

SAFETY DATA SHEET

1. Identification

Product Name N,N-Dimethylformamide Cat No. : D131-1; D131-4

CAS No 68-12-2

Synonyms DMF

Recommended Use Laboratory chemicals.

Uses advised against Food, drug, pesticide or biocidal product use.

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids Category 3

Acute dermal toxicity Category 4 Acute Inhalation Toxicity - Vapors Category 4 Serious Eye

Damage/Eye Irritation Category 2 Carcinogenicity Category 1B

Reproductive Toxicity Category 1B Specific target organ toxicity (single exposure) Category 3 Target
Organs - Respiratory system, Central nervous system (CNS).

Label Elements

Signal Word

Danger

Hazard Statements

Flammable liquid and vapor

Causes serious eye irritation

May cause respiratory irritation

May cause drowsiness or dizziness

May damage the unborn child

May cause cancer

Harmful in contact with skin or if inhaled



Precautionary Statements

Prevention

Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Use only outdoors or in a well-ventilated area
Wash face, hands and any exposed skin thoroughly after handling
Do not breathe dust/fume/gas/mist/vapors/spray
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
Keep cool
Wear protective gloves/protective clothing/eye protection/face protection

Response

IF exposed or concerned: Get medical attention/advice

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing **Skin**

Call a POISON CENTER or doctor/physician if you feel unwell

Wash contaminated clothing before reuse

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower **Eyes**

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

Fire

In case of fire: Use CO₂, dry chemical, or foam for extinction

Storage

Store locked up

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

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Lachrymator (substance which increases the flow of tears)

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Dimethylformamide	68-12-2	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention. **Ingestion** Do NOT induce vomiting. Get medical attention.

Irritating to eyes. Difficulty in breathing. May be harmful if absorbed through skin:

Most important symptoms and effects

Gastrointestinal discomfort: Symptoms of overexposure may be

headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO₂), dry chemical, alcohol-resistant foam. Water mist maybe used to cool closed containers.

Unsuitable Extinguishing Media No information available

Flash Point 58 °C / 136.4 °F

Method - Abel-Pensky (DIN 51755)

Autoignition Temperature 445 °C / 833 °F

Explosion Limits

Upper 15.2 vol %

Lower 2.2 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products

Carbon monoxide (CO). Carbon dioxide (CO₂). Nitrogen oxides (NO_x).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NEPA

Health

Flammability

Instability

Physical hazards

2

2

0

N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment/faceprotection. Do not get in eyes, on skin, or on clothing. Do not breathe mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Incompatible Materials. Strong oxidizing agents. Halogens. Halogenated compounds. Reducing Agent. .

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Dimethylformamide	TWA: 5 ppm Skin	(Vacated) TWA: 10 ppm (Vacated) TWA: 30 mg/m ³ Skin TWA: 10 ppm TWA: 30 mg/m ³	IDLH: 500 ppm TWA: 10 ppm TWA: 30 mg/m ³	TWA: 10 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State Liquid

Appearance Colorless

Odor Rotten-egg like

Odor Threshold No information available **pH** 6-8 @ 20°C 20% aq.sol **Melting Point/Range** -61 °C / -77.8 °F **Boiling Point/Range** 153 °C / 307.4 °F **Flash Point** 58 °C / 136.4 °F

Method - Abel-Pensky (DIN 51755) **Evaporation Rate** 0.17

Flammability (solid,gas) Not applicable **Flammability or explosive limits**

Upper 15.2 vol % **Lower** 2.2 vol % **Vapor Pressure** 4.9 mbar @ 20 °C **Vapor Density** 2.5

Specific Gravity 0.945

Solubility Soluble in water

Partition coefficient; n-octanol/water No data available **Autoignition Temperature** 445 °C / 833 °F

Decomposition Temperature > 350°C **Viscosity** 0.8 mPa.s at 20 °C **Molecular Formula** C3 H7 N O **Molecular**

Weight 73.09

Surface tension 36.42 mN/m (25 °C)

10. Stability and reactivity

Reactive Hazard None known, based on information available **Stability** Stable under normal conditions.

Conditions to Avoid Incompatible products. Heat, flames and sparks. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Halogens, Halogenated compounds, Reducing Agent, **Hazardous Decomposition**

Products Carbon monoxide (CO), Carbon dioxide (CO₂), Nitrogen oxides (NO_x) **Hazardous Polymerization** Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

LC50 Inhalation (DUST) VALUE 9400 mg/m³/24 (mouse)

LC50 Inhalation (VAPOR) VALUE 3421 ppm/h (rat)

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Dimethylformamide	3040 mg/kg (Rat)	1500 mg/kg (Rabbit) 3.2 g/kg (Rat)	>5.58 mg/L/4h (Rat)

No information available

Toxicologically Synergistic Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure Irritation Irritating to eyes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NT	ACGIH	OSHA	Mexico
Dimethylformamide	68-12-2	Group 2A	Not listed	A3	X	Not listed

Mutagenic Effects No information available

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals. **Developmental Effects** May cause harm to the unborn child. Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals.

STOT - single exposure Respiratory system Central nervous system (CNS) **STOT - repeated exposure** None known

Aspiration hazard No information available

May be harmful if absorbed through skin: Gastrointestinal discomfort: Symptoms of

Symptoms / effects, both acute and delayed

overexposure may be headache, dizziness, tiredness, nausea and

vomiting

Endocrine Disruptor Information

Component	EU - Endocrine Disruptors Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Dimethylformamide	Group III Chemical	Not applicable	Not applicable

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Dimethylformamide	EC50 = 7500 mg/L/96h	Pimephales promelas: LC50 = 10.6 g/L/96h Onchorhynchus mykiss: LC50 = 9.8 g/L/96h Lepomis macrochirus: LC50 = 6.3 g/L/96h	EC50 = 2000 mg/L 5 min EC50 = 570 mg/L 240 h	EC50 = 7500 mg/L/96h

Persistence and Degradability Persistence is unlikely

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility but will likely degrade over time. Will likely be mobile in the

environment due to its water solubility.

Component	log Pow
Dimethylformamide	-1.028

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN2265
Proper Shipping Name N,N-DIMETHYLFORMAMIDE
Hazard Class 3
Packing Group III

TDG

UN-No UN2265
Proper Shipping Name N,N-DIMETHYLFORMAMIDE
Hazard Class 3
Packing Group III

IATA

UN-No UN2265
Proper Shipping Name N,N-DIMETHYLFORMAMIDE

Hazard Class 3
Packing Group III

IMDG/IMO

UN-No UN2265
Proper Shipping Name N,N-DIMETHYLFORMAMIDE
Hazard Class 3
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Dimethylformamide	68-12-2	X	ACTIVE	-

Legend:

TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea(KECL).

Component	CAS No	DSL	NDSL	EINECS	P	E	AIC	IECSCKE
Dimethylformamide	68-12-2	X	200-679-					XKE-11411

KECL - NIER number or KE number (<http://ncis.nier.go.kr/en/main.do>)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Dimethylformamide	68-12-2	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Dimethylformamide	X		-

Not applicable

OSHA - Occupational Safety and Health Administration

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Dimethylformamide	100 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Dimethylformamide	68-12-2	Carcinogen	-	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Dimethylformamide	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y

DOT Marine Pollutant N

DOT Severe Marine Pollutant N

This product does not contain any DHS chemicals.

U.S. Department of Homeland Security

Other International Regulations

Mexico - Grade Moderate risk, Grade 2

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV -Substances Subject to Authorization	REACH (1907/2006) - Annex XVII -Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Dimethylformamide	-	Use restricted. See item 72. (see link for restriction details)Use restricted. See item 30. (see link for restriction details)Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - (Toxic toReproduction, Article 57c)

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. useinscientific research and development which includes routine analytics or use as intermediate.

<https://echa.europa.eu/substances-restricted-under-reach>

<https://echa.europa.eu/candidate-list-table>

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone DepletionPotential	Restriction of Hazardous Substances (RoHS)
Dimethylformamide	68-12-2	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Dimethylformamide	68-12-2	Not applicable	Not applicable	Not applicable	Annex I - Y42