SAFETY DATA SHEET

SPECIALTY ELECTRONIC MATERIALS UK LIMITED

Safety Data Sheet according to Regulation (EC) No 1907/2006 - Annex II

Product name: GREAT STUFF PRO™ Gun Fixer Foam 750ml

Revision Date: 24.02.2022
Version: 7.1
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SPECIALTY ELECTRONIC MATERIALS UK LIMITED encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier
Product name: GREAT STUFF PRO™ Gun Fixer Foam 750ml

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Cavity sealing foam.

1.3 Details of the supplier of the safety data sheet
COMPANY IDENTIFICATION
SPECIALTY ELECTRONIC MATERIALS UK
LIMITED
KINGS COURT, LONDON ROAD
STEVENAGE
England
SG1 2NG
UNITED KINGDOM

Customer Information Number: 00800-3876-6838
SDSQuestion-EU@dupont.com

1.4 EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: +(44)-870-8200418
Local Emergency Contact: +(44)-870-8200418

SECTION 2: HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008:
Aerosols - Category 1 - H222, H229
Acute toxicity - Category 4 - Inhalation - H332
Skin irritation - Category 2 - H315
Eye irritation - Category 2 - H319
Respiratory sensitisation - Category 1 - H334

Skin sensitisation - Category 1 - H317
Carcinogenicity - Category 2 - H351
Specific target organ toxicity - single exposure - Category 3 - H335
Specific target organ toxicity - repeated exposure - Category 2 - Inhalation - H373
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008:

Hazard pictograms

Signal word: DANGER

Hazard statements

H222	Extremely flammable aerosol.
H229	Pressurised container: May burst if heated.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs (Respiratory Tract) through prolonged or repeated exposure if inhaled.

Precautionary statements

P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P260	Do not breathe dust or mist.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P410 + P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/ 122 °F.

Supplemental information

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Contains	Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]; Diphenylmethane

Diisocyanate, isomers and homologues; 4,4'-methylenediphenyl diisocyanate; o-(p-isocyanatobenzyl)phenyl isocyanate

2.3 Other hazards
Persons already sensitised to diisocyanates may develop allergic reactions when using this product. Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product.
This product should not be used under conditions of poor ventilation unless a protective mask with an appropriate gas filter (i.e. type A1 according to standard EN 14387) is used.

Endocrine disrupting properties (human health):
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Endocrine disrupting properties (environment):
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

PBT and vPvB assessment:
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

This product is a mixture.

Identification number	Component	Classification according to Regulation (EU) 1272/2008 (CLP)	specific concentration limit/ M-Factors/ Acute toxicity estimate	%
CASRN 61111-77-1 **EC-No.** Polymer **Index-No.** – **REACH No** –	Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]	Resp. Sens. 1 - H334 Skin Sens. 1 - H317	Oral ATE: > 2,000 mg/kg Inhalation ATE: 2.24 mg/l (Aerosol) Dermal ATE: > 9,400 mg/kg	45.0 - < 65.0 %
CASRN 9016-87-9 **EC-No.** 618-498-9 **Index-No.** – **REACH No** –	Diphenylmethane Diisocyanate, isomers and homologues	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 10,000 mg/kg Inhalation ATE: 0.49 mg/l (dust/mist)	10.0 - < 25.0 %

			Dermal ATE: > 9,400 mg/kg	
CASRN 101-68-8 **EC-No.** 202-966-0 **Index-No.** 615-005-00-9 **REACH No** 01-2119457014-47	4,4'-methylenediphenyl diisocyanate	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 2,000 mg/kg Inhalation ATE: 1.5 mg/l (dust/mist) Dermal ATE: > 9,400 mg/kg	5.0 - < 15.0 %
CASRN 5873-54-1 **EC-No.** 227-534-9 **Index-No.** 615-005-00-9 **REACH No** 01-2119480143-45	o-(p-isocyanatobenzyl)phenyl isocyanate	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 2,000 mg/kg Inhalation ATE: 0.387 mg/l (dust/mist) Dermal ATE: > 9,400 mg/kg	0.1 - < 1.0 %
CASRN 6425-39-4 **EC-No.** 229-194-7 **Index-No.** – **REACH No** –	N,N'-Dimorpholinodiethylether	Eye Irrit. 2 - H319	Oral ATE: > 2,000 mg/kg Dermal ATE: 3,038 mg/kg	1.0 - < 2.5 %
CASRN 75-28-5 **EC-No.** 200-857-2 **Index-No.** 601-004-00-0 **REACH No** –	Isobutane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: 260200 ppm (gas)	< 7.0 %
CASRN 74-98-6 **EC-No.** 200-827-9 **Index-No.** 601-003-00-5 **REACH No** –	propane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: > 425000 ppm (vapour)	< 4.0 %
CASRN 115-10-6 **EC-No.** 204-065-8 **Index-No.** 603-019-00-8 **REACH No** –	dimethyl ether	Flam. Gas 1 - H220 Press. Gas Liquefied gas - H280	Inhalation ATE: 164000 ppm (gas)	< 7.0 %
CASRN 61111-77-1 **EC-No.** Polymer **Index-No.** – **REACH No** –	Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-	Resp. Sens. 1 - H334 Skin Sens. 1 - H317	Oral ATE: > 2,000 mg/kg Inhalation ATE: 2.24 mg/l (Aerosol) Dermal ATE: > 9,400 mg/kg	>= 50.0 - < 60.0 %

	1,2-ethanediyl)]]			
CASRN 9016-87-9 **EC-No.** 618-498-9 **Index-No.** – **REACH No** –	Diphenylmethane Diisocyanate, isomers and homologues	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 10,000 mg/kg Inhalation ATE: 0.49 mg/l (dust/mist) Dermal ATE: > 9,400 mg/kg	>= 20.0 - < 30.0 %
CASRN 101-68-8 **EC-No.** 202-966-0 **Index-No.** 615-005-00-9 **REACH No** 01-2119457014-47	4,4'-methylenediphenyl diisocyanate	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 2,000 mg/kg Inhalation ATE: 1.5 mg/l (dust/mist) Dermal ATE: > 9,400 mg/kg	>= 10.0 - < 20.0 %
CASRN 75-28-5 **EC-No.** 200-857-2 **Index-No.** 601-004-00-0 **REACH No** –	Isobutane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: 260200 ppm (gas)	>= 1.0 - < 10.0 %
CASRN 74-98-6 **EC-No.** 200-827-9 **Index-No.** 601-003-00-5 **REACH No** –	propane	Flam. Gas 1 - H220 Press. Gas Compr. Gas - H280	Inhalation ATE: > 425000 ppm (vapour)	>= 1.0 - < 10.0 %
CASRN 6425-39-4 **EC-No.** 229-194-7 **Index-No.** – **REACH No** –	N,N'-Dimorpholinodiethylether	Eye Irrit. 2 - H319	Oral ATE: > 2,000 mg/kg Dermal ATE: 3,038 mg/kg	>= 1.0 - < 10.0 %
CASRN 5873-54-1 **EC-No.** 227-534-9 **Index-No.** 615-005-00-9 **REACH No** 01-2119480143-45	o-(p-isocyanatobenzyl)phenyl isocyanate	Acute Tox. 4 - H332 Skin Irrit. 2 - H315 Eye Irrit. 2 - H319 Resp. Sens. 1 - H334 Skin Sens. 1 - H317 Carc. 2 - H351 STOT SE 3 - H335 STOT RE 2 - H373	Eye Irrit.2; H319:C >= 5 % STOT SE3; H335:C >= 5 % Skin Irrit.2; H315:C >= 5 % Resp. Sens.1; H334:C >= 0.1 % Oral ATE: > 2,000 mg/kg Inhalation ATE: 0.387 mg/l (dust/mist) Dermal ATE: > 9,400 mg/kg	>= 0.1 - < 1.0 %

Substances with a workplace exposure limit

Identification number	Component	Classification according to Regulation (EU) 1272/2008 (CLP)]	Specific Concentration Limits/ M-Factors/ Acute Toxicity Estimate	%
CASRN 115-10-6 **EC-No.** 204-065-8 **Index-No.** 603-019-00-8 **REACH No** –	dimethyl ether	Flam. Gas 1 - H220 Press. Gas Liquefied gas - H280	Inhalation ATE: 164000 ppm (gas)	>= 1.0 - < 10.0 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

Note

Both CAS# 101-68-8 and CAS# 5873-54-1 are MDI isomers that are part of CAS# 9016-87-9.

SECTION 4: FIRST AID MEASURES

4.1 Description of first aid measures
General advice:
First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Inhalation: Move person to fresh air. If not breathing, give artificial respiration; if by mouth to mouth use rescuer protection (pocket mask, etc). If breathing is difficult, oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Skin contact: Remove material from skin immediately by washing with soap and plenty of water. Remove contaminated clothing and shoes while washing. Seek medical attention if irritation persists. Wash clothing before reuse. An MDI skin decontamination study demonstrated that cleaning very soon after exposure is important, and that a polyglycol-based skin cleanser or corn oil may be more effective than soap and water. Discard items which cannot be decontaminated, including leather articles such as shoes, belts and watchbands. Suitable emergency safety shower facility should be available in work area.

Eye contact: Immediately flush eyes with water; remove contact lenses, if present, after the first 5 minutes, then continue flushing eyes for at least 15 minutes. Obtain medical attention without delay, preferably from an ophthalmologist. Suitable emergency eye wash facility should be available in work area.

Ingestion: If swallowed, seek medical attention. Do not induce vomiting unless directed to do so by medical personnel.

4.2 Most important symptoms and effects, both acute and delayed:
Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

4.3 Indication of any immediate medical attention and special treatment needed
Notes to physician: Maintain adequate ventilation and oxygenation of the patient. May cause respiratory sensitization or asthma-like symptoms. Bronchodilators, expectorants and antitussives may be of help. Treat bronchospasm with inhaled beta2 agonist and oral or parenteral corticosteroids. Respiratory symptoms, including pulmonary edema, may be delayed. Persons receiving significant exposure should be observed 24-48 hours for signs of respiratory distress. If you are sensitized to diisocyanates, consult your physician regarding working with other respiratory irritants or sensitizers. Exposure may increase "myocardial irritability". Do not administer sympathomimetic drugs such as epinephrine unless absolutely necessary. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient. Excessive exposure may aggravate preexisting asthma and other respiratory disorders (e.g. emphysema, bronchitis, reactive airways dysfunction syndrome).

SECTION 5: FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.

Unsuitable extinguishing media: Do not use direct water stream. Straight or direct water streams may not be effective to extinguish fire.

5.2 Special hazards arising from the substance or mixture
Hazardous combustion products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Isocyanates. Hydrogen chloride. Carbon monoxide. Carbon dioxide. Hydrogen cyanide.

Unusual Fire and Explosion Hazards: Contains flammable propellant. Aerosol cans exposed to fire can rupture and become flaming projectiles. Propellant release may result in a fireball. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Dense smoke is produced when product burns.

5.3 Advice for firefighters
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Stay upwind. Keep out of low areas where gases (fumes) can accumulate. Water may not be effective in extinguishing fire. Do not use direct water stream. May spread fire. Fight fire from protected location or safe distance. Consider the use of unmanned hose holders or monitor nozzles. Eliminate ignition sources. Move container from fire area if this is possible without hazard. Use water spray to cool fire-exposed containers and fire-affected zone until fire is out.

Special protective equipment for firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. Keep upwind of spill. Keep personnel out of confined or poorly ventilated areas. Ventilate area of leak or spill. Spilled material may cause a slipping hazard. Refer to section 7, Handling, for additional precautionary measures. Confined space entry procedures must be followed before entering the area. Eliminate all sources of ignition in vicinity of spill or released vapor to avoid fire or explosion. Ground and bond all containers and handling equipment. Check area with combustible gas detector before reentering area. Ground and bond all containers and handling equipment. See Section 10 for more specific information. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

6.2 Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

6.3 Methods and materials for containment and cleaning up: Contain spilled material if possible. Absorb with materials such as: Dirt. Vermiculite. Sand. Clay. Do NOT use absorbent materials such as: Cement powder (Note: may generate heat). Collect in suitable and properly labeled open containers. Do not place in sealed containers. Suitable containers include: Metal drums. Plastic drums. Polylined fiber pacs. Wash the spill site with large quantities of water. See Section 13, Disposal Considerations, for additional information.

6.4 Reference to other sections: References to other sections, if applicable, have been provided in the previous sub-sections.

SECTION 7: HANDLING AND STORAGE

7.1 Precautions for safe handling: No smoking, open flames or sources of ignition in handling and storage area. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. Vapors are heavier than air and may travel a long distance and accumulate in low lying areas. Ignition and/or flash back may occur. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated contact with skin. Avoid breathing vapor. Use only with adequate ventilation. Contents under pressure. Do not puncture or incinerate container. Do not enter confined spaces unless adequately ventilated. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.
Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

7.2 Conditions for safe storage, including any incompatibilities: Keep in a cool place, heat causes an increase in pressure and risk of bursting. Minimize sources of ignition, such as static build-up, heat, spark or flame. See Section 10 for more specific information. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact.

Storage stability

Storage temperature:	**Storage Period:**
15 - 25 °C	18 Month

7.3 Specific end use(s): Information on specific end use(s) of this product may be provided in a technical data sheet/annex to the SDS (if available).

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters
If exposure limits exist, they are listed below. If no exposure limits are displayed, then no values are applicable.

Component	Regulation	Type of listing	Value
Diphenylmethane Diisocyanate, isomers and homologues	GB EH40	TWA	0.02 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.		
	GB EH40	STEL	0.07 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.		
4,4'-methylenediphenyl diisocyanate	ACGIH	TWA	0.005 ppm
	Further information: resp sens: Respiratory sensitization		
	GB EH40	TWA	0.02 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.		
	GB EH40	STEL	0.07 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.		
o-(p-isocyanatobenzyl)phenyl isocyanate	GB EH40	TWA	0.02 mg/m3 , as -NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; HSC/E plans to review the limit values for this substance.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.
	GB EH40 | STEL | 0.07 mg/m3 , as -NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; HSC/E plans to review the limit values for this substance.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.
	GB EH40 | TWA | 0.02 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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

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Isobutane	ACGIH	STEL	1,000 ppm
	Further information: EX: Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosive limit.; CNS impair: Central Nervous System impairment		
propane	ACGIH		See Further information
	Further information: See Appendix F: Minimal Oxygen Content; EX: Explosion hazard: the substance is a flammable asphyxiant or excursions above the TLV® could approach 10% of the lower explosive limit.; asphyxia: Asphyxia; D: Simple asphyxiant; see discussion covering Minimal Oxygen Content found in the 'Definitions and Notations' section following the NIC tables		
dimethyl ether	US WEEL	TWA	1,000 ppm
	2000/39/EC	TWA	1,920 mg/m3 1,000 ppm
	Further information: Indicative		
	GB EH40	TWA	766 mg/m3 400 ppm
	GB EH40	STEL	958 mg/m3 500 ppm
Diphenylmethane Diisocyanate, isomers and homologues	GB EH40	TWA	0.02 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented.		

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4,4'-methylenediphenyl diisocyanate	ACGIH	TWA	0.005 ppm
	Further information: resp sens: Respiratory sensitization		
	GB EH40	TWA	0.02 mg/m3 , NCO
	Further information: 53+54: 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 to 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. 54 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 asthmagens or respiratory sensitisers.; 55: 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 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.; Sen: Capable of causing occupational asthma.; 56: The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.		

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dimethyl ether	US WEEL	TWA	1,000 ppm
	2000/39/EC	TWA	1,920 mg/m3 1,000 ppm
	Further information: Indicative		
	GB EH40	TWA	766 mg/m3 400 ppm
	GB EH40	STEL	958 mg/m3 500 ppm

This material contains a simple asphyxiant which may displace oxygen. Insure adequate ventilation to prevent an oxygen deficient atmosphere.
The minimum requirement of 19.5% oxygen at sea level (148 torr O2, dry air) provides an adequate amount of oxygen for most work assignments.

Biological occupational exposure limits

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Permissible concentration	Basis
Diphenylmethane Diisocyanate, isomers and homologues	9016-87-9	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT
4,4'-methylenediphenyl diisocyanate	101-68-8	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT
o-(p-isocyanatobenzyl)phenyl isocyanate	5873-54-1	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT
Diphenylmethane Diisocyanate, isomers and homologues	9016-87-9	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT
4,4'-methylenediphenyl diisocyanate	101-68-8	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT
o-(p-isocyanatobenzyl)phenyl isocyanate	5873-54-1	urinary diamine (Isocyanates)	Urine	At the end of the period of exposure	1 µmol/mol creatinine	GB EH40 BAT

Derived No Effect Level
4,4'-methylenediphenyl diisocyanate

Workers

Acute systemic effects		***Acute local effects***		***Long-term systemic effects***		***Long-term local effects***	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
50 mg/kg bw/day	0.1 mg/m3	28.7 mg/cm2	0.1 mg/m3	n.a.	0.05 mg/m3	n.a.	0.05 mg/m3

Consumers

Acute systemic effects			***Acute local effects***		***Long-term systemic effects***			***Long-term local effects***	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
25 mg/kg bw/day	0.05 mg/m3	20 mg/kg bw/day	17.2 mg/cm2	0.05 mg/m3	n.a.	0.025 mg/m3	n.a.	n.a.	0.025 mg/m3

o-(p-isocyanatobenzyl)phenyl isocyanate

Workers

Acute systemic effects		***Acute local effects***		***Long-term systemic effects***		***Long-term local effects***	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
50 mg/kg bw/day	0.1 mg/m3	28.7 mg/cm2	0.1 mg/m3	n.a.	0.05 mg/m3	n.a.	0.05 mg/m3

Consumers

Acute systemic effects			***Acute local effects***		***Long-term systemic effects***			***Long-term local effects***	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
25 mg/kg bw/day	0.05 mg/m3	20 mg/kg bw/day	17.2 mg/cm2	0.05 mg/m3	n.a.	0.025 mg/m3	n.a.	n.a.	0.025 mg/m3

4,4'-methylenediphenyl diisocyanate

Workers

Acute systemic effects		***Acute local effects***		***Long-term systemic effects***		***Long-term local effects***	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
50 mg/kg bw/day	0.1 mg/m3	28.7 mg/cm2	0.1 mg/m3	n.a.	0.05 mg/m3	n.a.	0.05 mg/m3

Consumers

Acute systemic effects			***Acute local effects***		***Long-term systemic effects***			***Long-term local effects***	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
25 mg/kg bw/day	0.05 mg/m3	20 mg/kg bw/day	17.2 mg/cm2	0.05 mg/m3	n.a.	0.025 mg/m3	n.a.	n.a.	0.025 mg/m3

o-(p-isocyanatobenzyl)phenyl isocyanate

Workers

Acute systemic effects		***Acute local effects***		***Long-term systemic effects***		***Long-term local effects***	
Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation	Dermal	Inhalation
50 mg/kg bw/day	0.1 mg/m3	28.7 mg/cm2	0.1 mg/m3	n.a.	0.05 mg/m3	n.a.	0.05 mg/m3

Consumers

Acute systemic effects			*Acute local effects*		*Long-term systemic effects*			*Long-term local effects*	
Dermal	Inhalation	Oral	Dermal	Inhalation	Dermal	Inhalation	Oral	Dermal	Inhalation
25 mg/kg bw/day	0.05 mg/m3	20 mg/kg bw/day	17.2 mg/cm2	0.05 mg/m3	n.a.	0.025 mg/m3	n.a.	n.a.	0.025 mg/m3

Predicted No Effect Concentration

4,4'-methylenediphenyl diisocyanate

Compartment	**PNEC**
Fresh water	1 mg/l
Marine water	0.1 mg/l
Intermittent use/release	10 mg/l
Soil	1 mg/kg dry weight (d.w.)
Sewage treatment plant	1 mg/l

o-(p-isocyanatobenzyl)phenyl isocyanate

Compartment	**PNEC**
Fresh water	1 mg/l
Marine water	0.1 mg/l
Intermittent use/release	10 mg/l
Soil	1 mg/kg dry weight (d.w.)
Sewage treatment plant	1 mg/l

4,4'-methylenediphenyl diisocyanate

Compartment	**PNEC**
Fresh water	1 mg/l
Marine water	0.1 mg/l
Intermittent use/release	10 mg/l
Soil	1 mg/kg dry weight (d.w.)
Sewage treatment plant	1 mg/l

o-(p-isocyanatobenzyl)phenyl isocyanate

Compartment	**PNEC**
Fresh water	1 mg/l
Marine water	0.1 mg/l
Intermittent use/release	10 mg/l
Soil	1 mg/kg dry weight (d.w.)
Sewage treatment plant	1 mg/l

8.2 Exposure controls

Engineering controls: Use only with adequate ventilation. Local exhaust ventilation may be necessary for some operations. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines. Exhaust systems should be designed to move the air away from the source of vapor/aerosol generation and people working at this point. The odor and irritancy of this material are inadequate to warn of excessive exposure. Lethal concentrations may exist in areas with poor ventilation.

Individual protection measures
Eye/face protection: Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent.
Skin protection
Hand protection: Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Butyl rubber. Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Viton. Avoid gloves made of: Polyvinyl chloride ("PVC" or "vinyl"). When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended. When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended. Glove thickness alone is not a good indicator of the level of protection a glove provides against a chemical substance as this level of protection is also highly dependent on the specific composition of the material that the glove is fabricated from. The thickness of the glove must, depending on model and type of material, generally be more than 0.35 mm to offer sufficient protection for prolonged and frequent contact with the substance. As an exception to this general rule it is known that multilayer laminate gloves may offer prolonged protection at thicknesses less than 0.35 mm. Other glove materials with a thickness of less than 0.35 mm may offer sufficient protection when only brief contact is expected. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.
Other protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task.
Respiratory protection: Atmospheric levels should be maintained below the exposure guideline. When atmospheric levels may exceed the exposure guideline, use an approved air-purifying respirator equipped with an organic vapor sorbent and a particle filter. For situations where the atmospheric levels may exceed the level for which an air-purifying respirator is effective, use a positive-pressure air-supplying respirator (air line or self-contained breathing apparatus). For emergency response or for situations where the atmospheric level is unknown, use an approved positive-pressure self-contained breathing apparatus or positive-pressure air line with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved self-contained breathing apparatus or positive pressure air line with auxiliary self-contained air supply.
Use the following CE approved air-purifying respirator: Organic vapor cartridge with a highly toxic particulate pre-filter, type AP3 (meeting standard EN 14387).

Environmental exposure controls
See SECTION 7: Handling and storage and SECTION 13: Disposal considerations for measures to prevent excessive environmental exposure during use and waste disposal.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state	aerosol
	Form Foam

Colour	Yellow
Odour	Mild
	Odour Threshold No test data available
Melting point/freezing point	Melting point/range: No test data available
	Freezing point: No test data available
Boiling point or initial boiling point and boiling range	Boiling point/boiling range: No test data available
Flammability	Extremely flammable aerosol.
Lower explosion limit and upper explosion limit / flammability limit	**Lower explosion limit** / **Lower flammability limit** No test data available
	Upper explosion limit / **Upper flammability limit** No test data available
Flash point	Method: (closed cup) No test data available
Auto-ignition temperature	No test data available
Decomposition temperature	**Thermal decomposition** No test data available
pH	Not applicable
Viscosity	**Viscosity, kinematic** No test data available
	Viscosity, dynamic 1,340 - 2,480 mPa.s (25 °C) Method: ASTM D 445
Solubility(ies)	**Water solubility** No data available
Partition coefficient: n-octanol/water	No data available.
Vapour pressure	No test data available
Density and / or relative density	**Relative Density (water = 1)** No test data available

Relative vapour density	No test data available
Particle characteristics	Not applicable

9.2 Other information

Explosives	Not explosive
Oxidizing properties	No
Aerosols	Extremely flammable aerosol.
Substances and mixtures, which in contact with water, emit flammable gases	The substance or mixture does not emit flammable gases in contact with water.
Evaporation rate	No test data available
Molecular weight	No test data available

NOTE: The physical data presented above are typical values and should not be construed as a specification.

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: No data available

10.2 Chemical stability: Stable under recommended storage conditions. See Storage, Section 7. Unstable at elevated temperatures.

10.3 Possibility of hazardous reactions: Can occur. Exposure to elevated temperatures can cause product to decompose and generate gas. This can cause pressure build-up and/or rupturing of closed containers. Acids.

10.4 Conditions to avoid: Avoid temperatures above 50 °C
Elevated temperatures can cause container to vent and/or rupture. Exposure to elevated temperatures can cause product to decompose.

10.5 Incompatible materials: Avoid contact with: Acids. Alcohols. Amines. Ammonia. Bases. Metal compounds. Strong oxidizers. Products based on diisocyanates like TDI and MDI react with many materials to release heat. The reaction rate increases with temperature as well as with increased contact; these reactions can become violent. Contact is increased by stirring or if the other material acts as a solvent. Products based on diisocyanates such as TDI and MDI are not soluble in water and will sink to the bottom, but react slowly at the interface. The reaction forms carbon dioxide gas and a layer of solid polyurea. Reaction with water will generate carbon dioxide and heat.

10.6 Hazardous decomposition products: Decomposition products depend upon temperature, air supply and the presence of other materials. Toxic gases are released during decomposition.

SECTION 11: TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

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

Acute toxicity

Acute toxicity (Acute oral toxicity)
Not classified
Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Acute toxicity (Acute dermal toxicity)
Not classified
Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Acute toxicity (Acute inhalation toxicity)
Acute toxicity, Category 4
H332: Harmful if inhaled.
Classification procedure: Calculation method

Acute toxicity estimate, 4 Hour, dust/mist, 4.53 mg/l Calculation method

Skin corrosion/irritation
Skin irritation, Category 2
H315: Causes skin irritation.
Classification procedure: Calculation method

Prolonged contact may cause moderate skin irritation with local redness.
Material may stick to skin causing irritation upon removal.
May stain skin.

Serious eye damage/eye irritation
Eye irritation, Category 2
H319: Causes serious eye irritation.
Classification procedure: Calculation method

Product test data not available. Refer to component data.

Respiratory or skin sensitisation
Respiratory sensitisation, Category 1
H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled.

Classification procedure: Calculation method

Skin sensitisation, Category 1
H317: May cause an allergic skin reaction.
Classification procedure: Calculation method

Product test data not available. Refer to component data.

Germ cell mutagenicity
Not classified
Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Product test data not available. Refer to component data.

Carcinogenicity
Carcinogenicity, Category 2
H351: Suspected of causing cancer.
Classification procedure: Calculation method

Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Not classified
Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for classification.

Toxicity to reproduction assessment :
Product test data not available. Refer to component data.

Assessment Teratogenicity:
Product test data not available. Refer to component data.

STOT - single exposure
Specific target organ toxicity - single exposure, Category 3
H335: May cause respiratory irritation.
Classification procedure: Calculation method

Product test data not available. Refer to component data.

STOT - repeated exposure
Specific target organ toxicity - repeated exposure, Category 2
H373: May cause damage to organs through prolonged or repeated exposure if inhaled.
Classification procedure: Calculation method

Product test data not available. Refer to component data.

Aspiration Hazard
Not classified
Not classified due to lack of data. / Not classified due to data which are conclusive although insufficient for

classification.

Based on physical properties, not likely to be an aspiration hazard.

COMPONENTS INFLUENCING TOXICOLOGY:

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Acute toxicity (Acute oral toxicity)
Typical for this family of materials. Observations in animals include: Gastrointestinal irritation.
LD50, Rat, > 2,000 mg/kg Estimated. No deaths occurred at this concentration.

Acute toxicity (Acute dermal toxicity)
Typical for this family of materials. LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

For similar material(s): 2,4'-Diphenylmethane diisocyanate (CAS 5873-54-1). LC50, Rat, 4 Hour, Aerosol, 0.387 mg/l

Skin corrosion/irritation
Prolonged contact may cause skin irritation with local redness.
Material may stick to skin causing irritation upon removal.
May stain skin.

Serious eye damage/eye irritation
May cause eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No specific, relevant data available for assessment.

Assessment Teratogenicity:
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Diphenylmethane Diisocyanate, isomers and homologues

Acute toxicity (Acute oral toxicity)
Typical for this family of materials. LD50, Rat, > 10,000 mg/kg

Acute toxicity (Acute dermal toxicity)
Typical for this family of materials. LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, dust/mist, 0.49 mg/l

For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

For similar material(s): 2,4'-Diphenylmethane diisocyanate (CAS 5873-54-1). LC50, Rat, 4 Hour, Aerosol, 0.387 mg/l

Skin corrosion/irritation
Prolonged contact may cause slight skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

4,4'-methylenediphenyl diisocyanate

Acute toxicity (Acute oral toxicity)
LD50, Rat, > 2,000 mg/kg No deaths occurred at this concentration.

Acute toxicity (Acute dermal toxicity)
LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 1 Hour, dust/mist, 2.24 mg/l

Acute toxicity estimate, dust/mist, 1.5 mg/l Acute toxicity estimate according to Regulation (EC) No. 1272/2008

Skin corrosion/irritation
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause moderate skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

o-(p-isocyanatobenzyl)phenyl isocyanate

Acute toxicity (Acute oral toxicity)
For similar material(s): LD50, Rat, > 2,000 mg/kg

Acute toxicity (Acute dermal toxicity)
For similar material(s): LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, dust/mist, 0.387 mg/l

For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

Skin corrosion/irritation
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause moderate skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
For similar material(s):
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
For similar material(s): Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
For similar material(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard

Based on physical properties, not likely to be an aspiration hazard.

N,N'-Dimorpholinodiethylether

Acute toxicity (Acute oral toxicity)
LD50, Rat, > 2,000 mg/kg

Acute toxicity (Acute dermal toxicity)
LD50, Rabbit, 3,038 mg/kg

Acute toxicity (Acute inhalation toxicity)
The LC50 has not been determined.

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin.
Prolonged contact may cause skin irritation with local redness.

Serious eye damage/eye irritation
May cause severe eye irritation.
May cause corneal injury.
Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously.

Respiratory or skin sensitisation
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
This material was not mutagenic in an Ames bacterial assay.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Assessment Teratogenicity:
No relevant data found.

STOT - single exposure
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - repeated exposure
Based on available data, repeated exposures are not expected to cause significant adverse effects except at very high aerosol concentrations. Repeated excessive aerosol exposures may cause respiratory tract irritation and even death.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Isobutane

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Mouse, 4 Hour, gas, 260200 ppm

Skin corrosion/irritation
Liquid may cause frostbite upon skin contact.
No hazard from gas.

Serious eye damage/eye irritation
Liquid may cause frostbite.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Respiratory or skin sensitisation
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
No relevant data found.

STOT - single exposure
May cause drowsiness or dizziness.

STOT - repeated exposure
Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Aspiration Hazard
Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

propane

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, male and female, 4 Hour, vapour, > 425000 ppm

Skin corrosion/irritation
No hazard from gas.
Liquid may cause frostbite upon skin contact.
Effects may be delayed.

Serious eye damage/eye irritation
Essentially nonirritating to eyes.
Liquid may cause frostbite.

Respiratory or skin sensitisation
For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Assessment Teratogenicity:
Screening studies suggest that this material does not affect fetal development.

STOT - single exposure
Available data are inadequate to determine single exposure specific target organ toxicity.

STOT - repeated exposure
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

dimethyl ether

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, gas, 164000 ppm

Skin corrosion/irritation
No hazard from gas.
Liquid may cause frostbite upon skin contact.
Prolonged or repeated exposure may cause defatting of the skin leading to drying or flaking of skin.

Serious eye damage/eye irritation
No hazard from gas.
Liquid may cause frostbite.

Respiratory or skin sensitisation
No relevant information found.

For respiratory sensitization:
No relevant information found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Carcinogenicity
Did not cause cancer in laboratory animals.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

STOT - single exposure
Available data are inadequate to determine single exposure specific target organ toxicity.

STOT - repeated exposure
In animals, effects have been reported on the following organs:
Kidney.
Liver.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Acute toxicity (Acute oral toxicity)
Typical for this family of materials. Observations in animals include: Gastrointestinal irritation.
LD50, Rat, > 2,000 mg/kg Estimated. No deaths occurred at this concentration.

Acute toxicity (Acute dermal toxicity)
Typical for this family of materials. LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

For similar material(s): 2,4'-Diphenylmethane diisocyanate (CAS 5873-54-1). LC50, Rat, 4 Hour, Aerosol, 0.387 mg/l

Skin corrosion/irritation
Prolonged contact may cause skin irritation with local redness.
Material may stick to skin causing irritation upon removal.
May stain skin.

Serious eye damage/eye irritation
May cause eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No specific, relevant data available for assessment.

Assessment Teratogenicity:
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Diphenylmethane Diisocyanate, isomers and homologues

Acute toxicity (Acute oral toxicity)
Typical for this family of materials. LD50, Rat, > 10,000 mg/kg

Acute toxicity (Acute dermal toxicity)
Typical for this family of materials. LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, dust/mist, 0.49 mg/l

For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

For similar material(s): 2,4'-Diphenylmethane diisocyanate (CAS 5873-54-1). LC50, Rat, 4 Hour, Aerosol, 0.387 mg/l

Skin corrosion/irritation
Prolonged contact may cause slight skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
In laboratory animals, MDI/polymeric MDI did not cause birth defects; other fetal effects occurred only at high doses which were toxic to the mother.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

4,4'-methylenediphenyl diisocyanate

Acute toxicity (Acute oral toxicity)
LD50, Rat, > 2,000 mg/kg No deaths occurred at this concentration.

Acute toxicity (Acute dermal toxicity)
LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 1 Hour, dust/mist, 2.24 mg/l

Acute toxicity estimate, dust/mist, 1.5 mg/l Acute toxicity estimate according to Regulation (EC) No. 1272/2008

Skin corrosion/irritation
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause moderate skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

Isobutane

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Mouse, 4 Hour, gas, 260200 ppm

Skin corrosion/irritation
Liquid may cause frostbite upon skin contact.
No hazard from gas.

Serious eye damage/eye irritation
Liquid may cause frostbite.
Vapor may cause eye irritation experienced as mild discomfort and redness.

Respiratory or skin sensitisation
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
No relevant data found.

STOT - single exposure
May cause drowsiness or dizziness.

STOT - repeated exposure
Based on available data, repeated exposures are not anticipated to cause significant adverse effects.

Aspiration Hazard
Aspiration into the lungs may occur during ingestion or vomiting, causing lung damage or even death due to chemical pneumonia.

propane

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, male and female, 4 Hour, vapour, > 425000 ppm

Skin corrosion/irritation
No hazard from gas.
Liquid may cause frostbite upon skin contact.
Effects may be delayed.

Serious eye damage/eye irritation
Essentially nonirritating to eyes.
Liquid may cause frostbite.

Respiratory or skin sensitisation
For skin sensitization:
No relevant data found.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :
In animal studies, did not interfere with reproduction. In animal studies, did not interfere with fertility.

Assessment Teratogenicity:
Screening studies suggest that this material does not affect fetal development.

STOT - single exposure
Available data are inadequate to determine single exposure specific target organ toxicity.

STOT - repeated exposure
Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

N,N'-Dimorpholinodiethylether

Acute toxicity (Acute oral toxicity)
LD50, Rat, > 2,000 mg/kg

Acute toxicity (Acute dermal toxicity)
LD50, Rabbit, 3,038 mg/kg

Acute toxicity (Acute inhalation toxicity)
The LC50 has not been determined.

Skin corrosion/irritation
Brief contact is essentially nonirritating to skin.
Prolonged contact may cause skin irritation with local redness.

Serious eye damage/eye irritation
May cause severe eye irritation.
May cause corneal injury.
Vapor of amines may cause swelling of the cornea resulting in visual disturbances such as blurred or hazy vision. Bright lights may appear to be surrounded by halos. Effects may be delayed and typically disappear spontaneously.

Respiratory or skin sensitisation
Did not cause allergic skin reactions when tested in guinea pigs.

For respiratory sensitization:
No relevant data found.

Germ cell mutagenicity
This material was not mutagenic in an Ames bacterial assay.

Carcinogenicity
No relevant data found.

Reproductive toxicity
Toxicity to reproduction assessment :

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Assessment Teratogenicity:
No relevant data found.

STOT - single exposure
Evaluation of available data suggests that this material is not an STOT-SE toxicant.

STOT - repeated exposure
Based on available data, repeated exposures are not expected to cause significant adverse effects except at very high aerosol concentrations. Repeated excessive aerosol exposures may cause respiratory tract irritation and even death.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

o-(p-isocyanatobenzyl)phenyl isocyanate

Acute toxicity (Acute oral toxicity)
For similar material(s): LD50, Rat, > 2,000 mg/kg

Acute toxicity (Acute dermal toxicity)
For similar material(s): LD50, Rabbit, > 9,400 mg/kg

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, dust/mist, 0.387 mg/l

For similar material(s): 4,4'-Methylenediphenyl diisocyanate (CAS 101-68-8). LC50, Rat, 1 Hour, Aerosol, 2.24 mg/l

Skin corrosion/irritation
Prolonged contact may cause moderate skin irritation with local redness.
Repeated contact may cause moderate skin irritation with local redness.
May stain skin.

Serious eye damage/eye irritation
May cause moderate eye irritation.
May cause slight temporary corneal injury.

Respiratory or skin sensitisation
For similar material(s):
Skin contact may cause an allergic skin reaction.
Animal studies have shown that skin contact with isocyanates may play a role in respiratory sensitization.

May cause allergic respiratory reaction.
MDI concentrations below the exposure guidelines may cause allergic respiratory reactions in individuals already sensitized.
Asthma-like symptoms may include coughing, difficult breathing and a feeling of tightness in the chest. Occasionally, breathing difficulties may be life threatening.

Germ cell mutagenicity
For similar material(s): Genetic toxicity data on MDI are inconclusive. MDI was weakly positive in some in vitro studies; other in vitro studies were negative. Animal mutagenicity studies were predominantly negative.

Carcinogenicity
Lung tumors have been observed in laboratory animals exposed to respirable aerosol droplets of MDI/Polymeric MDI (6 mg/m3) for their lifetime. Tumors occurred concurrently with respiratory irritation and lung injury. Current exposure guidelines are expected to protect against these effects reported for MDI.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
For similar material(s): Has been toxic to the fetus in laboratory animals at doses toxic to the mother. Did not cause birth defects in laboratory animals.

STOT - single exposure
May cause respiratory irritation.
Route of Exposure: Inhalation
Target Organs: Respiratory Tract

STOT - repeated exposure
Tissue injury in the upper respiratory tract and lungs has been observed in laboratory animals after repeated excessive exposures to MDI/polymeric MDI aerosols.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

dimethyl ether

Acute toxicity (Acute oral toxicity)
Single dose oral LD50 has not been determined.

Acute toxicity (Acute dermal toxicity)
The dermal LD50 has not been determined.

Acute toxicity (Acute inhalation toxicity)
LC50, Rat, 4 Hour, gas, 164000 ppm

Skin corrosion/irritation
No hazard from gas.
Liquid may cause frostbite upon skin contact.
Prolonged or repeated exposure may cause defatting of the skin leading to drying or flaking of skin.

Serious eye damage/eye irritation
No hazard from gas.
Liquid may cause frostbite.

Respiratory or skin sensitisation
No relevant information found.

For respiratory sensitization:
No relevant information found.

Germ cell mutagenicity
In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

Carcinogenicity
Did not cause cancer in laboratory animals.

Reproductive toxicity
Toxicity to reproduction assessment :
No relevant data found.

Assessment Teratogenicity:
Has been toxic to the fetus in laboratory animals at doses toxic to the mother.

STOT - single exposure
Available data are inadequate to determine single exposure specific target organ toxicity.

STOT - repeated exposure
In animals, effects have been reported on the following organs:
Kidney.
Liver.

Aspiration Hazard
Based on physical properties, not likely to be an aspiration hazard.

11.2. Information on other hazards

Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Further information

No data available

SECTION 12: ECOLOGICAL INFORMATION

Ecotoxicological information appears in this section when such data is available.

12.1 Toxicity

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Acute toxicity to fish

Material is not classified as dangerous to aquatic organisms.

Diphenylmethane Diisocyanate, isomers and homologues

Acute toxicity to fish

The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria

Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms

EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants

EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

4,4'-methylenediphenyl diisocyanate

Acute toxicity to fish

The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates

Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

o-(p-isocyanatobenzyl)phenyl isocyanate

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Chronic toxicity to aquatic invertebrates
Based on data from similar materials
NOEC, Daphnia magna (Water flea), 21 d, >= 10 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

N,N'-Dimorpholinodiethylether

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

LC50, Danio rerio (zebra fish), static test, 96 Hour, > 2,150 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia (water flea), static test, 48 Hour, > 100 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, Algae, static test, 72 Hour, > 100 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
EC50, Bacteria, static test, 3 Hour, 100 mg/l, activated sludge test (OECD 209)

Isobutane

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms.

propane

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms.

dimethyl ether

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
LC50, Poecilia reticulata (guppy), semi-static test, 96 Hour, > 4,000 mg/l

Acute toxicity to aquatic invertebrates
LC50, Daphnia magna (Water flea), 48 Hour, > 4,000 mg/l, OECD Test Guideline 202 or Equivalent

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms.

Diphenylmethane Diisocyanate, isomers and homologues

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants

Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

4,4'-methylenediphenyl diisocyanate

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants
EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

Isobutane

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms.

propane

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms.

N,N'-Dimorpholinodiethylether

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 2,150 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
EC50, Daphnia (water flea), static test, 48 Hour, > 100 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
ErC50, Algae, static test, 72 Hour, > 100 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
EC50, Bacteria, static test, 3 Hour, 100 mg/l, activated sludge test (OECD 209)

o-(p-isocyanatobenzyl)phenyl isocyanate

Acute toxicity to fish
The measured ecotoxicity is that of the hydrolyzed product, generally under conditions maximizing production of soluble species.
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
Based on information for a similar material:
LC50, Danio rerio (zebra fish), static test, 96 Hour, > 1,000 mg/l, OECD Test Guideline 203 or Equivalent

Acute toxicity to aquatic invertebrates
Based on information for a similar material:
EC50, Daphnia magna (Water flea), static test, 24 Hour, > 1,000 mg/l, OECD Test Guideline 202 or Equivalent

Acute toxicity to algae/aquatic plants
Based on information for a similar material:
NOEC, Desmodesmus subspicatus (green algae), static test, 72 Hour, Growth rate inhibition, 1,640 mg/l, OECD Test Guideline 201 or Equivalent

Toxicity to bacteria
Based on information for a similar material:
EC50, activated sludge, static test, 3 Hour, Respiration rates., > 100 mg/l

Chronic toxicity to aquatic invertebrates
Based on data from similar materials
NOEC, Daphnia magna (Water flea), 21 d, >= 10 mg/l

Toxicity to soil-dwelling organisms
EC50, Eisenia fetida (earthworms), Based on information for a similar material:, 14 d, > 1,000 mg/kg

Toxicity to terrestrial plants

EC50, Avena sativa (oats), Growth inhibition, 1,000 mg/l
EC50, Lactuca sativa (lettuce), Growth inhibition, 1,000 mg/l

dimethyl ether

Acute toxicity to fish
Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).
LC50, Poecilia reticulata (guppy), semi-static test, 96 Hour, > 4,000 mg/l

Acute toxicity to aquatic invertebrates
LC50, Daphnia magna (Water flea), 48 Hour, > 4,000 mg/l, OECD Test Guideline 202 or Equivalent

12.2 Persistence and degradability

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Biodegradability: Expected to degrade slowly in the environment.

Diphenylmethane Diisocyanate, isomers and homologues

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

4,4'-methylenediphenyl diisocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

o-(p-isocyanatobenzyl)phenyl isocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

N,N'-Dimorpholinodiethylether

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent

Isobutane

Biodegradability: Biodegradation may occur under aerobic conditions (in the presence of oxygen).

propane

Biodegradability: No relevant data found.

dimethyl ether

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

Biodegradability: Expected to degrade slowly in the environment.

Diphenylmethane Diisocyanate, isomers and homologues

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

4,4'-methylenediphenyl diisocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

Isobutane

Biodegradability: Biodegradation may occur under aerobic conditions (in the presence of oxygen).

propane

Biodegradability: No relevant data found.

N,N'-Dimorpholinodiethylether

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent

o-(p-isocyanatobenzyl)phenyl isocyanate

Biodegradability: In the aquatic and terrestrial environment, material reacts with water forming predominantly insoluble polyureas which appear to be stable. In the atmospheric environment, material is expected to have a short tropospheric half-life, based on calculations and by analogy with related diisocyanates.
10-day Window: Not applicable
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 302C or Equivalent

dimethyl ether

Biodegradability: Material is expected to biodegrade very slowly (in the environment). Fails to pass OECD/EEC tests for ready biodegradability.
10-day Window: Fail
Biodegradation: 5 %
Exposure time: 28 d
Method: OECD Test Guideline 301A or Equivalent

12.3 Bioaccumulative potential

Bioaccumulation: No data available.

12.4 Mobility in soil

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Diphenylmethane Diisocyanate, isomers and homologues

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

4,4'-methylenediphenyl diisocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

o-(p-isocyanatobenzyl)phenyl isocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

N,N'-Dimorpholinodiethylether

Potential for mobility in soil is low (Koc between 500 and 2000).
Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Partition coefficient (Koc): 784 Estimated.

Isobutane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 35 Estimated.

propane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 24 - 460 Estimated.

dimethyl ether

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 1.29 - 14 Estimated.

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Diphenylmethane Diisocyanate, isomers and homologues

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

4,4'-methylenediphenyl diisocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

Isobutane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 35 Estimated.

propane

Potential for mobility in soil is very high (Koc between 0 and 50).
Partition coefficient (Koc): 24 - 460 Estimated.

N,N'-Dimorpholinodiethylether

Potential for mobility in soil is low (Koc between 500 and 2000).
Given its very low Henry's constant, volatilization from natural bodies of water or moist soil is not expected to be an important fate process.
Partition coefficient (Koc): 784 Estimated.

o-(p-isocyanatobenzyl)phenyl isocyanate

In the aquatic and terrestrial environment, movement is expected to be limited by its reaction with water forming predominantly insoluble polyureas.

dimethyl ether

Potential for mobility in soil is very high (Koc between 0 and 50).

Partition coefficient (Koc): 1.29 - 14 Estimated.

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Diphenylmethane Diisocyanate, isomers and homologues

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

4,4'-methylenediphenyl diisocyanate

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

o-(p-isocyanatobenzyl)phenyl isocyanate

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

N,N'-Dimorpholinodiethylether

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Isobutane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

propane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

dimethyl ether

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

Diphenylmethane Diisocyanate, isomers and homologues

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

4,4'-methylenediphenyl diisocyanate

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).

Isobutane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

propane

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

N,N'-Dimorpholinodiethylether

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

o-(p-isocyanatobenzyl)phenyl isocyanate

This substance has not been assessed for persistence, bioaccumulation and toxicity (PBT).

dimethyl ether

This substance is not considered to be persistent, bioaccumulating and toxic (PBT). This substance is not considered to be very persistent and very bioaccumulating (vPvB).

12.6 Endocrine disrupting properties

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

N,N'-Dimorpholinodiethylether

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
May cause endocrine disruption.
No data available
rats

N,N'-Dimorpholinodiethylether

The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
May cause endocrine disruption.
No data available
rats

12.7 Other adverse effects

Product contains no ozone-depleting components.

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Diphenylmethane Diisocyanate, isomers and homologues

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

4,4'-methylenediphenyl diisocyanate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

o-(p-isocyanatobenzyl)phenyl isocyanate

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

N,N'-Dimorpholinodiethylether

This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Isobutane
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

propane
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

dimethyl ether
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Isocyanic acid, polymethylenepolyphenylene ester, polymer with -alpha-hydro-omega hydroxypoly[oxy(methyl-1,2-ethanediyl)] and ,alpha,alpha,'alpha'"-1,2,3-propanetriyltris[omega-hydroxypoly[oxy(methyl-1,2-ethanediyl)]]
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Diphenylmethane Diisocyanate, isomers and homologues
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

4,4'-methylenediphenyl diisocyanate
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

Isobutane
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

propane
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

N,N'-Dimorpholinodiethylether
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

o-(p-isocyanatobenzyl)phenyl isocyanate
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

dimethyl ether
This substance is not on the Montreal Protocol list of substances that deplete the ozone layer.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Contents under pressure. Do not puncture or incinerate container. Relieve all pressure prior to disposal. Do not dump into any sewers, on the ground, or into any body of water. The generation of waste should be avoided or minimized wherever possible. Refer to manufacturer/supplier for information on recovery/recycling. Any disposal practice must be in compliance with all local and national laws and regulations.

The definitive assignment of this material to the appropriate EWC group and thus its proper EWC code will depend on the use that is made of this material. Contact the authorized waste disposal services.

SECTION 14: TRANSPORT INFORMATION

Classification for ROAD and Rail transport (ADR/RID):

14.1	**UN number or ID number**	UN 1950
14.2	**UN proper shipping name**	AEROSOLS
14.3	**Transport hazard class(es)**	2.1
14.4	**Packing group**	Not applicable
14.5	**Environmental hazards**	Not considered environmentally hazardous based on available data.
14.6	**Special precautions for user**	No data available.

Classification for SEA transport (IMO-IMDG):

14.1	**UN number or ID number**	UN 1950
14.2	**UN proper shipping name**	AEROSOLS
14.3	**Transport hazard class(es)**	2.1
14.4	**Packing group**	Not applicable
14.5	**Environmental hazards**	Not considered as marine pollutant based on available data.
14.6	**Special precautions for user**	EmS: F-D, S-U
14.7	**Maritime transport in bulk according to IMO instruments**	Consult IMO regulations before transporting ocean bulk

Classification for AIR transport (IATA/ICAO):

14.1	**UN number or ID number**	UN 1950
14.2	**UN proper shipping name**	Aerosols, flammable
14.3	**Transport hazard class(es)**	2.1
14.4	**Packing group**	Not applicable
14.5	**Environmental hazards**	Not applicable
14.6	**Special precautions for user**	No data available.

This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Transportation classifications may vary by container volume and may be influenced by regional or country variations in regulations. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.

SECTION 15: REGULATORY INFORMATION

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

Restrictions on the manufacture, placing on the market and use:
The following substance/s contained in this product is/are subject through Annex XVII of REACH regulation to restrictions on the manufacture, placing on the market and use when present in certain dangerous substances, mixtures and articles. Users of this product have to comply with the restrictions placed upon it by the aforementioned provision.

CAS-No.: 9016-87-9	Name: Diphenylmethane Diisocyanate, isomers and homologues

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

CAS-No.: 101-68-8	Name: 4,4'-methylenediphenyl diisocyanate

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

CAS-No.: 5873-54-1	Name: o-(p-isocyanatobenzyl)phenyl isocyanate

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

CAS-No.: 9016-87-9	Name: Diphenylmethane Diisocyanate, isomers and homologues

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

CAS-No.: 101-68-8	Name: 4,4'-methylenediphenyl diisocyanate

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

CAS-No.: 5873-54-1	Name: o-(p-isocyanatobenzyl)phenyl isocyanate

Restriction status: listed in REACH Annex XVII
Restricted uses: See Annex XVII to Regulation (EC) no 1907/2006 for Conditions of restriction
Number on the list: 56, 74

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.
Listed in Regulation: FLAMMABLE AEROSOLS
Number in Regulation: P3a
150 t
500 t
Listed in Regulation: Petroleum products: (a) gasolines and naphthas, (b) kerosenes (including jet fuels), (c) gas oils (including diesel fuels, home heating oils and gas oil blending streams),(d) heavy fuel oils (e) alternative fuels serving the same purposes and with similar properties as regards flammability and environmental hazards as the products referred to in points (a) to (d)
Number in Regulation: 34
2,500 t
25,000 t
Listed in Regulation: FLAMMABLE AEROSOLS
Number in Regulation: P3a

150 t
500 t

Further information
Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

15.2 Chemical safety assessment

No Chemical Safety Assessment has been carried out for this substance/mixture.

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H220	Extremely flammable gas.
H222	Extremely flammable aerosol.
H229	Pressurised container: May burst if heated.
H280	Contains gas under pressure; may explode if heated.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure if inhaled.

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) No 1272/2008
Aerosol - 1 - H222 - Based on product data or assessment
Acute Tox. - 4 - H332 - Calculation method
Skin Irrit. - 2 - H315 - Calculation method
Eye Irrit. - 2 - H319 - Calculation method
Resp. Sens. - 1 - H334 - Calculation method
Skin Sens. - 1 - H317 - Calculation method
Carc. - 2 - H351 - Calculation method
STOT SE - 3 - H335 - Calculation method
STOT RE - 2 - H373 - Calculation method

Training advice
In Accordance with REACH Annex XVII, restriction no. 74, from 24 August 2023 adequate training is required before industrial or professional use.

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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

Legend

2000/39/EC	Europe. Commission Directive 2000/39/EC establishing a first list of indicative occupational exposure limit values
ACGIH	USA. ACGIH Threshold Limit Values (TLV)
GB EH40	UK. EH40 WEL - Workplace Exposure Limits
GB EH40 BAT	UK. Biological monitoring guidance values
STEL	Short-term exposure limit (15-minute reference period)
TWA	8-hr TWA
US WEEL	USA. Workplace Environmental Exposure Levels (WEEL)
Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Gas	Flammable gases
Press. Gas	Gases under pressure
Resp. Sens.	Respiratory sensitisation
Skin Irrit.	Skin irritation
Skin Sens.	Skin sensitisation
STOT RE	Specific target organ toxicity - repeated exposure
STOT SE	Specific target organ toxicity - single exposure

Full text of other abbreviations

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

Information Source and References
This SDS is prepared by Product Regulatory Services and Hazard Communications Groups from information supplied by internal references within our company.

SPECIALTY ELECTRONIC MATERIALS UK LIMITED urges each customer or recipient of this (M)SDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this (M)SDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given. Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that his activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of the manufacturer, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product. Due to the proliferation of sources for information such as manufacturer-specific (M)SDSs, we are not and cannot be responsible for (M)SDSs obtained from any source other than ourselves. If you have obtained an (M)SDS from another source or if you are not sure that the (M)SDS you have is current, please contact us for the most current version.
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