

Australian statement of hazardous nature : Classified as hazardous according to criteria of Safe Work Australia

Section 1 - Identification

Product Name 1,6-Diisocyanatohexane

CAS No 822-06-0

Synonyms Hexamethylene diisocyanate

Product Code **S37886**

Address ThermoFisher Scientific Australia Pty Ltd
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VICTORIA 3179, Australia

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03 9757 4559 or +613 9757 4559

Telephone / Fax Numbers Tel: 1300 735 292
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E-mail address ANZinfo@thermofisher.com

Recommended Use Laboratory chemicals.

Uses advised against This product does not contain any substance(s) on the Illicit Drug Precursors/Reagents list. This product does not contain any substance(s) subject to Prohibition, Authorization or Restriction. This product does not contain any substance(s) listed on the voluntary National Code of Practice for Chemicals of Security Concern.

Section 2 - Hazard(s) Identification

Classification under Safe Work Australia

Classified as hazardous according to criteria of Safe Work Australia

Physical hazards
No hazards identified

Health hazards

| | |
|------------------------------------|--------------|
| Acute Oral Toxicity | Category 4 |
| Acute Inhalation Toxicity - Vapors | Category 1 |
| Skin Corrosion/Irritation | Category 1 C |
| Serious Eye Damage/Eye Irritation | Category 1 |
| Respiratory Sensitization | Category 1 |
| Skin Sensitization | Category 1 |

Environmental hazards
No hazards identified

Label Elements



Skull and Crossbones



Health Hazard



Corrosion

Signal Word**Danger****Hazard Statements**

H302 - Harmful if swallowed
 H314 - Causes severe skin burns and eye damage
 H317 - May cause an allergic skin reaction
 H330 - Fatal if inhaled
 H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled

Precautionary Statements

P264 - Wash face, hands and any exposed skin thoroughly after handling
 P270 - Do not eat, drink or smoke when using this product
 P271 - Use only outdoors or in a well-ventilated area
 P272 - Contaminated work clothing should not be allowed out of the workplace
 P280 - Wear protective gloves/protective clothing/eye protection/face protection
 P284 - In case of inadequate ventilation wear respiratory protection
 P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
 P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing
 P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
 P310 - Immediately call a POISON CENTER or doctor
 P330 - Rinse mouth
 P331 - Do NOT induce vomiting
 P363 - Wash contaminated clothing before reuse
 P403 + P233 - Store in a well-ventilated place. Keep container tightly closed
 P405 - Store locked up
 P501 - Dispose of contents/ container to an approved waste disposal plant

Other information

Lachrymator (substance which increases the flow of tears)
 Toxic to terrestrial vertebrates

Section 3 - Composition and Information on Ingredients

| Component | CAS No | Weight % |
|----------------------------|----------|----------|
| Hexamethylene diisocyanate | 822-06-0 | >95 |

Section 4 - First Aid Measures

Inhalation

If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Remove to fresh air. Immediate medical attention is required.

Ingestion

Do NOT induce vomiting. Call a physician or poison control center immediately.

Skin Contact

Wash off immediately with plenty of water for at least 15 minutes. Immediate medical

| | |
|--|---|
| | attention is required. |
| Eye Contact | Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice. |
| General Advice | Show this safety data sheet to the doctor in attendance. Immediate medical attention is required. |
| Self-Protection of the First Aider | Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. |
| First Aid Facilities | Eyewash, safety shower and washroom. |
| Most important symptoms and effects | May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Causes burns by all exposure routes. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation |
| Notes to Physician | Treat symptomatically. |

Section 5 - Fire Fighting Measures

Suitable Extinguishing Media

CO₂, dry chemical, dry sand, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons

No information available.

Hazardous Decomposition Products

Nitrogen oxides (NO_x), Carbon monoxide (CO), Carbon dioxide (CO₂).

Specific Hazards Arising from the Chemical

Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes.

Special protective equipment and precautions for fire fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

Section 6 - Accidental Release Measures

Emergency procedures

Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Environmental Precautions

Should not be released into the environment. Do not flush into surface water or sanitary sewer system.

Methods for Containment and Clean Up

Clean-up methods - small spillage

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material.

Clean-up methods - large spillage

Typically only supplied in small quantities as packaged goods.

If extremely toxic or used in larger quantities ensure a spillage action plan is in place. Evacuate area. Control the source and/or

contain the spill if safe and able to do so. Use temporary diking, sand bags, dry sand, earth or proprietary booms/absorbent pads if available. Obtain advice on containment, neutralisation and clean-up from local emergency responders.

Reference to Other Sections

Refer to protective measures listed in Sections 8 and 13.

Section 7 - Handling and Storage

Precautions for Safe Handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance.

Conditions for Safe Storage, Including any Incompatibilities

To maintain product quality: Keep refrigerated. Corrosives area. Keep containers tightly closed in a dry, cool and well-ventilated place.

AS/NZS 2243.10:2004, Safety in laboratories - Storage of chemicals

Section 8 - Exposure Controls and Personal Protection

Exposure limits

AUS - Exposure Standards for Atmospheric Contaminants in the Occupational Environment - Guidance Note on the Interpretation of Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:3008(1995)]

Adopted National Exposure Standards for Atmospheric Contaminants in the Occupational Environment [NOHSC:1003(1995)] updated in August, 2005. Safe Work Australia **ACGIH** - Threshold Limit Values - Ceiling (TLV-C) guidelines by the American Conference of Governmental Industrial Hygienists (ACGIH) for controlling worker exposure to airborne chemical concentrations in the workplace. **UK** - EH40/2005 Work Exposure Limits, Fourth edition. Published 2020. **DE** - MAK and BAT values of Hazardous Chemical Compounds in the Work Area. Published by German Research Foundation on July 1, 2011

| Component | Australia | New Zealand WEL | ACGIH TLV | The United Kingdom | Germany |
|----------------------------|---|---|----------------|--|--|
| Hexamethylene diisocyanate | STEL: 0.07 mg/m ³ TWA: 0.02 mg/m ³ | TWA: 0.02 mg/m ³ STEL: 0.07 mg/m ³ | TWA: 0.005 ppm | STEL: 0.07 mg/m ³ 15 min TWA: 0.02 mg/m ³ 8 hr Resp. Sens. | TWA: 0.005 ppm (8 Stunden). AGW - ceiling factor 2; exposure factor 1 TWA: 0.035 mg/m ³ (8 Stunden). AGW - ceiling factor 2; exposure factor 1 TWA: 0.005 ppm (8 Stunden). MAK can occur as vapor and aerosol at the same time TWA: 0.035 mg/m ³ (8 Stunden). MAK can occur as vapor and aerosol at the same time Höhepunkt: 0.005 ppm Höhepunkt: 0.035 mg/m ³ |

Biological limit values

UK - Biological Monitoring Guidance Values provided by the UK's Health and Safety Executive (HSE) Control of Substances Hazardous to Health Regulations (COSHH) 2002 (as amended) and EH40/2005

| Component | Australia | New Zealand | European Union | United Kingdom | Germany |
|----------------------------|-----------|-------------|----------------|--|--|
| Hexamethylene diisocyanate | | | | : 1 mmol isocyanate-derived diamine/mol creatinine urine end of the period of exposure | Hexamethylenediamine (after hydrolysis): 15 µg/g Creatinine urine (end of shift) |

Exposure Controls**Engineering Measures**

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment**Eye Protection**

Wear safety glasses with side shields (or goggles) Goggles (Australian/New Zealand Standard AS/NZS 1337 - Eye protectors for Industrial applications)

Hand Protection

Protective gloves

| Glove material | Breakthrough time | Glove thickness | AUS/NZ Standard | Glove comments |
|----------------|-------------------|-----------------|-----------------|-----------------------|
| Nitrile rubber | See manufacturers | - | AS/NZS 2161 | (minimum requirement) |
| Neoprene | recommendations | | | |
| Natural rubber | | | | |
| PVC | | | | |

Inspect gloves before use.

Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. (Refer to manufacturer/supplier for information)

Ensure gloves are suitable for the task: Chemical compatibility, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.

Remove gloves with care avoiding skin contamination.

Skin and body protection

Long sleeved clothing

Respiratory Protection

Use an AS/NZS 1716 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained in line with AS/NZS 1715 on the use and maintenance of respiratory protective devices

Recommended Filter type:

Organic gases and vapours filter Type A Brown conforming to EN14387 (or AUS/NZ equivalent)

Recommended half mask:-

Valve filtering: EN405 or Half mask: EN140 plus filter, EN 141 (or AUS/NZ equivalent)
When RPE is used a face piece Fit Test should be conducted

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

Environmental exposure controls

Prevent product from entering drains.

Section 9 - Physical and Chemical Properties

Information on basic physical and chemical properties

| | | |
|---------------------------------|--------------------------|--|
| Appearance | Colorless | |
| Physical State | Liquid | |
| Odor | pungent | |
| Odor Threshold | No data available | |
| pH | No information available | |
| Melting Point/Range | -67 °C / -88.6 °F | |
| Softening Point | No data available | |
| Boiling Point/Range | 255 °C / 491 °F | |
| Flash Point | 130 °C / 266 °F | Method - No information available |
| Evaporation Rate | No data available | |
| Flammability (solid,gas) | Not applicable | Liquid |
| Explosion Limits | No data available | |

| | | |
|---|--------------------------|-------------|
| Vapor Pressure | 0.05 mmHg @ 25 °C | |
| Vapor Density | 5.81 | (Air = 1.0) |
| Specific Gravity / Density | 1.040 | |
| Bulk Density | Not applicable | Liquid |
| Water Solubility | Decomposes | |
| Solubility in other solvents | No information available | |
| Partition Coefficient (n-octanol/water) | | |
| Autoignition Temperature | No data available | |
| Decomposition Temperature | No data available | |
| Viscosity | No data available | |
| Explosive Properties | No information available | |
| Oxidizing Properties | No information available | |

Other information

| | |
|-------------------|--------------|
| Molecular Formula | C8 H12 N2 O2 |
| Molecular Weight | 168.19 |

Section 10 - Stability and Reactivity

| | |
|----------------------------------|--|
| Reactivity | None known, based on information available |
| Stability | Moisture sensitive. |
| Conditions to Avoid | Excess heat, Incompatible products, Exposure to moist air or water. |
| Incompatible Materials | Acids, Water, Strong oxidizing agents, Strong bases, Alcohols, Amines. |
| Hazardous Decomposition Products | Nitrogen oxides (NO _x). Carbon monoxide (CO). Carbon dioxide (CO ₂). |
| Hazardous Polymerization | No information available. |

Section 11 - Toxicological Information

Information on Toxicological Effects**Product Information****(a) acute toxicity;**

| | |
|------------|--|
| Oral | Category 4 |
| Dermal | Based on available data, the classification criteria are not met |
| Inhalation | Category 1 |

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|----------------------------|-------------------|-----------------------|------------------------|
| Hexamethylene diisocyanate | 738 mg/kg (Rat) | > 7000 mg/kg (Rabbit) | 0.124 mg/L (Rat) 4 h |

(b) skin corrosion/irritation; Category 1 C

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;

| | |
|-------------|------------|
| Respiratory | Category 1 |
| Skin | Category 1 |

Sensitization No information available

(e) germ cell mutagenicity; No data available

| | |
|-----------------------------|--|
| (f) carcinogenicity; | No data available There are no known carcinogenic chemicals in this product |
| (g) reproductive toxicity; | No data available |
| (h) STOT-single exposure; | No data available |
| (i) STOT-repeated exposure; | No data available |
| Target Organs | No information available. |
| (j) aspiration hazard; | No data available |

Other Adverse Effects

Symptoms / effects, both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

Section 12 - Ecological Information

Ecotoxicity effects

Contains a substance which is: Harmful to aquatic organisms. The product contains following substances which are hazardous for the environment. Reacts with water so no ecotoxicity data for the substance is available.

| Component | Freshwater Fish | Water Flea | Freshwater Algae | Microtox |
|----------------------------|---|------------|------------------|--|
| Hexamethylene diisocyanate | LC50: = 26.1 mg/L, 96h static (Brachydanio rerio) | | | EC50 = 15.7 mg/L 30 min EC50 = 25.5 mg/L 15 min EC50 = 53.2 mg/L 5 min |

Persistence and Degradability

No information available

Persistence

Persistence is unlikely, based on information available.

Degradability

Decomposes in contact with water.

Degradation in sewage treatment plant

Contains substances known to be hazardous to the environment or not degradable in waste water treatment plants. Decomposes in contact with water.

Bioaccumulative Potential

Product does not bioaccumulate due to reaction with water

Mobility

Decomposes in contact with water. Is not likely mobile in the environment

Endocrine Disruptor Information

This product does not contain any known or suspected endocrine disruptors

Persistent Organic Pollutant

This product does not contain any known or suspected substance

Ozone Depletion Potential

This product does not contain any known or suspected substance

Section 13 - Disposal Considerations

Waste from Residues/Unused Products

Do not allow into drains or watercourses or dispose of where ground or surface waters may be affected. Wastes, including emptied containers, are controlled wastes and should be disposed of in accordance with all federal, E.P.A., state and local regulations. Assure conformity with all applicable regulations.

Contaminated Packaging

Dispose of this container to hazardous or special waste collection point.

Other Information

Chemical wastes should be disposed through a licensed commercial waste collection service. Do not flush to sewer. Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Large amounts will affect pH and harm aquatic organisms.

Section 14 - Transport Information

IMDG/IMO

UN-No UN2281
 Proper Shipping Name HEXAMETHYLENE DIISOCYANATE
 Hazard Class 6.1
 Packing Group II

ADG

UN-No UN2281
 Proper Shipping Name HEXAMETHYLENE DIISOCYANATE
 Hazard Class 6.1
 Packing Group II

| Component | Hazchem Code |
|--|--------------|
| Hexamethylene diisocyanate 822-06-0 (>95) | 2Z |

IATA

UN-No UN2281
 Proper Shipping Name HEXAMETHYLENE DIISOCYANATE
 Hazard Class 6.1
 Packing Group II

Environmental hazards No hazards identified
 Special Precautions No special precautions required
 Additional information None known

Section 15 - Regulatory Information

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

National Regulations Australia

See section 8 for national exposure control parameters.

| Component | Health Surveillance |
|--|---|
| Hexamethylene diisocyanate 822-06-0 (>95) | Listed Demographic, medical and occupational history Completion of a standardised respiratory questionnaire Physical examination of respiratory system and skin Standardised respiratory function test, for example, FEV1, FVC and FEV1/FVC |

Standard for the Uniform Scheduling of Medicines and Poisons

Classified as a scheduled poison according to the Standard for Uniform Scheduling of Medicines and Poisons.

| Component | Standard for the Uniform Scheduling of Medicines and Poisons |
|---------------------------------------|--|
| Hexamethylene diisocyanate - 822-06-0 | Schedule 6 listed - free organic;boiling <300°C;except in viscous Polyurethane adhesive, or viscous Polyurethane sealants;containing <=0.7% of free organic Isocyanates boiling <300°C |

Australian Industrial Chemicals Introduction Scheme (AICIS)

| Component | Australian Industrial Chemicals Introduction Scheme (AICIS) | Additional information |
|---------------------------------------|---|------------------------|
| Hexamethylene diisocyanate - 822-06-0 | Present | - |

Australian - Illicit Drug Precursors/Reagents Substance List

This product does not contain any substance(s) on the Illicit Drug Precursors/Reagents list.

Chemicals of Security Concern

This product does not contain any substance(s) listed on the voluntary National Code of Practice for Chemicals of Security Concern

National pollutant inventory Not applicable

Prohibition or notification/licensing requirements

Shown below are details of specific prohibition/notifications or licensing requirements when they apply.

This product does not contain any substance(s) subject to Prohibition, Authorization or Restriction.

International Inventories

| Component | AICS | NZIoC | EINECS | ELINCS | TSCA | DSL | NDSL | PICCS | ENCS | ISHL | IECSC | KECL |
|----------------------------|------|-------|-----------|--------|------|-----|------|-------|------|------|-------|----------|
| Hexamethylene diisocyanate | X | X | 212-485-8 | - | X | X | - | X | X | X | X | KE-18613 |

Legend: X - Listed. '-' - Not Listed. **KECL** - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

International Regulations

Ozone Depletion Potential This product does not contain any known or suspected substance

Persistent Organic Pollutant This product does not contain any known or suspected substance

Rotterdam Convention (PIC) Not applicable

Basel convention on the control of transboundary movements of hazardous wastes and their disposal

Not applicable.

| Component | CAS No | OECD HPV | Restriction of Hazardous Substances (RoHS) | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements |
|----------------------------|----------|----------|--|---|--|
| Hexamethylene diisocyanate | 822-06-0 | Listed | Not applicable | Not applicable | Not applicable |

Authorisation/Restrictions according to EU REACH

| Component | REACH (1907/2006) - Annex XIV - Substances Subject to Authorization | REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances | REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC) |
|----------------------------|---|---|---|
| Hexamethylene diisocyanate | | | |

| | | | |
|----------------------------|---|--|---|
| Hexamethylene diisocyanate | - | Use restricted. See item 75. (see link for restriction details) | - |
|----------------------------|---|--|---|

<https://echa.europa.eu/substances-restricted-under-reach>

Section 16 - Other Information

Legend

AICS - Australian Inventory of Chemical Substances
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List
IECSC - Chinese Inventory of Existing Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
ICAO/IATA - International Civil Aviation Organization/International Air Transport Association
MARPOL - International Convention for the Prevention of Pollution from Ships
NZS 5433:2012 - Transport of Dangerous Goods on Land
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
WEL - Workplace Exposure Limit
DNEL - Derived No Effect Level
POW - Partition coefficient Octanol:Water
vPvB - very Persistent, very Bioaccumulative
VOC - (Volatile Organic Compound)

NZIoC - New Zealand Inventory of Chemicals
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS - Japanese Existing and New Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances
CAS - Chemical Abstracts Service
ACGIH - American Conference of Governmental Industrial Hygienists
 Predicted No Effect Concentration (PNEC)
IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

OECD - Organisation for Economic Co-operation and Development
LC50 - Lethal Concentration 50%
ATE - Acute Toxicity Estimate
RPE - Respiratory Protective Equipment
NOEC - No Observed Effect Concentration
BCF - Bioconcentration factor
PBT - Persistent, Bioaccumulative, Toxic

Key literature references and sources for data

<https://echa.europa.eu/information-on-chemicals>
 Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Revision Date 20-Nov-2022
Revision Summary Not applicable.

This Safety Data Sheet (SDS) is prepared in accordance to and complies with the requirements of Safe Work Australia - Work Health and Safety Regulations (WHS Regulations).

Disclaimer

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

End of Safety Data Sheet