

Material Safety Data Sheet



Revision Date 2017. 03. 20

1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

| | |
|--|---|
| Product name | Nru I |
| Product code | R029S, R029M, R029L, R029H |
| Recommended use of the chemical and restrictions on use | |
| Recommended use | For research use only |
| Restrictions on use | For research use only |
| Details of the supplier | |
| Company name | Enzynomics Inc. |
| Address | Munji-ro 281-9, Yuseong-gu, Daejeon, 34050, Korea |
| Emergency contact number | +82-42-719-1023 |

2. HAZARDS IDENTIFICATION

| | |
|--|----------------------------|
| Classification of Hazards and dangerousness | No relevant classification |
| Warning article including prevention methods | |
| Pictorial symbol | No information available |
| Category | No information available |
| Hazards and dangerousness | No information available |
| Prevention methods | |
| Prevention | No information available |
| Action | No information available |
| Store | No information available |
| Discard | No information available |
| Other hazards and dangerousness (NFPA) not included in classification | |
| Health | 1 |
| Fire | 1 |
| Reactivity | 0 |

3. COMPOSITION/INFORMATION ON INGREDIENTS

| | Material name | Usual name | CAS No. | Amount (%) |
|----------|---------------|------------|---------|------------|
| Glycerin | | GLYCEROL | 56-81-5 | 40 ~ 60 |

4. FIRST AID MEASURES

| | |
|---------------------------|---|
| Eye contact | Take medical action immediately. Immediately rinse skin and eyes thoroughly with plenty of running water for at least 20 minutes. |
| Skin contact | Take medical action immediately. Immediately rinse skin and eyes thoroughly with plenty of running water for at least 20 minutes. Remove contaminated clothes and shoes and isolate contaminated area Completely wash clothes and shoes before reuse |
| Inhalation | Remove to fresh air CPR when there is no breathing Provide Oxygen when breathing is difficult Take medical action immediately. |
| Ingestion | Do not provide any food for unconscious person |
| Note to physicians | Take protective action according to the material Do not inject adrenalin |

5. FIRE FIGHTING MEASURES

| | |
|---|--|
| Proper (improper) fire extinguishing agents | Small fire: dry sand, dry chemical, alcohol-resistant foam, water spray, regular foam, CO ₂ (suitable extinguishing agent) Large fires: water spray / mist, regular foam (suitable extinguishing agent) High pressure water (improper extinguishing agent) |
| Specific hazards from chemical compounds | Can be ignited by heat, spark, flame Container may explode on heating Some can ride, but not easily ignite May cause irritation and poisonous gas in case of fire Inhalation of the substance may be harmful Some fluids may cause dizziness, suffocation-inducing vapors |
| Protective equipment and precautions for fire fighting | |
| Glycerin | No information available |

6. ACCIDENTAL RELEASE MEASURES

| | |
|--|---|
| Personal precautions, protective equipment and emergency procedures | Micro particles can ignite fire or explosion therefore remove all the sources of fire. Stop leak if it is not dangerous Give attention to materials and conditions that should be avoid Do not enter the space without proper respirator or respirator until proper air (oxygen concentration 18 ~ 23.5%) is available. |
| Environmental precautions | Prevent entry into waterways, sewers, basements, and confined spaces. |
| Containment and cleaning up | In case of small leakage, flush contaminated area with large amount of water In case of small leakage, absorb with sand and non-combustible material and place in container. In case of large leakage, make a ditch away from liquid spills Put spills into a clean, dry container with clean shovel, loosely closed, then transfer container from leak area In case of powder leakage, cover with plastic sheet to prevent spread and keep dry |

7. HANDLING AND STORAGE

Precautions for safe handling

Note the substances and conditions to avoid

Wash thoroughly after handling

Note the high temperature

In case of material leakage, reduce the oxygen concentration in the air and cause suffocation in an enclosed space, so be careful not to spill

Check the oxygen concentration before entering the place because there is a risk of loss of consciousness or death due to oxygen deficiency at high concentration in the air

Keep this temperature below 20°C because this material evaporates slowly and reaches hazardous concentrations.

Do not spray because it will evaporate faster if sprayed

Conditions for safe storage

Keep it tightly closed

Store in a cool, dry place

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Exposure standard of chemical compound, biological exposure standard

Domestic regulations

Glycerin

TWA - 10 mg/m³

ACGIH regulation

Glycerin

TWA - 10 mg/m³

Biological release regulation

Glycerin

No information applicable

Individual protection equipment

Respiratory protection

Use respiratory protection equipment certified by Korea occupational safety and health agency in a release of gas/liquid according to their chemical physical properties.

Use proper filter or half-circled respiratory protection cartridge equipment if the concentration of release material is lower than 100mg/m³

Use proper filter or loose-fitting respiratory protection cartridge equipment such as hood/helmet shape motor operated equipment or continuous flow protection mask if the concentration of release material is lower than 250mg/m³

Use proper filter or full face cartridge or motor operated half-circled equipment or half circled continuous flow air supply respiratory protection equipment if the concentration of release material is lower than 500mg/m³

Use proper filter or full faced respiratory protection cartridge equipment or hood/helmet type, pressurized mask if the concentration of release material is lower than 10000mg/m³

Use proper filter or auto air supply (SCBA) equipment or pressurized auto air supply (SCBA) respiratory protection equipment if the concentration of release material is lower than 100000mg/m³

Eye protection

Use chemical protection glasses and safety glasses

Install eyewash and emergency shower near work area

Hand protection

Wear suitable chemical resistant gloves

Body protection

Wear suitable chemical resistant clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

State

Liquid

Color

Dark color to yellow color

Odor

Dull

Odor threshold

No information available

pH

Neutral

Melting point/freezing point

20 °C

Early boiling point and range

171 °C

Flashing point

160 °C ((c.c.))

| | |
|---|---|
| Evaporation rate | No information available |
| Evaporation rate (solid/liquid) | Liquid |
| Maximum / minimum evaporation or explosion range | 19 / 2.7 % |
| Steam pressure | 0.0025 mmHg (at 50 °C) |
| Solubility | water solubility :1000 g/L at 25 °C solvent solubility: alcohol, ethyl acetate, ether insolubility, benzene, chloroform, carbon tetrachloride, carbon disulfide, oil ether, oil |
| Vapor density | 3.1 ((air=1)) |
| Specific gravity | 1.2613 ((water=1)) |
| n-octanol/ distribution coefficient | No information available |
| Self-ignition temperature | 370 °C |
| Disassemble temperature | 290 °C |
| Viscosity | 954 cP (at 25 C) |
| Molecular weight | 92.09 |

10. STABILITY AND REACTIVITY

Chemical stability and possibility of hazardous reactions

Glycerin No information available

Situation to avoid

Glycerin No information available

Materials to avoid

Glycerin No information available

Harmful material produce by degradation

Glycerin No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Glycerin irritation, difficult to breathe, area, vomit, diarrhea, headache, dizziness, Sleep disorder, kidney problem, paralyzed

Can absorb body by suction

Can be absorbed by suction and extinguisher

Through skin, digestive system, can absorb body by inhalation of aerosol

Able to absorb body by suction of steam

Can be absorbed by inhalation, skin and digestive system

Health maleficence information

Acute poison

Oral

Glycerin LD50 27200 mg/kg Rat (rat/LD50/12600mg/kg(IUCLID))

Ingestion

Glycerin LD50 > 10000 mg/kg Rat

Inhalation

Glycerin No information available

Skin corrosion or irritant agent

Glycerin No irritation on skin

Serious eye damage or irritation

Glycerin No irritation on eyes

Respiratory organ hypersensitiveness

Glycerin No information available

Skin hypersensitiveness

Glycerin No information available

Carcinogenic

Occupational safety and health acts

Glycerin No information available

Employment announcement

Glycerin No information available

IARC

Glycerin No information available

OSHA

Glycerin No information available

ACGIH

Glycerin No information available

NTP

Glycerin No information available

EU CLP

Glycerin No information available

Germ cell mutagenicity

Glycerin Many color mammal red blood cell/negative

Reproduction toxicity test

Glycerin No information available

Special target poison (1 time exposer)

Glycerin No information available

Special target poison (long exposer)Glycerin rat(inhale):1-4mg/l
epiglottis epithelium**Absorption injurious**

Glycerin No information available

12. ECOLOGICAL INFORMATION**Ecotoxicity****Fish**

Glycerin LC50 5000 mg/l 24 hr Carassius auratus

CrustaceanGlycerin EC50 > 10000 mg/l 24 hr Daphnia magna (Daphnia magna EC50(24HR)
10000mg/L(US EPA ECOTOX); Daphnia magna EC50(24HR) >10000 mg/L (EU
IUCLID))**Algae**

Glycerin (LC50(96hr) 77712.039 mg/L)

Residual fungicide and resolvability**Residual fungicide**

Glycerin No information available

Resolvability

Glycerin No information available

Life enrichment**Enrichment**

Glycerin No expected life enrichment

BiodegradabilityGlycerin 63 (%) 14 day Fast biodegradability (OECD SIDS),
93% biodegradability in 30 days (OECD TG 301D) (IUCLID))**Soil**

Glycerin No information available

Other harmful influences

Glycerin Environmental summary : No information on toxicity on aquatic organisms

13. DISPOSAL CONSIDERATIONS

Waste treatment method

Glycerin No information available

Disposal considerations

Glycerin Dispose container and content according to the waster control act

14. TRANSPORT INFORMATION

IATA**Propriety shipping name**

Glycerin No dangerous good in sense of these transport regulations

Hazard class

Glycerin No information available

Subsidiary class

Glycerin No information available

Packing group

Glycerin No information available

UN-No

Glycerin No information available

Environmental hazards

Glycerin No information available

15. REGULATORY INFORMATION

Regulations of occupational safety and health act

No information available

Glycerin

Exposure standard materials

Regulations of toxic chemicals regulation act

Glycerin

No information available

Regulations of safety control of dangerous substances act

Glycerin

4th class The third kind Petroleum(Receptivity) 4000 L

Regulations of waste control act

Glycerin

Designated waste

Regulations of other domestic and international act**Domestic act****Persistent organic pollutants control act**

Glycerin

No information applicable

Foreign act**American supervision information**

Glycerin

No information applicable

CERCLA

Glycerin

No information applicable

EPCRA 302

Glycerin

No information applicable

EPCRA 304

Glycerin

No information applicable

EPCRA 313

Glycerin

No information applicable

**American supervision information
(Rotterdam agreement material)**

Glycerin

No information applicable

**American supervision information
(Stockholm agreement material)**

Glycerin

No information applicable

**American supervision information
(Montreal protocol material)**

Glycerin

No information applicable

**EU Classification information
(Confirmed classification results)**

Glycerin No information applicable

**EU Classification information
(Danger expression)**

Glycerin No information applicable

**EU Classification information
(Safety expression)**

Glycerin No information applicable

16. OTHER INFORMATION

Source of material

- IUCLID (oral)
- SIDS (oral)
- SIDS (skin corrosive or irritant)
- SIDS (severe eye damage or irritation)
- NLM (Germ Cell Mutagenesis)
- IUCLID (specific target organ toxicity (repeated exposure))
- OECD SIDS (fish)
- EU IUCLID (Crustaceans)
- OECD SIDS (Crustaceans)
- US EPA ECOTOX (Crustaceans)
- ECOSAR (agar)
- OECD SIDS (Enrichment)
- IUCLDE (biodegradable)
- OECD SIDS (biodegradable)
- OECD TG 301C (biodegradable)
- OECD TG 301D (biodegradable)

The above information was acquired by diligent search and/or investigation and the recommendations are based on prudent application of professional judgment. The information shall not be taken as being all inclusive and is to be used only as a guide. All materials and mixtures may present unknown hazards and should be used with caution. Since Enzynomics, Inc. cannot control the actual methods, volumes, or conditions of use, the company shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein.

Questions about the information found on this MSDS should be directed to info@enzynomics.com.

End of Material Safety Data Sheet