

SAFETY DATA SHEET

Conforms to Regulation (EC) No. 1907/2006 (REACH), Annex II, as amended by UK REACH Regulation SI 2019/758

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

1.1 Product identifier

Product identifier : UP2328
Product name : 2K STANDARD HARDENER
Product type : Liquid.
Other means of identification : Not available.
Date of issue/ Date of revision : 21 May 2026
Version : 1.03
Date of previous issue : 21 May 2026

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

Identified uses : Coating component.
Uses advised against : Not for sale to or use by consumers.

1.3 Details of the supplier of the safety data sheet

U-POL LTD,
DENINGTON ROAD,
WELLINGBOROUGH,
NN8 2QH
+44 (0) 1933 230310
sds-competence@axalta.com

e-mail address of person responsible for this SDS : sds-competence@axalta.com

U-POL NETHERLANDS B.V,
DE GEER 14,
4004LT TIEL,
NETHERLANDS
+31 20 240 2216
sds-competence@axalta.com

1.4 Emergency telephone number

Supplier

Telephone number : +(44)-870-8200418

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Mixture

Classification according to UK CLP/GHS

SECTION 2: Hazards identification

Flam. Liq. 2, H225
 Acute Tox. 4, H332
 Eye Irrit. 2, H319
 Skin Sens. 1, H317
 Carc. 2, H351
 STOT SE 3, H335
 STOT SE 3, H336

The product is classified as hazardous according to UK CLP Regulation SI 2019/720 as amended.

Ingredients of unknown toxicity : 4 percent of the mixture consists of component(s) of unknown acute inhalation toxicity

Ingredients of unknown ecotoxicity : Contains 4% of components with unknown hazards to the aquatic environment

See Section 16 for the full text of the H statements declared above.

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

2.2 Label elements

Hazard pictograms :



Signal word : Danger

Contains : Hexamethylene diisocyanate, oligomers
 4-methylpentan-2-one
 p-toluenesulphonyl isocyanate
 hexamethylene-di-isocyanate

Hazard statements : H225 - Highly flammable liquid and vapour.
 H317 - May cause an allergic skin reaction.
 H319 - Causes serious eye irritation.
 H332 - Harmful if inhaled.
 H335 - May cause respiratory irritation.
 H336 - May cause drowsiness or dizziness.
 H351 - Suspected of causing cancer.

Precautionary statements

Prevention : P201 - Obtain special instructions before use.
 P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P261 - Avoid breathing vapour.

Response : P304 + P312 - IF INHALED: Call a POISON CENTER or doctor if you feel unwell.
 P302 + P352 - IF ON SKIN: Wash with plenty of water.
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage : Not applicable.

Disposal : Not applicable.

Supplemental label elements : EUH066 - Repeated exposure may cause skin dryness or cracking.
 EUH204 - Contains isocyanates. May produce an allergic reaction.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

2.3 Other hazards

2K STANDARD HARDENER

SECTION 2: Hazards identification

Product meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII : This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

Other hazards which do not result in classification : None known.

SECTION 3: Composition/information on ingredients

3.2 Mixtures : Mixture

Product/ingredient name	Identifiers	%	Classification	Type
Hexamethylene diisocyanate, oligomers	REACH #: 01-2119485796-17 EC: 931-274-8 CAS: 28182-81-2	≥25 - ≤50	Acute Tox. 4, H332 Skin Sens. 1, H317 STOT SE 3, H335	[1] [2]
4-methylpentan-2-one	REACH #: 01-2119473980-30 EC: 203-550-1 CAS: 108-10-1 Index: 606-004-00-4	≥25 - ≤50	Flam. Liq. 2, H225 Acute Tox. 4, H332 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H336 EUH066	[1] [2]
2-methoxy-1-methylethyl acetate	REACH #: 01-2119475791-29 EC: 203-603-9 CAS: 108-65-6	≥10 - ≤25	Flam. Liq. 3, H226 STOT SE 3, H336	[1] [2]
pentyl propionate	EC: 210-852-7 CAS: 624-54-4	≤5	Flam. Liq. 3, H226 Eye Irrit. 2, H319	[1]
n-butyl acetate	REACH #: 01-2119485493-29 EC: 204-658-1 CAS: 123-86-4	≤3	Flam. Liq. 3, H226 STOT SE 3, H336 EUH066	[1] [2]
p-toluenesulphonyl isocyanate	REACH #: 01-2119980050-47 EC: 223-810-8 CAS: 4083-64-1	≤0.2	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 STOT SE 3, H335 EUH014	[1]
hexamethylene-di-isocyanate	REACH #: 01-2119457571-37 EC: 212-485-8 CAS: 822-06-0 Index: 615-011-00-1	<0.1	Acute Tox. 4, H302 Acute Tox. 1, H330 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Resp. Sens. 1, H334 Skin Sens. 1, H317 STOT SE 3, H335 See Section 16 for the full text of the H statements declared above.	[1] [2]

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

[1] Substance classified with a physical, health or environmental hazard

[2] Substance with a workplace exposure limit

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

SECTION 4: First aid measures

4.1 Description of first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Wash skin thoroughly with soap and water or use recognised skin cleanser. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Wash out mouth with water. Remove dentures if any. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain or irritation
watering
redness
- Inhalation** : Adverse symptoms may include the following:
respiratory tract irritation
coughing
nausea or vomiting
headache
drowsiness/fatigue
dizziness/vertigo
unconsciousness
- Skin contact** : Adverse symptoms may include the following:
irritation
redness
dryness
cracking
- Ingestion** : No specific data.

4.3 Indication of any immediate medical attention and special treatment needed

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SECTION 4: First aid measures

- Notes to physician** : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Specific treatments** : No specific treatment.

SECTION 5: Firefighting measures

5.1 Extinguishing media

- Suitable extinguishing media** : Recommended: alcohol-resistant foam, CO₂, powders, water spray or mist.
- Unsuitable extinguishing media** : Do not use water jet.

5.2 Special hazards arising from the substance or mixture

- Hazards from the substance or mixture** : Fire will produce dense black smoke. Exposure to decomposition products may cause a health hazard.
- Hazardous combustion products** : Decomposition products may include the following materials: carbon monoxide, carbon dioxide, smoke, oxides of nitrogen, hydrogen cyanide, monomeric isocyanates.

5.3 Advice for firefighters

- Special protective actions for fire-fighters** : Cool closed containers exposed to fire with water. Do not release runoff from fire to drains or watercourses.
- Special protective equipment for fire-fighters** : Appropriate breathing apparatus may be required.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : Exclude sources of ignition and ventilate the area. Avoid breathing vapour or mist. Refer to protective measures listed in sections 7 and 8.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

- 6.2 Environmental precautions** : Do not allow to enter drains or watercourses. If the product contaminates lakes, rivers, or sewers, inform the appropriate authorities in accordance with local regulations.

6.3 Methods and material for containment and cleaning up

Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Place in a suitable container. The contaminated area should be cleaned immediately with a suitable decontaminant. One possible (flammable) decontaminant comprises (by volume): water (45 parts), ethanol or isopropyl alcohol (50 parts) and concentrated (d: 0,880) ammonia solution (5 parts). A non-flammable alternative is sodium carbonate (5 parts) and water (95 parts). Add the same decontaminant to the remnants and let stand for several days until no further reaction in an unsealed container. Once this stage is reached, close container and dispose of according to local regulations (see section 13).

- 6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

Persons with a history of asthma, allergies or chronic or recurrent respiratory disease should not be employed in any process in which this product is used.

Examination of lung function should be carried out on a regular basis on persons spraying this mixture.

7.1 Precautions for safe handling

Prevent the creation of flammable or explosive concentrations of vapours in air and avoid vapour concentrations higher than the occupational exposure limits.

In addition, the product should only be used in areas from which all naked lights and other sources of ignition have been excluded. Electrical equipment should be protected to the appropriate standard.

Mixture may charge electrostatically: always use earthing leads when transferring from one container to another.

Operators should wear antistatic footwear and clothing and floors should be of the conducting type.

Care should be taken when re-opening partly-used containers. Precautions should be taken to minimise exposure to atmospheric humidity or water. CO₂ will be formed, which, in closed containers, could result in pressurisation. Keep away from heat, sparks and flame. No sparking tools should be used.

Avoid contact with skin and eyes. Avoid the inhalation of dust, particulates, spray or mist arising from the application of this mixture. Avoid inhalation of dust from sanding.

Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed.

Put on appropriate personal protective equipment (see Section 8).

Never use pressure to empty. Container is not a pressure vessel.

Always keep in containers made from the same material as the original one.

Comply with the health and safety at work laws.

Do not allow to enter drains or watercourses.

Information on fire and explosion protection

Vapours are heavier than air and may spread along floors. Vapours may form explosive mixtures with air.

7.2 Conditions for safe storage, including any incompatibilities

Store in accordance with local regulations.

Notes on joint storage

Keep away from: oxidising agents, strong alkalis, strong acids.

Additional information on storage conditions

Observe label precautions. Store in a dry, cool and well-ventilated area. Keep away from heat and direct sunlight.

Keep container tightly closed.

Keep away from sources of ignition. No smoking. Prevent unauthorised access. Containers that have been opened must be carefully resealed and kept upright to prevent leakage.

Seveso Directive - Reporting thresholds

Danger criteria

Category	Notification and MAPP threshold	Safety report threshold
P5c	5000 tonnes	50000 tonnes

7.3 Specific end use(s)

Recommendations : Not available.

Industrial sector specific solutions : Not available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational exposure limits

SECTION 8: Exposure controls/personal protection

Hexamethylene diisocyanate, oligomers	EH40/2005 WELs (United Kingdom (UK), 1/2020) [isocyanates, all, except methyl isocyanate] Inhalation sensitiser. STEL 15 minutes: 0.07 mg/m ³ (as -NCO). TWA 8 hours: 0.02 mg/m ³ (as -NCO).
4-methylpentan-2-one	EH40/2005 WELs (United Kingdom (UK), 1/2020) Absorbed through skin. STEL 15 minutes: 416 mg/m ³ . STEL 15 minutes: 100 ppm. TWA 8 hours: 208 mg/m ³ . TWA 8 hours: 50 ppm.
2-methoxy-1-methylethyl acetate	EH40/2005 WELs (United Kingdom (UK), 1/2020) Absorbed through skin. STEL 15 minutes: 548 mg/m ³ . TWA 8 hours: 50 ppm. TWA 8 hours: 274 mg/m ³ . STEL 15 minutes: 100 ppm.
n-butyl acetate	EH40/2005 WELs (United Kingdom (UK), 1/2020) STEL 15 minutes: 966 mg/m ³ . STEL 15 minutes: 200 ppm. TWA 8 hours: 724 mg/m ³ . TWA 8 hours: 150 ppm.
hexamethylene-di-isocyanate	EH40/2005 WELs (United Kingdom (UK), 1/2020) [isocyanates, all, except methyl isocyanate] Inhalation sensitiser. STEL 15 minutes: 0.07 mg/m ³ (as -NCO). TWA 8 hours: 0.02 mg/m ³ (as -NCO).

Biological exposure indices

Product/ingredient name	Exposure indices
4-methylpentan-2-one	EH40/2005 BMGVs (United Kingdom (UK), 1/2020) BGV: 20 µmol/l, 4-methylpentan-2-one [in urine]. Sampling time: post shift.

Recommended monitoring procedures : Reference should be made to monitoring standards, such as the following: British Standard BS EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) British Standard BS EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) British Standard BS EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

Product/ingredient name	Result
Hexamethylene diisocyanate, oligomers	DNEL - Workers - Long term - Inhalation 0.5 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Short term - Inhalation 1 mg/m ³ <u>Effects</u> : Local
4-methylpentan-2-one	DNEL - Workers - Long term - Dermal 11.8 mg/kg bw/day <u>Effects</u> : Systemic
-	DNEL - Workers - Long term - Inhalation 83 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Long term - Inhalation 83 mg/m ³ <u>Effects</u> : Systemic

SECTION 8: Exposure controls/personal protection

-	DNEL - Workers - Short term - Inhalation 208 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Short term - Inhalation 208 mg/m ³ <u>Effects</u> : Systemic
-	DNEL - General population - Long term - Oral 4.2 mg/kg bw/day <u>Effects</u> : Systemic
2-methoxy-1-methylethyl acetate	DNEL - Workers - Long term - Dermal 796 mg/kg bw/day <u>Effects</u> : Systemic
-	DNEL - Workers - Long term - Inhalation 275 mg/m ³ <u>Effects</u> : Systemic
-	DNEL - Workers - Short term - Inhalation 550 mg/m ³ <u>Effects</u> : Local
-	DNEL - General population - Long term - Inhalation 33 mg/m ³ <u>Effects</u> : Systemic
-	DNEL - General population - Long term - Inhalation 33 mg/m ³ <u>Effects</u> : Local
-	DNEL - General population - Long term - Dermal 320 mg/kg bw/day <u>Effects</u> : Systemic
-	DNEL - General population - Long term - Oral 36 mg/kg bw/day <u>Effects</u> : Systemic
-	DNEL - General population - Short term - Oral 500 mg/kg bw/day <u>Effects</u> : Systemic
pentyl propionate	DNEL - General population - Long term - Inhalation 5 mg/m ³ <u>Effects</u> : Local
-	DNEL - General population - Short term - Inhalation 17.1 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Long term - Inhalation 20.2 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Short term - Inhalation 68.6 mg/m ³ <u>Effects</u> : Local
n-butyl acetate	DNEL - Workers - Short term - Dermal 11 mg/kg bw/day <u>Effects</u> : Systemic

SECTION 8: Exposure controls/personal protection

- **DNEL - General population - Long term - Oral**
2 mg/kg bw/day
Effects: Systemic
- **DNEL - General population - Short term - Oral**
2 mg/kg bw/day
Effects: Systemic
- **DNEL - General population - Long term - Dermal**
3.4 mg/kg bw/day
Effects: Systemic
- **DNEL - General population - Short term - Dermal**
6 mg/kg bw/day
Effects: Systemic
- **DNEL - Workers - Short term - Dermal**
11 mg/kg bw/day
Effects: Systemic
- **DNEL - General population - Long term - Inhalation**
12 mg/m³
Effects: Systemic
- **DNEL - General population - Long term - Inhalation**
35.7 mg/m³
Effects: Local
- **DNEL - General population - Short term - Inhalation**
300 mg/m³
Effects: Local
- **DNEL - General population - Short term - Inhalation**
300 mg/m³
Effects: Systemic
- **DNEL - Workers - Long term - Inhalation**
300 mg/m³
Effects: Local
- **DNEL - Workers - Short term - Inhalation**
600 mg/m³
Effects: Local
- **DNEL - Workers - Short term - Inhalation**
600 mg/m³
Effects: Systemic
- **DNEL - Workers - Long term - Inhalation**
300 mg/m³
Effects: Systemic
- p-toluenesulphonyl isocyanate **DNEL - Workers - Long term - Inhalation**
3.24 mg/m³
Effects: Systemic
- **DNEL - Workers - Long term - Dermal**
0.92 mg/kg bw/day
Effects: Systemic
- **DNEL - General population - Long term - Inhalation**
0.8 mg/m³
Effects: Systemic

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SECTION 8: Exposure controls/personal protection

-	DNEL - General population - Long term - Dermal 0.46 mg/kg bw/day <u>Effects</u> : Systemic
-	DNEL - General population - Long term - Oral 0.46 mg/kg bw/day <u>Effects</u> : Systemic
hexamethylene-di-isocyanate	DNEL - Workers - Long term - Inhalation 0.035 mg/m ³ <u>Effects</u> : Local
-	DNEL - Workers - Short term - Inhalation 0.07 mg/m ³ <u>Effects</u> : Local

PNECs

Product/ingredient name

Hexamethylene diisocyanate, oligomers

Result

Marine water
12.7 µg/l

Fresh water
1270 µg/l

Sediment
266700 mg/kg

Soil
53200 mg/kg

Sewage Treatment Plant
38.28 mg/kg

4-methylpentan-2-one

Marine water
0.06 mg/l

Fresh water
0.6 mg/l

Sediment
8.27 mg/kg

2-methoxy-1-methylethyl acetate

Fresh water
0.635 mg/l

Marine water
0.0635 mg/l

Sewage Treatment Plant
100 mg/l

Fresh water sediment
3.29 mg/kg dwt

Marine water sediment
0.329 mg/kg dwt

Soil
0.29 mg/kg dwt

n-butyl acetate

Soil
0.09 mg/kg

Fresh water

SECTION 8: Exposure controls/personal protection

0.18 mg/l

Sewage Treatment Plant

35.6 mg/l

Marine water

0.018 mg/l

Fresh water sediment

0.981 mg/kg

Marine water sediment

0.098 mg/kg

p-toluenesulphonyl isocyanate

Fresh water

0.03 mg/l

Marine water

0.003 mg/l

Sewage Treatment Plant

0.4 mg/l

Fresh water sediment

0.172 mg/kg dwt

Marine water sediment

0.017 mg/kg dwt

Soil

0.017 mg/kg dwt

hexamethylene-di-isocyanate

Sewage Treatment Plant

8.42 mg/l

8.2 Exposure controls

Persons with a history of asthma, allergies, chronic or recurrent respiratory disease should not be exposed to any process in which this product is used.

Examination of lung function should be carried out on a regular basis on persons spraying this mixture.

Appropriate engineering controls : Provide adequate ventilation. Where reasonably practicable, this should be achieved by the use of local exhaust ventilation and good general extraction. Air-fed protective respiratory equipment must be worn by the spray operator, even when good ventilation is provided. In other operations, if local exhaust ventilation and good general extraction are not sufficient to maintain concentrations of particulates and solvent vapours below the OEL, suitable respiratory protection must be worn. (See Occupational exposure controls.)

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Use safety eyewear designed to protect against splash of liquids.

Skin protection

Hand protection

SECTION 8: Exposure controls/personal protection

There is no one glove material or combination of materials that will give unlimited resistance to any individual or combination of chemicals.

The breakthrough time must be greater than the end use time of the product.

The instructions and information provided by the glove manufacturer on use, storage, maintenance and replacement must be followed.

Gloves should be replaced regularly and if there is any sign of damage to the glove material.

Always ensure that gloves are free from defects and that they are stored and used correctly.

The performance or effectiveness of the glove may be reduced by physical/chemical damage and poor maintenance.

Barrier creams may help to protect the exposed areas of the skin but should not be applied once exposure has occurred.

Gloves : Duration / breakthrough time: <1 hour,
Glove material: NBR, nitrile rubber, material thickness as splash protection: at least 0.2 mm, (EN374)
Glove material: NBR, nitrile rubber Material thickness for short-term contact: at least 0.5 mm, (EN374)
The recommendation for the type or types of glove to use when handling this product is based on information from the following source:
Expert judgment
The user must check that the final choice of type of glove selected for handling this product is the most appropriate and takes into account the particular conditions of use, as included in the user's risk assessment.

Body protection : Personnel should wear antistatic clothing made of natural fibres or of high-temperature-resistant synthetic fibres.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : By spraying: air-fed respirator.
By other operations than spraying, in well ventilated areas, air-fed respirators could be replaced by a combination charcoal filter and particulate filter mask.

Under cool, dry conditions, it is possible for the isocyanate to remain unreacted in the paint film for up to 30 hours after application. If dry flattening is unavoidable, air-fed respiratory protective equipment should be used.

Environmental exposure controls : Do not allow to enter drains or watercourses.

SECTION 9: Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

9.1 Information on basic physical and chemical properties

Appearance

Physical state : Liquid.
Colour : Clear.
Odour : Not available.
Odour threshold : Not available.
Melting point/freezing point : Technically not possible to measure
Initial boiling point and boiling range : 114 to 203°C (237.2 to 397.4°F)
Flammability (solid, gas) : Not available.
Upper/lower flammability or explosive limits : Lower: 1.2%
Upper: 8%
Not available.
Flash point : Closed cup: 18.4°C (65.1°F)
Auto-ignition temperature : 333°C (631.4°F)

SECTION 9: Physical and chemical properties

Decomposition temperature : Not applicable.
pH : Not applicable.
Viscosity : Dynamic (room temperature): Not available.
 Kinematic (room temperature): Not available.
 Kinematic (40°C): Not available.

Solubility(ies) :

Media	Result
cold water	Soluble

Solubility in water : Not available.
Miscible with water : Yes.
Partition coefficient: n-octanol/ water : Not applicable.
Vapour pressure : 0.87 kPa (6.5 mm Hg)
Relative density : Not available.
Density : 0.951 g/cm³
Vapour density : Not available.
Explosive properties : Not available.
Oxidising properties : Not available.
Weight volatiles : 57.8 % (w/w)
VOC content : (2010/75/EU)

Particle characteristics

Median particle size : Not applicable.

9.2 Other information

9.2.1 Information with regard to physical hazard classes

Further information Not available.

9.2.2 Other safety characteristics

Miscible with water : Yes.

Further information Not available.

room temperature (=20°C)

SECTION 10: Stability and reactivity

10.1 Reactivity : The product reacts slowly with water, resulting in the production of carbon dioxide.

10.2 Chemical stability : Stable under recommended storage and handling conditions (see Section 7).

10.3 Possibility of hazardous reactions : In closed containers, pressure build-up could result in distortion, expansion and, in extreme cases, bursting of the container.

10.4 Conditions to avoid : In a fire, hazardous decomposition products may be produced.

10.5 Incompatible materials : Keep away from: oxidising agents, strong alkalis, strong acids, amines, alcohols, water. Uncontrolled exothermic reactions occur with amines and alcohols.

10.6 Hazardous decomposition products : Decomposition products may include the following materials: carbon monoxide, carbon dioxide, smoke, oxides of nitrogen, hydrogen cyanide, monomeric isocyanates.

SECTION 10: Stability and reactivity**SECTION 11: Toxicological information****11.1 Information on toxicological effects****Acute toxicity**

Product/ingredient name	Result
Hexamethylene diisocyanate, oligomers	Rat - Inhalation - LC50 Dusts and mists 18500 mg/m ³ [1 hours]
4-methylpentan-2-one	Rat - Oral - LD50 2080 mg/kg Rat - Inhalation - LC50 Vapour 16.4 mg/l [4 hours]
pentyl propionate	Rat - Oral - LD50 >14 g/kg <u>Toxic effects:</u> Behavioral - Somnolence (general depressed activity) Behavioral - Ataxia Liver - Other changes Rabbit - Dermal - LD50 >14 g/kg <u>Toxic effects:</u> Gastrointestinal - Hypermotility, diarrhea Liver - Other changes Musculoskeletal - Other changes
n-butyl acetate	Rat - Oral - LD50 10768 mg/kg <u>Toxic effects:</u> Behavioral - Somnolence (general depressed activity) Lung, Thorax, or Respiration - Other changes Liver - Other changes Rabbit - Dermal - LD50 >17600 mg/kg Rat - Inhalation - LC50 Vapour 21.1 mg/l [4 hours]
p-toluenesulphonyl isocyanate	Rat - Oral - LD50 2330 mg/kg OECD 401 Rat - Dermal - LD50 >2000 mg/kg OECD 402
hexamethylene-di-isocyanate	Rat - Inhalation - LC50 Vapour 124 mg/m ³ [4 hours] Rat - Inhalation - LC50 Dusts and mists 462 mg/m ³ [4 hours] <u>Toxic effects:</u> Lung, Thorax, or Respiration - Changes in lung weight Metabolism (intermediary) - Other proteins

Conclusion/Summary [Product] : Not available.

Acute toxicity estimates

SECTION 11: Toxicological information

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapours) (mg/l)	Inhalation (dusts and mists) (mg/l)
mixture	N/A	N/A	N/A	14.0	3.6
Hexamethylene diisocyanate, oligomers	N/A	N/A	N/A	11	1.5
4-methylpentan-2-one	2080	N/A	N/A	11	N/A
n-butyl acetate	10768	N/A	N/A	21.1	N/A
hexamethylene-di-isocyanate	500	N/A	N/A	0.124	0.462

Skin corrosion/irritation**Product/ingredient name**

4-methylpentan-2-one

Result**Rabbit - Skin - Mild irritant**Duration of treatment/exposure: 24 hoursAmount/concentration applied: 500 mg**Conclusion/Summary [Product]** : Not available.**Serious eye damage/eye irritation****Product/ingredient name**

4-methylpentan-2-one

Result**Rabbit - Eyes - Moderate irritant**Duration of treatment/exposure: 24 hoursAmount/concentration applied: 100 uL**Rabbit - Eyes - Severe irritant**Amount/concentration applied: 40 mg

pentyl propionate

Rabbit - Eyes - Mild irritantAmount/concentration applied: 100 mg**Conclusion/Summary [Product]** : Not available.**Respiratory corrosion/irritation**

Not available.

Conclusion/Summary [Product] : Not available.**Respiratory or skin sensitization****Product/ingredient name**

Hexamethylene diisocyanate, oligomers

Result**Mouse - skin**

OECD [Skin Sensitization: Local Lymph Node Assay]

Result: Sensitising**Skin****Conclusion/Summary [Product]** : Not available.**Respiratory****Conclusion/Summary [Product]** : Not available.**Germ cell mutagenicity**

Not available.

Conclusion/Summary [Product] : Not available.

SECTION 11: Toxicological information

Carcinogenicity

Not available.

Conclusion/Summary [Product] : Not available.

Reproductive toxicity

Not available.

Conclusion/Summary [Product] : Not available.

Specific target organ toxicity (single exposure)

Product/ingredient name	Result
Hexamethylene diisocyanate, oligomers	STOT SE 3, H335 (Respiratory tract irritation)
4-methylpentan-2-one	STOT SE 3, H336 (Narcotic effects)
2-methoxy-1-methylethyl acetate	STOT SE 3, H336 (Narcotic effects)
n-butyl acetate	STOT SE 3, H336 (Narcotic effects)
p-toluenesulphonyl isocyanate	STOT SE 3, H335 (Respiratory tract irritation)
hexamethylene-di-isocyanate	STOT SE 3, H335 (Respiratory tract irritation)

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on likely routes of exposure

Not available.

Potential acute health effects

Eye contact	: Causes serious eye irritation.
Inhalation	: Harmful if inhaled. Can cause central nervous system (CNS) depression. May cause drowsiness or dizziness. May cause respiratory irritation.
Skin contact	: Defatting to the skin. May cause skin dryness and irritation. May cause an allergic skin reaction.
Ingestion	: Can cause central nervous system (CNS) depression.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	: Adverse symptoms may include the following: respiratory tract irritation coughing nausea or vomiting headache drowsiness/fatigue dizziness/vertigo unconsciousness
Skin contact	: Adverse symptoms may include the following: irritation redness dryness cracking
Ingestion	: No specific data.

SECTION 11: Toxicological information**Delayed and immediate effects as well as chronic effects from short and long-term exposure****Short term exposure**

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

Conclusion/Summary [Product] : Not available.

General : Prolonged or repeated contact can defat the skin and lead to irritation, cracking and/or dermatitis. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Carcinogenicity : Suspected of causing cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : No known significant effects or critical hazards.

Reproductive toxicity : No known significant effects or critical hazards.

Other information

Not available.

SECTION 12: Ecological information**12.1 Toxicity****Product/ingredient name**

Hexamethylene diisocyanate, oligomers

Result**Acute - LC50**

Fish - *danio rerio*
>100 mg/l [96 hours]

Acute - EC50

Daphnia - *Daphnia magna*
>100 mg/l [48 hours]

4-methylpentan-2-one

Acute - LC50 - Fresh water

Fish - Fathead minnow - *Pimephales promelas*
Age: 29 days; Size: 21 mm; Weight: 0.141 g
505 mg/l [96 hours]
Effect: Mortality

Chronic - NOEC - Fresh water

Daphnia - Water flea - *Daphnia magna*
78 mg/l [21 days]
Effect: Behavior

Chronic - NOEC - Fresh water

Fish - Fathead minnow - *Pimephales promelas* - Embryo
Age: <24 hours
168 mg/l [33 days]
Effect: Mortality

n-butyl acetate

Acute - LC50 - Marine water

Fish - Inland silverside - *Menidia beryllina*
185 ppm [96 hours]
Effect: Mortality

SECTION 12: Ecological information**Conclusion/Summary [Product]** : Not available.**12.2 Persistence and degradability****Product/ingredient name**

Hexamethylene diisocyanate, oligomers

Result**Aerobic**

1% [28 days] - Not readily

Conclusion/Summary [Product] : Not available.

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Hexamethylene diisocyanate, oligomers	-	-	Not readily

12.3 Bioaccumulative potential

Product/ingredient name	LogP _{ow}	BCF	Potential
Hexamethylene diisocyanate, oligomers	5.54	367.7	Low
4-methylpentan-2-one	1.9	-	Low
n-butyl acetate	2.3	-	Low
hexamethylene-di-isocyanate	0.02	57.63	Low

12.4 Mobility in soil**Soil/water partition coefficient** : Not available.**Mobility** : Not available.**12.5 Results of PBT and vPvB assessment**

Product/ingredient name	PBT	P	B	T	vPvB	vP	vB
Hexamethylene diisocyanate, oligomers	No	N/A	No	No	No	N/A	No
4-methylpentan-2-one	No	N/A	N/A	No	N/A	N/A	N/A
2-methoxy-1-methylethyl acetate	No	N/A	N/A	No	N/A	N/A	N/A
pentyl propionate	No	N/A	N/A	No	N/A	N/A	N/A
n-butyl acetate	No	N/A	N/A	No	N/A	N/A	N/A
p-toluenesulphonyl isocyanate	No	N/A	N/A	No	N/A	N/A	N/A
hexamethylene-di-isocyanate	No	N/A	No	No	No	N/A	No

12.6 Other adverse effects : No known significant effects or critical hazards.**SECTION 13: Disposal considerations**

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods**Product**

SECTION 13: Disposal considerations

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction.

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





Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Type of packaging	Waste catalogue
	15 01 10* packaging containing residues of or contaminated by hazardous substances

Special precautions : This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapour from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	ADR/RID	ADN	IMDG	IATA
14.1 UN number	UN1263	UN1263	UN1263	UN1263
14.2 UN proper shipping name	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL	PAINT RELATED MATERIAL
14.3 Transport hazard class(es)	3 	3 	3 	3 
14.4 Packing group	II	II	II	II
14.5 Environmental hazards	No.	No.	No.	No.

Additional information

ADR/RID : **Special provisions** 640 (C)
Tunnel code (D/E)

ADN : **Special provisions** 640 (C)

14.6 Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

14.7 Transport in bulk according to IMO instruments : Not available.

SECTION 15: Regulatory information**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture****UK (GB)/REACH****Annex XIV - List of substances subject to authorisation****Annex XIV**

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

Product/ingredient name	%	Designation [Usage]
mixture	≥90	3
hexamethylene-di-isocyanate	<0.1	74

Labelling : Not applicable.**Seveso Directive**

This product is controlled under the Seveso Directive.

Danger criteria

Category
P5c

National regulations

Product/ingredient name	List name	Name on list	Classification	Notes

International regulations**Chemical Weapon Convention List Schedules I, II & III Chemicals**

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

15.2 Chemical safety assessment : This product contains substances for which Chemical Safety Assessments are still required.**SECTION 16: Other information**

✔ Indicates information that has changed from previously issued version.

Abbreviations and acronyms :

- ADN = European Provisions concerning the International Carriage of Dangerous Goods by Inland Waterway
- ADR = The European Agreement concerning the International Carriage of Dangerous Goods by Road
- ATE = Acute Toxicity Estimate
- GB CLP = UK CLP (EC No 1272/2008) on the Classification, Labelling and Packaging of Substances and Mixtures as amended by (EU Exit) Regulations 2019 No. 720 and amendments
- DMEL = Derived Minimal Effect Level
- DNEL = Derived No Effect Level
- EUH statement = GB CLP-specific Hazard statement
- IATA = International Air Transport Association
- IMDG = International Maritime Dangerous Goods
- IMO = International Maritime Organization
- N/A = Not available
- PBT = Persistent, Bioaccumulative and Toxic
- PNEC = Predicted No Effect Concentration

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SECTION 16: Other information

RID = The Regulations concerning the International Carriage of Dangerous Goods by Rail

RRN = REACH Registration Number

SGG = Segregation Group

vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification

Classification	Justification
Flam. Liq. 2, H225	On basis of test data
Acute Tox. 4, H332	Calculation method
Eye Irrit. 2, H319	Calculation method
Skin Sens. 1, H317	Calculation method
Carc. 2, H351	Calculation method
STOT SE 3, H335	Calculation method
STOT SE 3, H336	Calculation method

Full text of abbreviated H statements

H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
EUH014	Reacts violently with water.
EUH066	Repeated exposure may cause skin dryness or cracking.

Full text of classifications

Acute Tox. 1	ACUTE TOXICITY - Category 1
Acute Tox. 4	ACUTE TOXICITY - Category 4
Carc. 2	CARCINOGENICITY - Category 2
Eye Irrit. 2	SERIOUS EYE DAMAGE/EYE IRRITATION - Category 2
Flam. Liq. 2	FLAMMABLE LIQUIDS - Category 2
Flam. Liq. 3	FLAMMABLE LIQUIDS - Category 3
Resp. Sens. 1	RESPIRATORY SENSITISATION - Category 1
Skin Irrit. 2	SKIN CORROSION/IRRITATION - Category 2
Skin Sens. 1	SKIN SENSITISATION - Category 1
STOT SE 3	SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE - Category 3

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SECTION 16: Other information

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