SAFETY DATA SHEET

Revision Date 08/04/2023

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	: N,N-Dimethylformamide [DMF]
Product Number	: RP8360
Brand	: Advanced ChemTech
CAS-No.	: 68-12-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	: Advanced ChemTech 5609 Fern Valley Rd, Louisville, KY 40228 USA
Telephone	: +1 833-317-5620
Fax	: +1 502-968-1000

1.4 Emergency telephone number : +1 800-424-9300 Chemtrec

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture:

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 1B), H360
For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements:

Pictogram

Signal word	Danger
Hazard statement(s)	
H226	Flammable liquid and vapour.
H312 + H332	Harmful in contact with skin or if inhaled
H319	Causes serious eye irritation. H360 May damage fertility or the unborn child
Precautionary statement(s)	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
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.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS – none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	: DMF
Formula	: C_3H_7NO
Molecular Weight	: 73.09 g/mole
CAS-No.	: 68-12-2

Hazardous Components

Component	Classification	Concentration
N,N-Dimethylformamide Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006		

(REACH)		
	Flam. Liq. 3; Acute Tox. 4; Eye Irrit. 2A; Repr. 1B; H226 H312 + H332, H319, H360	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact: Wash off with soap and plenty of water. Consult a physician.

In case of eye contact: Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician

If swallowed: Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed: The most important known symptoms and effects are described in the labeling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed: No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture: Carbon oxides, nitrogen oxides (NOx)

5.3 Advice for firefighters: Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information: Use water spray to cool unopened containers

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal Precautions, protective equipment, and emergency procedure: Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8

6.2 Environmental precautions: Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up: Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections: For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling: Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities: Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s): Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control Parameters	Basis
N,N-Dimethylformamide	68-12-2	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		TWA	10 ppm 30 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	10 ppm 30 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Liver damage: Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption Skin designation Potential for dermal absorption		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological Specimen	Basis
N,N-Dimethylformamide	68-12-2	N-Methylformamide	15.0000 mg/l	Urine	ACGIH-Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

Derived No Effect Level (DNEL)

Application Area	Exposure Routes	Health Effect	Value
Workers	Skin Contact	Acute systemic effects	26.3 mg/kg BW/d
Workers	Inhalation	Acute systemic effects	30 mg/m3
Workers	Skin Contact	Long-term systemic effects	3.31 mg/kg BW/d
Workers	Inhalation	Long-term systemic effects	15 mg/m3
Workers	Inhalation	Long-term local effects	15 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Water	30 mg/l
Soil	16.235 mg/kg

Marine Water	3 mg/kg
Fresh Water	30 mg/l
Fresh Water Sediment	25.05 mg/kg
Onsite Sewage Treatment Plant	123 mg/l

8.2 Exposure controls

Appropriate engineering controls: Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday

Personal protective equipment

Eye/face protection: Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection: impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure: Prevent further leakage or spillage if safe to do so. Do not let product enter drains

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance	Form: Clear and Colorless Liquid
b) Odor	no data available
c) Odor Threshold	no data available
d) pH	6.7
e) Melting point/freezing point	Melting point/range: -61 °C (-78 °F)
f) Initial boiling point and boiling range	153 °C (307 °F)
g) Flash point	58 °C (136 °F) - closed cup
h) Evaporation rate	no data available
i) Flammability (solid, gas)	no data available
j) Upper/lower flammability or explosive limits	Upper explosion limit: 15.2 %(V) Lower explosion limit: 2.2 %(V)
k) Vapor pressure	3.60 hPa (2.70 mmHg) at 20 °C (68 °F) 5.16 hPa (3.87 mmHg) at 25 °C (77 °F)
l) Vapor density	2.52 - (Air = 1.0)
m) Relative density	0.944 g/mL at 25 °C (77 °F)
n) Water solubility	no data available
o) Partition coefficient: n- octanol/water	log Pow: -1.01
p) Auto-ignition temperature	no data available
q) Decomposition temperature	no data available
r) Viscosity	no data available
s) Explosive properties	no data available
t) Oxidizing properties	no data available

9.2 Other safety information:

Relative vapour density	2.522 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 **Reactivity:** No data available

10.2 **Chemical stability:** Stable under recommended storage conditions.

10.3 **Possibility of hazardous reactions:** No data available

10.4 **Conditions to avoid:** Heat, flames and sparks

10.5 **Incompatible materials:** Strong oxidizing agents, Strong reducing agents

10.6 **Hazardous decomposition products:** Other decomposition products - no data available**.** In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity: No data available

Oral: LD50 Oral - Rat - 2800 mg/kg

Inhalation: LDLO Inhalation - Rat - 4 h - > 9-15 mg/l

Dermal: LD50 Dermal - Rabbit - 1500 mg/kg

Skin corrosion/irritation: Skin – Human; Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation: Eyes - Rabbit Result: Eye Moderate eye irritation

Respiratory or skin sensitization: No data available

Germ cell mutagenicity: Mouse; lymphocyte; Mutation in mammalian somatic cells.

Carcinogenicity:

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: May cause congenital malformation in the fetus.

Specific target organ toxicity - single exposure: No data available

Specific target organ toxicity - repeated exposure: No data available

Aspiration hazard: No data available
Additional Information: RTECS: LQ2100000 Warning: intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N,N-dimethylformamide is considered to be a potent liver toxin., Vomiting, Diarrhoea, Abdominal pain, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity:

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 9,000 - 13,000 mg/l - 96 h	
	LC50 - Lepomis macrochirus (Bluegill) - 6,700 - 7,500 mg/l - 96 h	
	LC50 - Pimephales promelas (fathead minnow) - 10,400 - 10,800 mg/l - 96 h	
	LC50 - Oncorhynchus mykiss (rainbow trout) - 9,800 mg/l - 96 h	
	LC50 - Lepomis macrochirus (Bluegill) - 6,300 mg/l - 96 h	
	LC50 - Pimephales promelas (fathead minnow) - 10,600 mg/l - 96 h	
Toxicity to daphnia and other aquatic invertebrates		EC50 - Daphnia magna (Water flea) - 9,600 - 13,100 mg/l - 48 h
		EC50 - Daphnia magna (Water flea) - 15,700 mg/l - 48 h
Toxicity to algae	LC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 96 h	

12.2 Persistence and degradability: Biodegradability Result: 90 % - Readily biodegradable
12.3 Bioaccumulative potential: No data available
12.4 Mobility in soil: No data available
12.5 Results of PBT and vPvB assessment: PBT/vPvB assessment not available as chemical safety assessment not required/not conducted
12.6 Other adverse effects: No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods
Product: This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.
Contaminated packaging: Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
NA-Number: 2265 Class: 3 Packing group: III
Proper shipping name: N,N-Dimethylformamide
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No
IMDG
NA-Number: 2265 Class: 3 Packing group: III
Proper shipping name: N,N-Dimethylformamide
IATA
NA-Number: 2265 Class: 3 Packing group: III
Proper shipping name: N,N-Dimethylformamide

15. REGULATORY INFORMATION

SARA 302 Components: SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components: The following components are subject to reporting levels established by SARA Title III, Section 313:

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SARA 311/312 Hazards: Fire Hazard, Acute Health Hazard, Chronic Health Hazard
Massachusetts Right to Know Components:

	CAS-No.	Revision Date
N,N-Dimethylformamide	68-12-2	2007-07-01

Pennsylvania Right to Know Components

	CAS-No.	Revision Date
N,N-Dimethylformamide	68-12-2	2007-07-01

New Jersey Right to Know Components

	CAS-No.	Revision Date
N,N-Dimethylformamide	68-12-2	2007-07-01

California Prop. 65 Components: WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H360	May damage fertility or the unborn child.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Advanced ChemTech shall not be liable for any damage resulting in the handling or from contact with the above product.