA	: 8-hour, time-weighted average
ACGIH / STEL	: Short-term exposure limit
GB EH40 / TWA	: Long-term exposure limit (8-hour TWA reference period)
GB EH40 / STEL	: Short-term exposure limit (15-minute reference period)

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number - European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

#### Further information

Training advice	: Provide adequate information, instruction and training for operators.
Other information	: For Industry guidance and tools on REACH please visit the CEFIC website at <a href="http://cefic.org/Industry-support">http://cefic.org/Industry-support</a> .

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The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

A vertical bar (|) in the left margin indicates an amendment from the previous version.

Sources of key data used to compile the Safety Data Sheet : The quoted data are from, but not limited to, one or more sources of information (e.g. toxicological data from Shell Health Services, material suppliers' data, CONCAWE, EU IUCLID data base, EC 1272 regulation, etc).

### Identified Uses according to the Use Descriptor System

#### Uses - Worker

Title : Formulation & (re)packing of substances and mixtures- Industrial

#### Uses - Worker

Title : Flexible Foam Applications- Industrial

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

GB / EN

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### Exposure Scenario - Worker

<b>300000000982</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Formulation & (re)packing of substances and mixtures- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU3, SU10 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC2
<b>Scope of process</b>	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, sampling, maintenance and associated laboratory activities.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General risk management measures applicable to all activities	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems)General measures (skin irritants).	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE:

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	Wear a respirator conforming to EN140 with Type A/P2 filter or better.
General exposures (closed systems)Use in contained batch processes	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
General exposures (open systems)	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Batch processes at elevated temperatures	Formulate in enclosed or ventilated mixing vessels. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a full face respirator TM3 conforming to EN12942 with Type A/P2 filter or better.
Mixing operations (open systems)	Provide extraction ventilation at points where emissions occur. Wear a full face respirator TM3 conforming to EN12942 with Type A/P2 filter or better.
Process sampling	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Bulk transfersDedicated facility	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Drum/batch transfersDedicated facility	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Drum and small package filling	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not

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	feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Laboratory activities	Handle in a fume cupboard or under extract ventilation.
Equipment cleaning and maintenance Dedicated facility	Drain down and flush system prior to equipment opening or maintenance. Transfer via enclosed lines. Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Storage.	Store substance within a closed system.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1
Regional use tonnage (tonnes/year):	3.2E+04
Fraction of Regional tonnage used locally:	0.3125
Annual site tonnage (tonnes/year):	1.0E+04
Maximum daily site tonnage (kg/day):	3.3E+04
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	3.0E-04
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
Wastewater emission controls are not applicable as there is no direct	

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release to wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Wastewater emission controls are not applicable as there is no direct release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)	1.1E+09
Assumed domestic sewage treatment plant flow (m3/d)	0
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
Measured data have been used to estimate exposure.	

<b>Section 3.2 -Environment</b>	
Used EUSES model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	

<b>Section 4.2 -Environment</b>	
Not applicable.	



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### Exposure Scenario - Worker

<b>300000000983</b>	
<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Flexible Foam Applications- Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU3 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 14, PROC 15, PROC 21 <b>Environmental Release Categories:</b> ERC2, ERC3, ERC 6C
<b>Scope of process</b>	Covers material transfers, mixing, pouring or compression during open or closed moulding or slabstock operations, laboratory use, equipment cleaning and maintenance.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure < 0.5 kPa at STP
Concentration of the Substance in Mixture/Article	Covers use of substance/product up to 100% (unless stated differently).
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene is implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General risk management measures applicable to all activities	Avoid direct skin contact with product. Identify potential areas for indirect skin contact. Wear gloves (tested to EN374) if hand contact with substance likely. Clean up contamination/spills as soon as they occur. Wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop. Use suitable eye protection and gloves. Wear suitable coveralls to prevent exposure to the skin.
General exposures (closed systems)	No other specific measures identified.
General exposures (closed systems)Continuous processGeneral measures (skin irritants).	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.

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General exposures (closed systems)Use in contained batch processes	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
General exposures (open systems)	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Mixing operations (open systems)	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a full face respirator TM3 conforming to EN12942 with Type A/P2 filter or better.
Process sampling	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Bulk transfersDedicated facility	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Drum/batch transfersDedicated facility	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Injection moulding of articles(closed systems)	Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Injection moulding of articles(open systems)	Provide extraction ventilation at points where emissions occur.

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	If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
Production or preparation or articles by tableting, compression, extrusion or pelletisation	Provide extraction ventilation at points where emissions occur. Wear a full face respirator TM3 conforming to EN12942 with Type A/P2 filter or better. Limit the substance content in the product to 85%.
Low energy manipulation of substances bound in materials and/or articles.	Provide extraction ventilation at points where emissions occur. Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the product to 1 %.
Low energy manipulation of substances bound in materials and/or articles.elevated temperature	Provide extraction ventilation at points where emissions occur. Wear a respirator conforming to EN140 with Type A filter or better. Limit the substance content in the product to 1 %.
Laboratory activities	Handle in a fume cupboard or under extract ventilation.
Equipment cleaning and maintenance	Drain down and flush system prior to equipment opening or maintenance. Transfer via enclosed lines. Provide extraction ventilation at points where emissions occur. If above technical/organisational control measures are not feasible, then adopt following PPE: Wear a respirator conforming to EN140 with Type A/P2 filter or better.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Predominantly hydrophobic.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1
Regional use tonnage (tonnes/year):	4.48E+05
Fraction of Regional tonnage used locally:	0.0223
Annual site tonnage (tonnes/year):	1.0E+04
Maximum daily site tonnage (kg/day):	3.3E+04
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	

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Release fraction to air from process (initial release prior to RMM):	9.0E-05
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process re-release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
If discharging to domestic sewage treatment plant, no onsite wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
Wastewater emission controls are not applicable as there is no direct release to wastewater.	
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	0
<b>Organisational measures to prevent/limit release from site</b>	
Prevent discharge of undissolved substance to or recover from onsite wastewater.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Wastewater emission controls are not applicable as there is no direct release to wastewater.	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Maximum allowable site tonnage (MSafe) based on release following total wastewater treatment removal (kg/d)Not applicable.	1.1E-09
Assumed domestic sewage treatment plant flow (m3/d)	0
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
Measured data have been used to estimate exposure.	
<b>Section 3.2 -Environment</b>	
Used EUSES model.	

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<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>Section 4.2 -Environment</b>	
Not applicable.	