Safety Data Sheet

National Institute of Advanced Industrial Science and Technology AIST

1. Identification of Product and the Organization

Organization Name : The National Institute of Advanced Industrial Science and Technology (AIST)
Address : 1-3-1, Kasumigaseki, Chiyoda, Tokyo, Japan
Institute in Charge : Reference Materials Office, Center for Quality Management of Metrology, National Metrology Institute of Japan (NMIJ), Reference Materials Office
Person in Charge : Person in Charge of Certified Reference Materials
Telephone No. : +81-29-861-4059 Fax No. : +81-29-861-4009
Emergency Phone : Same as above

Prepared on : April 24, 2006
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Reference No. : 4002001

Identification of the Product : Certified Reference Material NMIJ CRM 4002-a Benzene

2. Hazard identification

GHS Classification:

Flammable liquids	:	Category 2
Acute oral toxicity	:	Category 4
Skin corrosion/irritation	:	Category 2
Serious eye damages/eye irritation	:	Category 2A
Germ cell mutagenicity	:	Category 2
Carcinogenicity	:	Category 1A
Reproductive toxicity	:	Category 2
Specific target organ systemic toxicity (single exposure)	:	Category 1 (respiratory organs), Category 3 (anesthetic action)
Specific target organ systemic toxicity (repeated exposure)	:	Category 1 (central nervous system, hematopoietic system)
Aspiration hazard	:	Category 1
Hazardous to the aquatic environment-acute hazard	:	Category 2
Hazardous to the aquatic environment-chronic hazard		Category 2

GHS Label element :

Signal word : Danger
Hazard communication : Highly flammable liquid and vapor
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation

Suspected of causing genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
Causes damage to organs (respiratory organs)
May cause drowsiness and dizziness
Causes damage to organs (central nervous system, hematopoietic system) through prolonged or repeated exposure
May be fatal if swallowed and enters airways
Toxic to aquatic life
Toxic to aquatic life with long lasting effects

Precautionary statement:

[Preventative Measures]
Do not handle until all safety precautions have been read and understood.
Keep away from ignition sources such as heat, sparks, or open flame.
Use explosion-proof apparatus.
Use only non-sparking tools.
Do not breathe dust, mist, and vapor.
Use only well-ventilated area.
Use protective gloves/protective eyewear/protective mask when handling.
Avoid release to environment.
Do not eat, drink or smoke while handling this product.
Wash the hands after handling.

[Response]
If swallowed: Rinse mouth, do not induce vomiting. Immediately get medical treatment.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical treatment, if you feel unwell.
If in eye: Rinse carefully with water for several minutes. Then if using contact lens, take it off if possible, and continue rinsing the eye. Get medical treatment.
If on skin: Remove immediately all contaminated clothing. Flush with soap and water. Get medical treatment, if you feel unwell.

[Storage]
Store in clean environment at about −20 °C, avoid direct sunlight.
Store locked up.

[Disposal]
Outsource to the specialized disposing agent authorized by a prefectural governor.

Hazardous and toxic properties not specified in the above are not subject to the classification or not classifiable.

3. Composition/Component Information

Single or compoound product : Single product
Chemical Ingredient Name : Benzene
Content : About 99.9 %
Chemical formula : C_6H_6
Official Gazette Reference No. : Act on the Evaluation of Chemical Substances and Regulation of their Manufacture, etc : (3)-1

Industrial Safety and Health Act : public

CAS No. : 71-43-2

TSCA : Yes

EINECS : 2007537

Dangerous and hazardous ingredients : Benzene

4. Emergency Measures

◇If in eyes : Rinse carefully with water for several minutes. Then if using contact lens, take it off if possible, and continue rinsing the eye. Get medical treatment.

◇If on skin : Remove immediately all contaminated clothing. Flush with soap and water. Get medical treatment, if you feel unwell.

◇If swallowed : Rinse mouth, do not induce vomiting. Immediately get medical treatment.

◇If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical treatment, if you feel unwell.

5.Fire-Fighting Measures

Extinguishing media : Dry chemical powder, carbon dioxide, dry sand, foam

Specific hazards at the time of fire : Generates toxic gas by combustion (CO,CO_2)

Specific extinguishing measures : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.

Protecting fire- fighting personnel : Extinguish from windward. Use personal protective equipment such as fire-resistant clothing, self-contained compressed air breathing apparatus, etc.

6. Accidental Release Measures

Cautions for personnel : Wear protective equipment and avoid contact with skin and inhalation of vapor. Keep unprotected persons away. Keep away from ignition sources.

Cautions for environment : Do not drain the product into the sewer or public water area.

Removal measure : Absorb spill with inert material (sand, diatomite, sawdust).

7. Handling and Storage

Handling

- Use protective eyewear/protective clothing.
- Avoid contact with eyes, skin.
- Use only with adequate ventilation and in closed system.
- Keep ignition sources away.
- Protect against electrostatic charges.
- Keep away from incompatibles such as oxidizing agents, acids.
- Do not eat, drink or smoke while handling.
- Wash hands thoroughly after handling.

Storage

Condition for safe storage : Store in clean environment at about −20 °C, avoid direct sunlight. Store locked up.

※ Refer to the Certificate for the appropriate condition of the certified reference materials storage and the usage precautions.

8. Exposure Control/Personal Protection

Permissible concentration

- ACGIH : 0.5 ppm(TLV-TWA), 2.5 ppm(TLV-STEL) Transdermal absorption
- OSHA PEL TWA : 1 ppm(short term), 5 ppm(long term)

Facility equipment installation

- Use only with local exhaust ventilation or in closed system.
- Install hand and eye wash station close to the working place, and mark the location conspicuously.

Protective equipment

- Protective eyewear
- Chemical cartridge respirator with an organic vapor cartridge or airline respirator
- Organic solvents resistant gloves
- Protective clothing

9. Physical and Chemical Properties

- Appearance : Liquid
- Color : Colorless
- Odor : Characteristic aromatic odor
- pH : No data
- Vapor pressure : 10 KPa(20 °C)
- Density : 0.879 g/mL(20 °C)
- Vapor density : 2.7 (Air = 1)
- Boiling point : 80.1 °C
- Melting point : 5.5 °C
- Flash point : −11 °C
- Ignition temperature : 555 °C
- Explosion limit : lower : 1.4 vol%
  upper : 7.1 vol%
- Solubility in solvents : Water : 0.15 g/100mL, 20 °C
  Organic solvents : Soluble in acetone, ethanol, diethyl ether.
- log Pow : 2.15

10. Stability and Reactivity

◇Stability

- Stable under normal condition

◇Reactivity

- May react with oxidizing substances.

◇Condition to avoid

- Fire, static, sunlight, heat, sparks

◇Hazardous decomposition products

- Generate toxic gases (CO, CO_2) if combusted.

11. Toxicological Information

Acute toxicity

- Human oral LD50 : 50 mg/kg (RTECS)
- Human inhalation TCLo : 100 ppm (RTECS)

	・Rat oral LD50：930 mg/kg (RTECS) ・Mouse oral LD50：4700 mg/kg (RTECS) ・Mouse inhalation LC50：9980 ppm (RTECS) ・Mouse abdominal LD50：340 mg/kg (RTECS)
Skin corrosion/irritation	Skin；rabit：15 mg/24H；mild (RTECS)
Serious eye damages/eye irritation	Eye；rabit：88 mg；moderate (RTECS) Eye；rabit：2 mg/24H；severe (RTECS)
Germ cell mutagenicity	DNA damage；mouse；oral：20 g/kg
Carcinogenicity	NTP：K (Known to be human carcinogens) IARC：1 (Human carcinogen (Group 1)) ACGIH：A1 (Comfirmed human carcinogen (A1)) EPA：A (Human carcinogen)
Toxic to reproduction	Animal；fetal toxicity (NTP 1986, ATSDR 2005)
Specific target organ systemic toxicity – single exposure	Human：“irritation to skin, nose, mouth and pharynx”,”tracheitis, bronchitis, pharyngitis, massive hemorrhage in lugs”(NICNAS, 2001) Animal：“respiratory disturbance in state of anaesthesia”(EHC 150, 1993)
Specific target organ systemic toxicity – repeated exposure	Human：“The hypoplasia of the bone marrow, hypocythemia with the hypermorphoisis or the normal blast cell”,”Hematotoxicity”,and “Death by the anaplastic anemia”(EHC 150, 1993) ,“Transverse myelitis”(IRIS 2002), “The frequent headache, feebleness, sleep disorder, and disturbance of memory”and “Decrease in the number of red blood cells and white blood corpuscle, and increase of the mean corpuscular volume in red blood cell”(NICNAS 2001) Animal：“The decrease in the number of red blood cells and the lymphocyte, the malformation of the circulating erythrocyte and the neutrophilic leukocyte. The decrease in the number of circulating erythrocyte and the lymphocyte and nucleated cell in spleen”,“Decrease of white blood corpuscle”,“Decrease of solid myeloma cell having nucleus cell, and decrease in number of marrow multipotent stem cells”(EHC 150, 1993) “Increase in the mean corpuscular volume in red blood cell, and decrease of red blood corpuscle, white blood corpuscle, lymphocyte, hematocrit”(IRIS 2002)
Aspiration toxicity	Human：“Swallowing the liquid may couse aspiration into the lungs with the risk of chemical pneumonitis.”(ICSC 2003)

12. Ecological Information

Degradability, concentration

・39 % to 41 %　by BOD

Bioaccumulation

・No data available

Ecotoxicity

・Rainbow trout；LC50：5.3 mg/L/96hr (EU-RAR 2003)

13. Disposal Consideration

・Dispose of in compliance with applicable laws and ordinances, local government regulations.

・When disposing of empty containers, remove the content completely.

14. Transport Information

UN number	:	1114
UN proper shipping name	:	Benzene
Class or division	:	Class 3 (Flammable liquid)
Packing group	:	PG II
Marine pollutant	:	Yes
Safety measures	:	Store in a clean environment at about −20 °C, avoid direct sunlight. Handle carefully, avoid fall or drop, etc., prevent collapse or damages to containers.

15. Applicable Laws and Regulations

◇ Fire Service Act

・Hazardous materials; Category IV (inflammable liquids); Class I petroleums

◇Industrial Safety and Health Act

・Hazardous substances of which the name, etc. should be displayed

・Hazardous substances of which the name, etc. should be notified

◇ Act on Confirmation, etc. of Release Amounts of Specific Chemical Substances in the Environment and Promotion of Improvements to the Management Thereof

・Specific Class I Designated Chemical Substance No. 400

◎ **This SDS is originally prepared for the use of the material in Japan, thus the stated laws and regulations are stipulated and carried out in Japan. The use of the product in other countries should be referred to and by application of the relevant laws and regulations of the country in which the product will be used.**

16.Other Information

References cited

・Manual of Chemical Substances, etc. Controlled by Law (2009), The Chemical Daily (2009)
・Complete Substances Data subject to MSDS (Revised 2nd Edition、The Chemical Daily (2007)
・International Chemical Safety Cards (ICSC), Japanese version, The Chemical Daily
・European Union Risk Assessment Report, DINP, European Chemicals Bureau, 2003

Other

The information in this Safety Data Sheet is not intended to be exhaustive and is based on currently-available information and data. The precautions given in this data sheet are applicable only to normal handling conditions. When handling this reference material under special conditions etc., it is recommended to take safety precautions appropriate to each specific application and context of use. This Safety Data Sheet (SDS) is intended to provide information and not intended to guarantee anything in handling the reference material. This Safety Data Sheet (SDS) is prepared based on JIS Z7253, and presents identical information to Material Safety Data Sheet (MSDS) prepared based on JIS Z7250:2010.