

1. Substance/preparations and company identification

- A. Product name : COSMONATE M-200
- B. Relevant identified uses of the substance or mixture and uses advised against
- Component in manufacturing of polyurethane compounds
- C. Details of the supplier of the safety data sheet.
- Company name : KUMHO MITSUI CHEMICALS INC,
 - Head office) 11F, East wing, Signature Tower, #100 Cheonggyecheon-ro, Jung-gu, Seoul, Korea
 - Plant) 305, Yeosusandan2-ro, Yeosu-si, Jeonnam, Korea
- D. Emergency telephone number.
- Tel) 82-61-688-5000 (9:00 am to 5:00 pm, Mon to Fri, Korean time)

2. Hazard identification

- A. Classification of substance
- Acute Toxicity.(inhalation-vapor): Cat.4
 - Skin Corrosion/Irritation: Cat.2
 - Serious Eye Damage/Eye Irritation: Cat.2
 - Respiratory Sensitization: Cat.1
 - Skin Sensitization: Cat.1
 - Carcinogenicity: Cat.2
 - Specific Target Organ Toxicity-Single: Cat.3
 - Specific Target Organ Toxicity-Repeated: Cat.2
- B. Classification of substance according to 1999/45/EC
- Xn, R20-48/20
 - Xi, R36/37/38, R42/43
 - Carc Cat 3, R40
- C. Label elements and hazard statement
- Pictogram



- Signal Word : Danger

- Hazard statements
 - 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 (Olfactory organs) through prolonged or repeated exposure (inhalation).

- Precautionary statements(Prevention)
 - P201 : Obtain special instructions before use.
 - P202 : Do not handle until all safety precautions have been read and understood.
 - P260 : Do not breathe gas/mist/vapors/spray.
 - P261 : Avoid breathing gas/mist/vapours/spray.
 - P264 : Wash thoroughly after handling.
 - 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.
 - P281 : Use personal protective equipment as required.
 - P285 : In case of inadequate ventilation wear respiratory protection.

- Precautionary statements(Response)
 - P312 : Call a POISON CENTER or doctor/physician if you feel unwell.
 - P314 : Get medical advice/attention if you feel unwell.
 - P321 : Specific treatment.
 - P362 : Take off contaminated clothing and wash before reuse.
 - P363 : Wash contaminated clothing before reuse.
 - P302+P352 : IF ON SKIN: Wash with plenty of soap and water.
 - P304+P340 : IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 - P304+P341 : IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position 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
 - P308+P313 : If exposed or concerned get medical advice/attention.
 - P332+P313 : If skin irritation or rash occurs: Get medical advice/attention.
 - P333+P313 : If skin irritation or rash occurs: Get medical advice/attention.
 - P337+P313 : If eye irritation persists: Get medical advice/attention.
 - P342+P311 : If experiencing respiratory symptoms: Call a poison center or doctor.

- Precautionary statements(Storage)
P403+P233 : Store in a well-ventilated place. Keep container tightly closed.
P405 : Store locked up.
- Precautionary statements(Disposal)
P501 : Dispose of contents/container in accordance with local regulations.

D. Other hazard

Ingredient	NFPA Ratings		
	Health	Fire	Reactivity
4,4'-Methylene diphenyl diisocyanate	3	1	1

3. Composition/information on ingredients

Component	CAS Number	Content(w/w %)
Polymethylene polyphenyl isocyanate	9016-87-9	60~65
4,4'-Methylene diphenyl diisocyanate	101-68-8	35~40

4. First-Aid Measures

A. Eye contact

- If in eyes, rinse cautiously with room-temperature water for several minutes.
- Remove contact lenses if present and easy to do.
- If eye irritation persists, get medical attention.

B. Skin contact

- Remove contaminated clothing and wash affected area with soap and water (or, if available, polyethylene glycol, followed by copious water).
- Get medical attention if irritation or rash occurs.
- Launder contaminated clothing before re-use.
- Remove clothing and shoes contaminated with chemicals.

C. Inhalation

- If inhaled, remove victim to fresh air and keep at rest in a position comfortable for breathing
- If don't breathe, perform CPR.
- If symptoms persist, get medical attention.

D. Ingestion

- If swallowed, wash out mouth thoroughly and give water to drink.
- Get prompt medical attention.
- Do not induce vomiting, unless instructed by medical personnel.

- E. Most important symptoms and effects, both acute and delayed
- If inhaled, the product may cause harmful effects, respiratory irritation, and difficulty in breathing.
- F. Indication of any immediate medical attention and special treatment needed
- Treat symptoms as they occur.

5. Fire-Fighting Measures

- A. Extinguishing media
- Dry chemical powder, carbon dioxide, water spray or alcohol-resistant foam.
 - For larger fires, use water spray, fog or regular foam.
- B. Hazardous combustion products
- The product is not flammable, but may decompose if involved in a fire, producing smoke, and toxic vapours and gases (including hydrogen cyanide).
- C. Fire fighting
- Move container from fire area if you can do it without risk.
 - Leave a maximum space when fight a fire.
 - Stay away from ends of tanks.
 - Prepare fire water for further treatment.
 - Do not scatter spilled material with high-pressure water streams.
 - Stop the leak first and try to extinguish it.
 - Mass spray with fine spray.
 - After evolution, spray the container for a considerable amount of time to cool the container.
 - Spray at the protected area or at a safe distance.
 - Do not inhale substances or combustible materials.

6. Accidental Release Measures

- A. Personal precautions
- Do not touch spilled material.
 - Ensure adequate ventilation.
 - Evacuate unauthorized personnel from spillage area.
 - For large-scale spills, ensure full personal protection is worn.
- B. Environmental precautions.
- Shut off the ignition source.
 - Stop the leak if you can take action without danger.
 - Do not discharge into drains/surface waters/groundwater.
 - If there are many leaks, stack the banks to prevent them from spreading far away.

C. Methods and material for containment and cleaning up

- For small amounts, move the storage container from the leakage area to a safe place.

Absorb using non-combustible materials.

Transfer the leaked substance to a suitable container for further disposal and dispose of it.

- For large amounts, if emission exceeds the standard amount, notify the government departments or local governments of the details of discharge.

Isolate the exposed area and control access of non-related people.

Build and manage the embankment for the treatment of leakage materials.

Use a mixture of 90% water, 8% concentrated ammonia and 2% detergent to decontaminate

7. Handling and Storage

A. Precautions for safe handling

- Should be handled in a ventilated area.
- Observe all federal, state and local regulations when storing this substance.
- Do not store food-like substances or work on welding as residues in empty containers may explode or produce harmful gases mixed with other substances.

B. Conditions for safe storage, including any incompatibilities

- Use disposable containers and tools where possible.
- Product reacts with moisture, so keep container tightly closed when not in use.
- Store in a cool, well-ventilated area between 5~35°C, away from direct sunlight.

8. Exposure controls and personal protection

A. Exposure limits

Component	Korean Regulation	ACGIH Regulation	Biological Exposure limit
4,4'-Methylene diphenyl diisocyanate	TWA-0.005ppm, 0.055mg/m ³	TLV-TWA- 0.005ppm	Not applicable

※ Note. TWA : time-weighted average, STEL: short term exposure limit

B. Exposure controls

- Engineering controls
 - Local exhaust ventilation or use in a closed system is recommended.
- Personal protective equipment
 - The need for personal protective equipment should be based on a workplace risk assessment for the particular use.

- Avoid skin and eye contact by wearing chemical resistant gloves (eg nitrile rubber, Viton) and eye protection/face shield. Where more extensive contact may occur, wear protective clothing (eg apron, overalls). Wear respiratory protective equipment (eg vapour mask) if exposure to vapours is possible.
- Facilities for eye washing and showering are recommended within the immediate work area.

9. Physical and Chemical Properties

- A. Description: Dark amber to brown, viscous liquid.
- B. Odor: Musty
- C. Odor threshold value: not applicable
- D. pH: not applicable
- E. Melting point : <0 °C (<32 °F)
- F. Initial boiling point & boiling point range: 200~208 °C (392~406 °F)
- G. Flashing point: >200 °C
- H. Vaporization velocity: not applicable
- I. Flammability (solid, gas): not flammable
- J. Ignition or explosion range maximum/minimum: liquids not relevant for classification and labelling.
- K. Vapor pressure: 0.00062 Pa (20 °C)
- L. Solubility: Not soluble in water (reacts); soluble in benzene, nitrobenzene, acetone, chlorobenzene
- M. Vapor density: 8.5
- N. Specific gravity: 1.20 (at 25 °C)
- O. N-octanol/water division coefficient: not applicable
- P. Spontaneous combustion temp.: > 600 °C
- Q. Decomposition temp.: > 230 °C
- R. Viscosity: 150~220cps (25 °C)
- S. Molecular weight: not applicable

10. Stability and Reactivity

- A. Reactivity
 - Reacts slowly and exothermically on contact with water, generating sufficient heat and pressure to rupture the container in a closed system.
- B. Conditions to avoid
 - High temperatures, flame, and moisture.

C. Incompatibilities

- Acids, amines, alcohols, water, Alkalines, strong bases, substances/products that react with isocyanates..

D. Hazardous decomposition products

- Thermal decomposition products may include highly toxic fumes of hydrogen cyanide and toxic oxides of carbon and nitrogen.

11. Toxicological information

A. Primary routes of exposure

- Acute toxicity (4,4'-Methylene diphenyl diisocyanate)

- Acute toxicity. : LD50 rat(oral)>2000mg/kg
- Acute toxicity. : LD50 rabbit(dermal)>9400mg/kg
- Acute toxicity. : LC50 rat(inhalation) : 0.431mg/L
- Acute toxicity.(inhalation-vapor) : Category 4
- Aerosols of respirable particles were tested.

Artificially generated aerosols are not produced in the workplace and there is no potential exposure to such aerosols (EC 2005)

- Respiratory irritants: classified as respiratory irritants
- Skin irritant: Causing skin irritation in the mouse
- Specific Target Organ Toxicity-Single: Human has bronchial irritation

- Skin Corrosion/Irritation:

- May cause mild skin irritation accompanied by redness during prolonged contact.
- Skin may be stained.

- Serious Eye Damage/Eye Irritation

- Causes eye pain
- Repeated contact may cause conjunctivitis.

- Respiratory Sensitization

- May cause allergic respiratory reactions.
- Re-exposure to a very small concentration of isocyanate may cause respiratory allergic reactions.

- Skin Sensitization

- Causes skin pain.
- Isocyanate substances can cause skin allergies such as eczema.

- Carcinogenicity

- Lung tumors were observed in animal experiments in MDI/Polymeric MDI (6 mg/m³) exposed to small droplets of mist. The tumor caused both respiratory irritation and lung injury.

- Specific Target Organ Toxicity-Single
 - May cause irritation in the respiratory system.
- Specific Target Organ Toxicity-Repeated
 - Upper respiratory and lung tissue injuries were observed after repeated excessive exposure to MDI/Polymeric MDI aerosols in animal testing.

12. Ecological information

A. Ecotoxicity

- Assessment of aquatic toxicity
 - Measured environmental poisoning is environmental poisoning of hydrolyzed products, primarily in situations that maximize the production of soluble species. Essentially non-toxic to aquatic organisms.
LC50/EC50/EL50/LL50 > 100 mg/L, most sensitive species
LC50, Daniorio (Jebrafish), Exponential Test, 96 h, > 1000 mg/l, OECD Test Guideline 203 or equivalent

B. Assessment biodegradation and elimination (H2O)

- Poorly biodegradable. The product is unstable in water. The elimination data also refer to products of hydrolysis.

C. Bioaccumulative potential

- Significant accumulation in organisms is not to be expected.
- Bioaccumulation potential: Bioconcentration factor:
 - 200 (28 d), *Cyprinus carpio* (OECD Guideline 305 E)

D. Mobility in soil

- Assessment transport between environmental compartments:
 - The substance will not evaporate into the atmosphere from the water surface. Adsorption to solid soil phase is not expected.

E. Other adverse effects

- Other environmental toxicity information:
 - Untreated discharges should not be allowed into natural water systems and should not be allowed to enter soil, waterways and wastewater.

13. Disposal Considerations

A. Disposal method

- Incinerate or dispose of in a licensed facility. Dispose of isocyanate waste in a dried container and do not mix with other wastes (reaction, hazardous pressure)

B. Container disposal

- Empty contents from contaminated packaging as much as possible and can be recycled after completely cleaning the packaging. Dispose of this material and container in a safe manner.

C. Precautions for Disposal

- A business operator (business waste discharger) that discharges waste from a business establishment shall dispose of waste generated at the workplace on its own, or delegate it to a waste disposal business operator, a waste disposal business operator, or a waste disposal facility installation operator. Compliance with the Wastes Control Act is required

14. Transport Information

A. Sea transport (IMDG)

- Not classified as dangerous good under transport regulations.

B. Air transport (IATA/ICAO)

- Not classified as dangerous good under transport regulations.

15. Regulatory Information

A. Federal Regulations

- Registration status:

Chemical	TSCA, US released / listed
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- EPCRA 311/312 (Hazard categories): Refer to SDS section 2 for GHS hazard classes applicable for this product.

- EPCRA 313

CAS Number	Chemical name
101-68-8	4,4'-Methylene diphenyl diisocyanate

CERCLA RQ	CAS Number	Chemical name
5000 LBS	101-68-8	4,4'-Methylene diphenyl diisocyanate

B. State regulations

State RTK	CAS Number	Chemical name
NJ	101-68-8	4,4'-Methylene diphenyl diisocyanate
PA	101-68-8	4,4'-Methylene diphenyl diisocyanate

• NFPA Hazard codes:

Health: 3	Fire: 1	Reactivity: 1	Special: -
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• HMIS III rating

Health: 2	Flammability: 1	Physical hazard: 1
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16. Other Information

A. Reference

- K-REACH registration information (JIL)
- EU : http://ec.europa.eu/enterprise/reach/docs/ghs/ghs_prop_vol_iiia_en.pdf
- KOREA : <http://www.kosha.net>
- UN GHS File
- ECHA: <http://clp-inventory.echa.europa.eu/>
- <http://kischem.nier.go.kr/kischem2/wsp/main/main.jsp>
- EU Indicative Occupational Exposure Limit Values (IOELVs): Directives 2000/39/EC, 2006/15/EC and 2009/161/EU

B. List of R- phrases / S-phrases

- R20: Harmful by inhalation.
- R36/37/38: Irritating to eyes, respiratory system and skin.
- R40: Limited evidence of a carcinogenic effect.
- R42/43: May cause sensitization by inhalation and skin contact.
- R48/20: Harmful: danger of serious damage to health by prolonged exposure through inhalation.
- S1/2: Keep locked up and out of the reach of children.
- S23: Do not breathe gas/fumes/vapour/spray (appropriate wording to be specified by the manufacturer).
- S36/37: Wear suitable protective clothing and gloves.
- R45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

C. Creation date : 2004. 03. 23

D. Revision date

- 1st revision : 2010. 07. 26
- 2nd revision : 2012. 02. 16
- 3rd revision : 2012. 05. 11
- 4th revision: 2012. 06. 25
- 5th revision: 2013. 11. 20
- 6th revision: 2017. 05. 18
- 7th revision: 2017. 08. 17
- 8th revision: 2020. 04. 23
- 9th revision: 2021. 03. 04

E. The others : -