LG Chem
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SECTION 1. IDENTIFICATION

A. PRODUCT NAME : CYCLOPENTANE

B. Recommended Use and Restriction on Use

○ General use :
- Solvent, Synthetic initiator, Automotive fuel, Azeotrope distillation Agent. Painkillers, Sedative, Sleeping pills, Anticancer drugs, CNS Sedative, prostaglandin , Pesticides

○ Restriction on Use : Not available

C. Manufacturer/Supplier

○ Supplier : ㈜LG Chem NCC Oxo-Alcohol plant
○ Address : 760 Jungheung-dong, Yeosu-si, Jeollanam-do, 500-878 Korea
○ information service or Emergency Phone No. : +82-61-689-3340
○ Division in charge : BD/BTX production

SECTION 2. HAZARDS IDENTIFICATION

A. GHS Classification :
○ Physical Hazards - Flammable liquids : Classification 2
○ Health Hazards
Skin corrosion/irritation : Classification 2
Serious eye damage/eye irritation : Classification 2A
Specific target organ toxicity(single exposure) : Classification 3(Respiratory tract irritation)
Specific target organ toxicity(single exposure) : Classification 3(Narcotic effects)
Aspiration toxicity : Classification 1
○ Environmental Hazards - Chronic aquatic toxicity : Classification 3

B. GHS label elements

○ Hazard symbols



○ Signal word Warning

○ Hazard statement
Highly flammable liquid and vapour
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness
May be fatal if swallowed and enters airways
Harmful to aquatic life with long lasting effects

○ Precautionary statement

- Prevention :
  - P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
  - P233 Keep container tightly closed.
  - P240 Ground/bond container and receiving equipment.
  - P241 Use explosion-proof electrical/ventilating/lighting/equipment.
  - P242 Use only non-sparking tools.
  - P243 Take precautionary measures against static discharge.
  - P280 Wear protective gloves/protective clothing/eye protection/face protection.
  - P264 Wash hands thoroughly after handling.
  - P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
  - P271 Use only outdoors or in a well-ventilated area.
- Response :
  - P312 Call a POISON CENTER or doctor/physician if you feel unwell.
  - P331 Do NOT induce vomiting.
  - P362 Take off contaminated clothing and wash before reuse.
  - P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
  - 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.
  - P332+P313 If skin irritation occurs: Get medical advice/attention.
  - P337+P313 If eye irritation persists: Get medical advice/attention.
  - P370+P378 In case of fire: Use Chemical powder, carbon dioxide, water, regular foam for extinction.
  - P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
  - 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 :
  - P405 Store locked up.
  - P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  - P403+P235 Store in a well-ventilated place. Keep cool.
- Disposal : P501 Dispose of contents/container in accordance with local/regional/national/international regulation

다 . Other hazards which do not result in classification

○ NFPA : health=1, Flammability=3, Reactivity =0

SECTION 3. COMPOSION/INFORMATION ON INGREDIENTS

Chemical Name	Other Name	CAS Number	Contents(%)
CYCLOPENTANE	-	287-92-3	95~98.5 wt%
NORMALPENTANE	-	109-66-0	≥ 0.3 wt%
2,2-DIMETHYLBUTANE	-	75-83-2	≥ 0.5 wt%

SECTION 4. FIRST-AID MESURES

A. Eye Contact
- Immediately flush eyes with plenty of water at least 15 min.
- Get medical advice/attention immediately.

B. Skin Contact
- Remove contaminated clothing and shoes.
- Immediately wash skin with water and soap at least 15 min.
- If necessary, get medical attention
- Wash contaminated clothing and shoes before reuse.

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C. Inhalation
- Move victim to fresh air.
- If adverse effects occur, remove to uncontaminated area.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Get medical advice/attention immediately.

D. Ingestion
- Do not induce vomiting.
- If person is conscious, give 2-4 cup of water or milk.
- If occur vomiting, lay the patient down as head would be lower than body for suffocation prevention.
- Do not give anything by mouth to an unconscious person.
- Get medical advice/attention immediately.

아. Delayed and immediate effects and also chronic effects from short and long term exposure : Not available

E. Note to physician
- In case of ingestion, consider gastrolavage.
- Give oxygen if needed.

SECTION 5. FIRE-FIGHTING MEASURES

A. Suitable (Unsuitable) extinguishing media
- ○ Suitable extinguishing media : Chemical powder, carbon dioxide, water, normal foam
- ○ Unsuitable extinguishing media : Not available
- ○ Large Fire : Use normal extinguishing materials or water spray, fog.

B. Specific hazards arising from the chemical
○ Decomposition products : Thermal decomposition may produce toxic or/and harmful gases.
○ Hazard of fire and explosion
- Highly flammable material. Will be easily ignited by heat, spark or flames.
- Vapors are heavier then air.
- Above flash point, vapor-air mixtures are explosive within flammable limits noted above.
- Vapor may travel a considerable distance to source of ignition and flash back.

C. Special fire fighting procedures
- Move containers from fire area if you can do it without risk.
- Cool containers with water spray until well after fire is out.
- Always stay away from tanks engulfed in fire.
- If a fire occur in Receiving/Forwarding or storage space, cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out.
- if this is impossible, take prevention measure as follow.
- Isolate danger area and keep unauthorized personnel out.
- Let fire burn.
- Take shelter immediately if sound a fire alarm or fade the tank.
- If tank, rail car or tank truck is involved in a fire, isolate for 800meters(1/2mile) in all direction ; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.
- Water may be ineffective.

SECTION 6. ACCIDENTAL RELEASE MEASURES

A. Personal Precautions, Protective Equipment and Emergency procedures
- Avoid heat, sparks, flames and other ignition sources.
- Stop leak if possible without personal risk.
- All equipment used when handling the product must be grounded .
  And use clean non-sparking tools to collect absorbed material.
- Water spray may be used to reduce vapors.
- Refer to personal Protective equipment listed in sections 8.

B. Environmental Precautions
○ Prevent entry into waterways, sewers, basements and apply proper barricade.
○ If large spills : Contact your federal, state, local and provincial regulations.

C. Methods and materials for containment and cleaning up
○ Small spills : Absorb with sand or other non-combustible material.
Collect spilled material in appropriate container for disposal
○ Large spills : Dike for later disposal.
Keep sources of ignition away.
Keep unnecessary people away, isolate hazard area.
○ Dispose in accordance with the Waste Control Law.

SECTION 7. HANDLING AND STORAGE

A. Handling
- Indemnify against physical injury.
- Keep away from heat, spark or flame.
- Exposure to heat may cause bursting or explosion.
- Avoid inhalation. Avoid contact with skin and eyes.
- Wash thoroughly after handling.

B. Storage Precautionary Statements
- Store and handle in accordance with laws and regulations in force.
- Store in a cool dry area.
- Keep containers securely sealed.
- Store away from incompatible materials.
- Keep away from waterworks and sewerage.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

A. Exposure limits, biological exposure limits etc
○ Exposure limit (ISHL in Korea) :
  - TWA : 600 ppm, 1720㎎/㎥
  - STEL : Not available
○ ACGIH : TWA 600 ppm(skin)
○ NIOSH : TWA 600 ppm(1720 ㎎/㎥) ; 10hr
○ Biological exposure limits : Not available

B. Engineering Controls :
- The use of local exhaust ventilation is recommended to control emissions near the source. Laboratory samples should be handled in a fumehood. Provide mechanical ventilation of confined spaces.
- If there is risk of explosion, equip the explosion prevention facilities.

C. Personal Protective Equipment :
○ Respiratory Protection : Under conditions of frequent use or heavy exposure, Respiratory protection may be needed. Respiratory protection is ranked in order from minimum to maximum. Consider warning properties before use.
  - Air-supplying Respirator(Pressure-demand respirators, Full-face respirator)
  - Airline respirators(Pressure-demand respirators, Full-face respirator)

  For unknown concentration or immediately dangerous to life or health
  - Air-supplying respirator(combination airline mask)
  - Airline respirators(Full-face respirator)

○ Eye protection
- Use chemical safety goggles to protect from dusting or splashing of solutions.
- Ensure that eyewash stations and safety showers are close to warehouse or the workstation location.

○ Hand protection
- Wear appropriate protective anti-chemical gloves.

○ Body protection
- Wear impermeable clothing.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

A. Appearance	physical property : liquid color : colorless
B. Odor	unique odor
C. Odor threshold	Not available
D. pH	Not available
E. Melting point / Freezing point	-94 ℃
F. Initial Boiling Point / Boiling Ranges	49 ℃
G. Flash point	Not available
H. Evaporation Rate	Not applicable
I. Flammability (solid, gas)	Not available
J. Upper/Lower Flammability or explosive limits	8.7/1.1 vol.%
K. Vapor pressure	318 mmHg(25°C)
L. Solubility	Insoluble
M. Vapor density	2.4 (air=1)
N. Relative density	0.7 at 20 ℃
O. Partition coefficient of n-octanol/water	Not available
P. Autoignition Temperature	380 ℃
Q. Decomposition Temperature	Not applicable
R. Viscosity	Not available

SECTION 10. STABILITY AND REACTIVITY

A. Chemical Stability
- Stable in normal temperature and pressure.

B. Possibility of Hazardous Reaction
- May not occur.

C. Conditions to avoid
- Do not exposure to heat, sparks, flames and other ignition sources
- Exposure to heat may cause bursting or explosion.

D. Materials to avoid
- Oxidizing agent(chlorine, bromine, fluorine etc)

E. Hazardous Decomposition Products
- Thermal decomposition may produce toxic or/and harmful gases.

SECTION 11. TOXICOLOGICAL INFORMATION

A. Information on the likely routes of exposure :

○ Inhalation by respiratory tract :
- Short term exposure : Irritation, Headache, Sleepiness, Dizziness, Loss of control function
- long term exposure : Irritation

○ Ingestion by mouse :
- Short term exposure : nausea, stomach ache, Headache, Sleepiness, Dizziness, Loss of control function, aspiration risk
- long term exposure : No data available

○ Skin contact :
- Short term exposure : Irritation
- long term exposure : Refer to the Short term exposure impact.

○ Eye contact :
- Short term exposure : Irritation
- long term exposure : Refer to the Short term exposure impact.

B. Delayed and immediate effects and also chronic effects from short and long term exposure:

○ Acute Toxicity
- Oral : LD50 11,400 mg/kg(rat) [Ref.:KOSHA]
- Skin : Not available
- Inhalation : LC50 106 mg/L/2hr(mouse) [Ref.:KOSHA]
  LC50 106,000 m^3(rat) [Ref.:CHEMWATCH]
  LC50 72,000 m^3(mouse) [Ref.:CHEMWATCH]

○ Skin Corrosion/Irritation :
- Contact with this product may stimulate human skin [Ref.:KOSHA,NITE]
- The result of application on guinea pig's skin, this product causes erythema, dryness. [Ref.:HSDB]

○ Serious Eye damage/Eye irritation :
- contact to this product and vapor stimulate the human eyes [Ref.:NITE]

○ Respiratory sensitization : Not available

○ Skin sensitization :
- Dermatitis is caused by long-term contacts. Since it is impossible to distinguish if it is just stimulative or allergic, it could not be classified due to lack of data. [Ref.:NITE]

○ Carcinogenicity : Not Classifiable as a carcinogen [Ref.:KOSHA]

○ Germ Cell Mutagenicity : Not available

○ Reproductive toxicity : Not available

○ Specific target organ toxicity(single exposure) :
- There is the description that the influence of the central nerve, such as giddiness, clouding of consciousness, a coma is seen as a result of exposures. Moreover, respiratory irritation was indicated.(anesthesia action, respiratory irritation) [Ref.:NITE]

○ Specific target organ toxicity(repeated exposure) :
- In the 12-week repetition examination in a rat of high inhalation exposure which corresponds outside the Category, only the suppression of weight gain was observed. [Ref.:NITE]

○ Aspiration hazard :
- Aspiration causes chemical pneumonia. [Ref.:NITE]

C. Other toxicity information : Not available

SECTION 12. ECOLOGICAL INFORMATION

A. Ecotoxicity

○ Acute aquatic toxicity :
- Fish : LC50 >100 mg/L/24hr, Oncorhynchus kisutch [Ref.:ESIS]
- Crustacea : EC50 19.6 mg/L/24hr, Crustacea [Ref.:ESIS]
- Algae : EC50 116 mg/L/3hr, Chlorella vulagaris [Ref.:ESIS]

○ Chronic aquatic toxicity :
- Classified into Category 3, since acute toxicity was Category 3 and rapid degradability is unknown, though supposed less bio-accumulative (log Kow=3)

B. Persistence and degradability

○ Persistent : Not available

○ Degradation : Not available

C. Bioaccumulative potential

○ Biodegradation : 0% (4day) [Ref.:ESIS]

○ Bioaccumulation : log kow=3 [Ref.:KOSHA]

D. Mobility in soil : Not available

E. Other adverse effects : Not available

SECTION 13. DISPOSAL CONSIDERATIONS

A. Disposal methods
- Dispose of contents/container in accordance with local regulation.
- The user of this product must properly characterize the waste/container generated from the use of this product in accordance with all applicable federal, state and/or local laws and regulations in order to determine the proper disposal of the waste in accordance with all applicable federal, state and/or local laws and regulations.

B. Special precautions for disposal :
- The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.
- Dispose of waste in accordance with local regulation.

SECTION 14. TRANSPORT INDORMATION

A. UN Number : 1146

B. UN Proper Shipping name : CYCLOPENTANE

C. Transport hazard class(es) : Class 3 – Flammable liquid

D. Packing group : Group Ⅱ

E. Sea pollutants : Cyclopentane

F. Special precautions for user related to transport or transportation measures
○ Type of extraordinary step in fire : F-E
○ Type of extraordinary step in spill : S-D

SECTION 15. REGULATORY INFORMATION

A. ISHL(The industrial Safety and Health Law in Korea):
- [Cyclopentane; 287-92-3] is subject to the chemical needs monitoring workplace exposure limit under ISHL Article 42.[MOE's Public Notice No. 2008-26]
- This product is subject to the chemical for classification and labeling under ISHL Article 41.
- This product is not subject to the chemical needs monitoring workplace exposure limit under ISHL Article 42.

B. TCCA(The Toxic Chemical Control Act in Korea):
- This product is not classified as Toxic chemical and observational chemical under TCCA Article 2.3 and 4.

C. Dangerous goods Safety Management Law in Korea :
- This product is classified as Class 4 Dangerous good(flammable liquid), Petroleum Class 1 (Storage volume limit as water Insoluble liquid: 200 L) under the Presidential decree of Dangerous goods Safety Management Law, Table 1. (Acetone, gasoline and the others have flash point below 21℃ in 1 atm.)

D. Other local or international regulation
○ POPs Management Law : Not applicable
○ EU Classification
- Classification : F Highly flammable.
- R-Phrases : R11 High
- S-Phrases : S2.S9.S16.S29.S33

○ U.S. Regulation
- OSHA regulation(29CFR1910.119) : Not regulated
- CERCLA 103(40CFR302.4) : Not regulated
- SARA 302(40CFR355.30) : Not regulated
- SARA 304(40CFR355.40) : Not regulated
- SARA 313(40CFR372.65) : Not regulated

- SARA HAZARDOUS CATEGORIES. SARA 311/312(40 CFR370.21)
  ACUTE : YEA
  CHRONIC : NO
  FIRE : YEA
  REACTIVE : NO
  SUDDEN RELEASE : NO

○ Rotterdam Convention on Harmful Chemicals & Pesticides : Not applicable
○ Stockholm Convention on Persistent Organic Pollutants : Not applicable
○ Montreal Protocol on Substances That Deplete the Ozone Layer : Not applicable

SECTION 16. OTHER INFORMATION

A. References : handbook of industrial poisoning, shinkwangpub
TOXNET, U.S. National Library of Medicine,
National Chemicals Information System, National Institute of Environmental Research(http://ncis.nier.go.kr)
Hazardous Material Information System, National Emergency Management Agency(http://hazmat.nema.go.kr)
IUCLID Chemical Data Sheet, EC-ECB
National Institute of Technology and Evaluation(NITE)(http://www.nite.go.jp)
2004 ERG(Emergency Response Guidebook)
he International Chemical Safety Cards (ICSC)
CHEMWATCH(Chemical DB)

B. Issue date : 2008/04/07

C. Revision number and Last date revised : 1996/06/20(2nd Rev.)

D. Other information be related to MSDS : Not available
Source : LG CHEM, The Korea Occupational Safety and Health Agency(KOSHA)

E. Other information : Not available

Division of Preparation	BD/BTX production	Person of Preparation	Lim, Kyoung Hee	Deliberation (Team manager of environmental safety support team)	Jin, Su-gil	Deliberation (Team manager of using division	Jo, Byung-Gu