SAFETY DATA SHEET

according to the (US) Hazard Communication Standard (29 CFR 1910.1200)

Revision Date 06/09/2014 Version 1.1

SECTION 1. Identification

Product identifier

Product number	DX1729
Product name	N,N-Dimethylformamide For Peptide Synthesis
Synonyms	DMF
CAS-No.	68-12-2

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

Identified uses	Reagent for analysis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5)
Emergency telephone	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2. Hazards identification

GHS Classification

Flammable liquid, Category 3, H226
Acute toxicity, Category 4, Inhalation, H332
Acute toxicity, Category 4, Dermal, H312
Eye irritation, Category 2, H319
Reproductive toxicity, Category 1B, H360D

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

GHS-Labeling

Hazard pictograms



Signal Word
Danger

Hazard Statements
H360D May damage the unborn child.
H226 Flammable liquid and vapor.
H312 + H332 Harmful in contact with skin or if inhaled.
H319 Causes serious eye irritation.

Precautionary Statements
P201 Obtain special instructions before use.
P210 Keep away from heat.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
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.

Restricted to professional users.

OSHA Hazards
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS and may deviate from the GHS information.

Other hazards
None known.

SECTION 3. Composition/information on ingredients

Formula	$HCON(CH_3)_2$	C_3H_7NO (Hill)
Synonyms	DMF	
Molar mass	73.09 g/mol	

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
N,N-dimethylformamide (>= 90 % - <= 100 %)
68-12-2
Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures
Inhalation
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

Skin contact
After skin contact: wash off with plenty of water. Remove contaminated clothing. Consult a physician.

Eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist.

Ingestion
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed
Gastrointestinal disturbance, Vomiting, Nausea, Headache, Dizziness, Drowsiness
irritant effects

Indication of any immediate medical attention and special treatment needed
No information available.

SECTION 5. Fire-fighting measures

Extinguishing media
Suitable extinguishing media
Water, Foam, Carbon dioxide (CO2), Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

Special hazards arising from the substance or mixture
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapors possible in the event of fire.
Fire may cause evolution of:
nitrogen oxides

Advice for firefighters
Special protective equipment for fire-fighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

Further information
Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions
Do not let product enter drains. Risk of explosion.

Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Observe label precautions.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Store at room temperature.

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
N,N-dimethylformamide 68-12-2			
ACGIH	Skin designation:		Can be absorbed through the skin.
	Time Weighted Average (TWA):	10 ppm	
NIOSH/GUIDE	Recommended exposure limit (REL):	10 ppm 30 mg/m³	
	Skin designation:		Can be absorbed through the skin.
OSHA_TRANS	PEL:	10 ppm 30 mg/m³	
	Skin designation:		Can be absorbed through the skin.
Z1A	Time Weighted Average (TWA):	10 ppm 30 mg/m³	
	Skin designation (Final Rule Limit applies):		Can be absorbed through the skin.

Engineering measures

Technical measures and appropriate working operations should be given priority over the use of personal protective equipment.

Individual protection measures

Protective clothing should be selected specifically for the workplace, depending on concentration and quantity of the hazardous substances handled. The chemical resistance of the protective equipment should be inquired at the respective supplier.

Hygiene measures

Immediately change contaminated clothing. Apply skin- protective barrier cream. Wash hands and face after working with substance.

Eye/face protection

Safety glasses

Hand protection

Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protective equipment:

Flame retardant antistatic protective clothing

Respiratory protection

required when vapors/aerosols are generated.

Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

SECTION 9. Physical and chemical properties

Physical state	liquid
Color	colorless
Odor	weakly amine-like
Odor Threshold	0.329 ppm
pH	7 at 200 g/l 68 °F (20 °C)
Melting point	-61 °C
Boiling point/boiling range	307 °F (153 °C) at 1,013 hPa Method: DIN 53171
Flash point	136 °F (58 °C) Method: c.c.
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	2.2 %(V)

Upper explosion limit	16 %(V)
Vapor pressure	3.77 hPa at 68 °F (20 °C)
Relative vapor density	2.51
Density	0.94 g/cm³ at 68 °F (20 °C)
Relative density	No information available.
Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	log Pow: -0.85 (25 °C) OECD Test Guideline 107 Bioaccumulation is not expected.
Autoignition temperature	No information available.
Decomposition temperature	> 662 °F (> 350 °C)
Viscosity, dynamic	0.82 mPa.s at 68 °F (20 °C)
Explosive properties	Not classified as explosive.
Oxidizing properties	none
Ignition temperature	770 °F (410 °C) Method: DIN 51794

SECTION 10. Stability and reactivity

Reactivity

Vapor/air-mixtures are explosive at intense warming.

Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

Possibility of hazardous reactions

Violent reactions possible with:

Alkali metals, halogens, halides, Reducing agents, triethylaluminum, nitrates, metallic oxides, nonmetallic oxides, Halogenated hydrocarbon, Isocyanates, sodium, Sodium borohydride, hydrides, Oxidizing agents, Oxides of phosphorus

A risk of explosion and/or of toxic gas formation exists with the folllowing substances:

azides, Bromine, Chlorine, chromium(VI) oxide, potassium permanganate, triethylaluminum, chlorates

Halogenated hydrocarbon, with, Iron

Conditions to avoid
Heating.

Incompatible materials
various plastics, Copper, Copper alloys, Tin

Hazardous decomposition products
in the event of fire: See section 5.

SECTION 11. Toxicological information

Information on toxicological effects

Likely route of exposure
Inhalation, Eye contact, Skin contact

Target Organs
Eyes
Skin
Respiratory system
Liver
Kidneys
cardiovascular system

Acute oral toxicity
LD50 rat: 3,010 mg/kg
OECD Test Guideline 401

Symptoms: Gastrointestinal disturbance, Nausea, Vomiting

Acute inhalation toxicity
absorption
Symptoms: Possible damages:, Irritation symptoms in the respiratory tract.

Acute dermal toxicity
LD50 rabbit: 1,500 mg/kg
(IUCLID)

absorption

Skin irritation
rabbit
Result: No irritation
(IUCLID)

Eye irritation
rabbit
Result: Eye irritation
(IUCLID)

Causes serious eye irritation.

Sensitization
Sensitization test: guinea pig
Result: negative
(Lit.)

Sensitization test: mouse
Result: negative
Method: OECD Test Guideline 429

Genotoxicity in vitro
Ames test
Result: negative
(Lit.)

Carcinogenicity
Did not show carcinogenic effects in animal experiments. (Lit.)

CMR effects
Teratogenicity:
May damage the unborn child.

Specific target organ systemic toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ systemic toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
Regarding the available data the classification criteria are not fulfilled.

Carcinogenicity

IARC	No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
OSHA	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.
NTP	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
ACGIH	No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Further information
After absorption:
Headache, Dizziness, Drowsiness
Damage to:
Kidney, Liver
This substance should be handled with particular care.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
flow-through test LC50 Lepomis macrochirus (Bluegill sunfish): 7,100 mg/l; 96 h
US-EPA

Toxicity to daphnia and other aquatic invertebrates
static test EC50 Daphnia magna (Water flea): 13,100 mg/l; 48 h
OECD Test Guideline 202

Toxicity to algae
EC50 Desmodesmus subspicatus (Scenedesmus subspicatus): > 1,000 mg/l; 72 h
DIN 38412

Toxicity to bacteria
static test EC50 Vibrio fischeri: 12,300 - 17,500 mg/l; 5 min (External MSDS)

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)
semi-static test NOEC Daphnia magna (Water flea): 1,500 mg/l; 21 d
(External MSDS)

Persistence and degradability

Biodegradability
100 %; 21 d; aerobic
OECD Test Guideline 301E
Readily biodegradable.

Biochemical Oxygen Demand (BOD)
900 mg/g (5 d)
(Lit.)

Theoretical oxygen demand (ThOD)
1,863 mg/g
(Lit.)

Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: -0.85 (25 °C)
OECD Test Guideline 107
Bioaccumulation is not expected.

Bioaccumulation
Bioconcentration factor (BCF): 0.3 - 1.2
Cyprinus carpio (Carp); 56 d
OECD Test Guideline 305C (Does not significantly accumulate in organisms.)

Mobility in soil

No information available.

Other adverse effects

Stability in water
ca. 50 d
reaction with hydroxyl radicals (calculated) (Lit.)

Additional ecological information
Discharge into the environment must be avoided.

SECTION 13. Disposal considerations

The information presented only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations. Disposal should be in accordance with applicable regional, national and local laws and regulations.

SECTION 14. Transport information

Land transport (DOT)

UN number	UN 2265
Proper shipping name	N,N-DIMETHYLFORMAMIDE
Class	3
Packing group	III
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 2265
Proper shipping name	N,N-DIMETHYLFORMAMIDE
Class	3
Packing group	III
Environmentally hazardous	--
Special precautions for user	no

Sea transport (IMDG)

UN number	UN 2265
Proper shipping name	N,N-DIMETHYLFORMAMIDE
Class	3
Packing group	III
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-E S-D

SECTION 15. Regulatory information

United States of America

OSHA Hazards

Combustible Liquid
Harmful by skin absorption.
Eye irritant
Teratogen
Target organ effects

This information is based on 29 CFR 1910.1200 criteria prior to adoption of the GHS, and may deviate from the GHS information on the label and in section 2.

SARA 311/312 Hazards

Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313

The following components are subject to reporting levels established by SARA Title III, Section 313:

Ingredients

N,N-dimethylformamide	68-12-2	*100 %*

SARA 302

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

Clean Water Act

This product does not contain any Hazardous Substances listed under the U.S. CleanWater Act, Section 311, Table 116.4A.

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.

DEA List I

Not listed

DEA List II

Not listed

US State Regulations

Massachusetts Right To Know

Ingredients
N,N-dimethylformamide

Pennsylvania Right To Know

Ingredients
N,N-dimethylformamide

New Jersey Right To Know

Ingredients
N,N-dimethylformamide

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Notification status

TSCA:	All components of the product are listed in the TSCA-inventory.
DSL:	All components of this product are on the Canadian DSL.

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

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

H226	Flammable liquid and vapor.
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H360D	May damage the unborn child.

Key or legend to abbreviations and acronyms used in the safety data sheet
Used abbreviations and acronyms can be looked up at www.wikipedia.org.

Revision Date06/09/2014

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.
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