Safety Data Sheet

1. Identification of the substance/mixture and of the company/undertaking

Product identifier:
- Product name: N,N-Dimethylformamide
- Product code (SDS NO): 2493E-2

Details of the supplier of the safety data sheet
- Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.
- Address: 3-1, Honmachibashi, Chuo-ku, Osaka 540-0029, JAPAN
- Division: Safety Management Dept. of Chemicals
- Telephone number: +81-6-6946-8061
- FAX: +81-6-6946-1607
- e-mail address: kagakuhinanzenkanri@kishida.co.jp

2. Hazards identification

GHS classification and label elements of the product

PHYSICAL AND CHEMICAL HAZARDS
- Flammable liquids: Category 3

HEALTH HAZARDS
- Acute toxicity (Inhalation): Category 3
- Serious eye damage/eye irritation: Category 1
- Germ cell mutagenicity: Category 2
- Carcinogenicity: Category 1B
- Reproductive toxicity: Category 1B
- Specific target organ toxicity - single exposure: Category 1(liver)
- Specific target organ toxicity - single exposure: Category 2(respiratory apparatus/system)
- Specific target organ toxicity - repeated exposure: Category 1(liver)

Label elements

Signal word: Danger

HAZARD STATEMENT
- Flammable liquid and vapor
- Toxic if inhaled
- Causes serious eye damage
- Suspected of causing genetic defects
- May cause cancer
- May damage fertility or the unborn child
- Causes damage to organs after single exposure
- May cause damage to organs after single exposure
- Causes damage to organs through prolonged or repeated exposure

PRECAUTIONARY STATEMENT
- Prevention
  - Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
  - Keep container tightly closed.
  - Ground/bond container and receiving equipment.
  - Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash contaminated parts thoroughly after handling.
Wear protective gloves and face protection.
Wear eye protection/face protection.
Do not eat, drink or smoke when using this product.

Response
In case of fire: Use appropriate media other than water for extinction.
Get medical advice/attention if you feel unwell.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage
Store in a well-ventilated place. Keep container tightly closed. Keep cool.

Disposal
Dispose of contents/container in accordance with local/national regulation.

Specific Physical and Chemical hazards
Flammable liquid. Vapor/air mixture may explode.

3. Composition/information on ingredients
Mixture/Substance selection:

<table>
<thead>
<tr>
<th>Substance</th>
<th>Ingredient name: Dimethyl formamide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content(%)</td>
<td>99(min)</td>
</tr>
<tr>
<td>Chemical formula</td>
<td>C₃H₇NO</td>
</tr>
<tr>
<td>Chemicals No., Japan</td>
<td>2-680</td>
</tr>
<tr>
<td>CAS No.</td>
<td>68-12-2</td>
</tr>
<tr>
<td>MW</td>
<td>73.09</td>
</tr>
<tr>
<td>ECNO</td>
<td>200-679-5</td>
</tr>
</tbody>
</table>

Note: The figures shown above are not the specifications of the product.

4. First-aid measures

Descriptions of first-aid measures

General measures
Get medical attention/advice if you feel unwell.

IF INHALED
Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.

IF ON SKIN (or hair)
Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation or rash occurs: Get medical advice/attention.

IF IN EYES
Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.

IF SWALLOWED
Rinse mouth.
Call a POISON CENTER or doctor/physician if you feel unwell.
5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media suitable for surrounding facilities.

Specific hazards arising from the substance or mixture

Containers may explode when heated.
Fire may produce irritating, corrosive and/or toxic gases.

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire/flame resistant/retardant clothing.
Wear protective gloves/protective clothing/eye protection/face protection.
Firefighters should wear self-contained breathing apparatus with full face piece operated positive pressure mode.

6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Ventilate area until material pick up is complete.
Wear proper protective equipment.

Methods and materials for containment and cleaning up

Absorb spill with inert material (dry sand, earth, etc), then place in a chemical waste container.

Preventive measures for secondary accident

Collect spillage.

7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)
Do not breathe dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.

Exhaust/ventilator

Exhaust/ventilator should be available.

Safety treatments

Avoid contact with skin.
Avoid contact with eyes.

Safety Measures/Incompatibility

Use only outdoors or in a well-ventilated area.
Wear protective gloves, protective clothing or face protection.
Wear eye protection/face protection.
When using do not eat, drink or smoke.

Conditions for safe storage, including any incompatibilities

Recommendation for storage

Keep container tightly closed.
Store in a cool, dry place. Do not store in direct sunlight.
8. Exposure controls/personal protection

Control parameters

Adopted value
(Dimethyl formamide)
ACGIH(2017) TWA: 5ppm (Liver dam; eye & URT irr)

Notation
(Dimethyl formamide)

Skin
OSHA–PEL
Dimethyl formamide TWA: 10ppm, 30mg/m3

Exposure controls

Appropriate engineering controls
Do not use in areas without adequate ventilation.
Eye wash station should be available.
Washing facilities should be available.

Individual protection measures

Respiratory protection
Wear respiratory protection.

Hand protection
Wear protective gloves.

Eye protection
Wear eye/face protection.

Safety and Health measures
Wash … thoroughly after handling.
Do not eat, drink or smoke when using this product.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical properties

Appearance: Liquid
Color: Colorless to yellow
Odor: Characteristic odour
pH data N.A.

Phase change temperature
Initial Boiling Point/Boiling point: 153°C
Boiling range data N.A.
Melting point/Freezing point: −61°C
Decomposition temperature data N.A.
Flash point: (Dimethyl formamide)(C.C.) 58°C
Auto−ignition temperature: 440°C

Explosive properties data N.A.

Vapor pressure: 0.49 kPa (25 °C)
Relative Vapor Density (Air=1): 2.5
Relative density of the Vapor/air−mixture at 20°C (Air = 1): 1
Specific gravity/Density: 0.95g/ml

Solubility
Solubility in water: Easily soluble
n−Octanol /water partition coefficient: log Pow−0.87

10. Stability and Reactivity

Reactivity
N.A.

Chemical stability
Stable under normal storage/handling conditions.

Possibility of hazardous reactions
Decomposes on heating. This produces toxic fumes including nitrogen oxides. Reacts violently with strong oxidants, halogens, halogenated hydrocarbons and nitrates. Attacks some plastics and rubber. (ICSC 0457)

Conditions to avoid
Contact with incompatible materials.
Contact with fire source.

Incompatible materials
Strong oxidizing agents, Halogens, Halogenated hydrocarbons, Nitrates

Hazardous decomposition products
Carbon oxides, Nitrogen oxides

11. Toxicological Information
Information on toxicological effects

Acute toxicity
Acute toxicity (Dermal)
[GHS Cat. Japan, base data]
(Dimethyl formamide)
rat LD50=3500mg/kg (MOE risk assessment vol.1, 2002)

Acute toxicity (Inhalation)
[GHS Cat. Japan, base data]
(Dimethyl formamide)
vapor: mouse LC50=4.7mg/L/4hr (HSDB, 2005)

Irritant properties
Serious eye damage /irritation
[GHS Cat. Japan, base data]
(Dimethyl formamide)
rabbit severe damage (EHC 114, 1991)

No Allergenic and sensitizing effects data available

Germ cell mutagenicity
[GHS Cat. Japan, base data]
(Dimethyl formamide)
cat.2; CERI/NITE risk assessment No.8, 2005

Carcinogenicity
[GHS Cat. Japan, base data]
(Dimethyl formamide)
cat.1B; (MHLW carcinogenicity examination, 2000)
(Dimethyl formamide)
IARC–Gr.2A: Probably carcinogenic to humans
(Dimethyl formamide)
ACGIH–A3(2017): Confirmed Animal Carcinogen with Unknown Relevance to Humans

Reproductive toxicity
[GHS Cat. Japan, base data]
(Dimethyl formamide)
cat.1B; CERI/NITE risk assessment No.8, 2005

No Teratogenic effects data available
Delayed and immediate effects and also chronic effects from short– and long–term exposure
STOT
STOT–single exposure
[cat.1]
12. Ecological Information

Ecotoxicity

Aquatic toxicity

Aquatic acute toxicity component(s) data

[GHS Cat. Japan, base data]
(Dimethyl formamide)

Fish (top minnow) LC50 > 100mg/L/96hr (MOE Japan, 1995)

Water solubility

[(Dimethyl formamide)
100 g/100 ml (PHYSPROP_DB, 2005)

Bioaccumulative potential

(Dimethyl formamide)

log Pow=-0.87 (ICSC, 2014)

No Mobility in soil data available

13. Disposal considerations

Waste treatment methods

Dispose of contents/container in accordance with local/national regulation.

14. Transport Information

UN No.: 2265
Proper Shipping Name:
N,N-DIMETHYLFORMAMIDE
Class or division: 3
Packing group: III
ERG GUIDE No.: 129

IMDG Code (International Maritime Dangerous Goods Regulations)
UN No.: 2265
Proper Shipping Name:
N,N-DIMETHYLFORMAMIDE
Class or division: 3
Packing group: III

IATA Dangerous Goods Regulations
UN No.: 2265
Proper Shipping Name:
N,N-DIMETHYLFORMAMIDE
Class or division : 3
Hazard labels : Flamm.liquid
Packing group : III

Environmental hazards
MARPOL Annex III – Prevention of pollution by harmful substances
Marine pollutants (yes/no) : no
MARPOL Annex V – Prevention of pollution by garbage discharge
Carcinogenicity: cat.1, 1A, 1B
Dimethyl formamide
Reproductive toxicity: cat.1, 1A, 1B
Dimethyl formamide
Specific target organ toxicity – repeated exposure: cat.1
Dimethyl formamide

Transport in bulk according to Annex II of MARPOL73/78 and IBC Code
Noxious Liquid ; Cat. Y
Dimethyl formamide

15. Regulatory Information
Safety, health and environmental regulations/legislation specific for the substance or mixture
US major regulations
TSCA
Dimethyl formamide
Other regulatory information
Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information
GHS classification and labelling
Flam. Liqu. 3: H226 Flammable liquid and vapor
Acute Tox. 3: H331 Toxic if inhaled
Eye Dam. 1: H318 Causes serious eye damage
Muta. 2: H341 Suspected of causing genetic defects
Carc. 1B: H350 May cause cancer
Repr. 1B: H360 May damage fertility or the unborn child
STOT SE 1: H370 Causes damage to organs after single exposure
STOT RE 1: H372 Causes damage to organs through prolonged or repeated exposure

Reference Book
Globally Harmonized System of classification and labelling of chemicals, (5th ed., 2013), UN
Recommendations on the TRANSPORT OF DANGEROUS GOODS 20th edit., 2017 UN
Classification, labelling and packaging of substances and mixtures (table3–1 ECNO6182012)
2016 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
2018 TLVs and BEIs. (ACGIH)
http://monographs.iarc.fr/ENG/Classification/index.php
Supplier's data/information

General Disclaimer
This information contained in this data sheet represents the best information currently available to us. However, no warranty is made with respect to its completeness and we assume no liability resulting from its use. It are advised to make their own tests to determinate the safety and suitability of each such product or combination for their own purposes.
The data given here is based on current knowledge and experience. The purpose of this
Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products’ properties.

The GHS classification data given here is based on current Japan official data (NITE published in 2017).