

**Monomethylformamide**

Version 2.0

Revision Date 06/24/2014

Ref. 13000000313

This SDS adheres to the standards and regulatory requirements of the United States and may not meet the regulatory requirements in other countries.

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Monomethylformamide
Tradename/Synonym : MMF

Product Use : Solvent

Restrictions on use : For industrial use only.

Manufacturer/Supplier : DuPont
1007 Market Street
Wilmington, DE 19898

Product Information : 1-800-441-7515 (outside the U.S. 1-302-774-1000)
Medical Emergency : 1-800-441-3637 (outside the U.S. 1-302-774-1139)
Transport Emergency : CHEMTREC: +1-800-424-9300 (outside the U.S. +1-703-527-3887)

SECTION 2. HAZARDS IDENTIFICATION**Product hazard category**

Acute toxicity (Oral)	Category 4
Acute toxicity (Dermal)	Category 4
Serious eye damage/eye irritation	Category 2B
Reproductive toxicity	Category 1B

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Label content

Pictogram

:



Signal word

: Danger

Hazardous warnings

: Harmful if swallowed or in contact with skin
Causes eye irritation.
May damage fertility or the unborn child.Hazardous prevention
measures: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/ protective clothing.
Use personal protective equipment as required.
IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed or concerned: Get medical advice/ attention.
Rinse mouth.
If eye irritation persists: Get medical advice/ attention.
Wash contaminated clothing before reuse.
Store locked up.
Dispose of contents/ container to an approved waste disposal plant.**Other hazards**

No applicable data available.

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SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Concentration
N-Methylformamide	123-39-7	99.5 %

May contain as trace impurity:

Carbon monoxide	630-08-0	>0.1%
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SECTION 4. FIRST AID MEASURES

- General advice : Never give anything by mouth to an unconscious person.
- Inhalation : Move to fresh air. Oxygen or artificial respiration if needed. Call a physician immediately.
- Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately.
- Eye contact : Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician. Keep eye wide open while rinsing. Remove contact lenses.
- Ingestion : Rinse mouth. Immediately give plenty of water (if possible charcoal slurry). Do NOT induce vomiting. Consult a physician if necessary.

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Most important symptoms/effects, acute and delayed : Eye contact may provoke the following symptoms: Pain, tearing, swelling, redness, or temporary visual impairment.
Skin contact may provoke the following symptoms: Discomfort, itching, redness, or swelling.

Protection of first-aiders : If potential for exposure exists refer to Section 8 for specific personal protective equipment.

Notes to physician : No applicable data available.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media : Dry powder, Foam, Carbon dioxide (CO₂)
Keep containers and surroundings cool with water spray.

Unsuitable extinguishing media : No applicable data available.

Specific hazards : Vapours may spread long distances and ignite.

Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit. Decontaminate all equipment used in fire fighting efforts before returning to service.

Further information : Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. Collect contaminated fire extinguishing water separately. This must not be discharged into drains. Cool containers / tanks with water spray.

SECTION 6. ACCIDENTAL RELEASE MEASURES

NOTE: Review FIRE FIGHTING MEASURES and HANDLING (PERSONNEL) sections before proceeding with clean-up. Use appropriate PERSONAL PROTECTIVE EQUIPMENT during clean-up.

Safeguards (Personnel) : Ensure adequate ventilation. Remove all sources of ignition. Wear personal protective equipment. Evacuate personnel to safe areas.

Environmental precautions : Prevent product from entering drains. Do not contaminate surface water.



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Spill Cleanup : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Transfer to steel drums with a lid. Use mechanical handling equipment. After cleaning, flush away traces with water.

Accidental Release Measures : No applicable data available.

SECTION 7. HANDLING AND STORAGE

Handling (Personnel) : Use only in area provided with appropriate exhaust ventilation. Do not use sparking tools. Provide adequate precautions, such as electrical grounding and bonding, or inert atmospheres. Avoid contact with skin and eyes. Do not breathe vapours or spray mist. Avoid formation of aerosol.
General industrial hygiene practice. Wash hands before breaks and immediately after handling the product. Wash contaminated clothing before re-use. Discard contaminated shoes.

Handling (Physical Aspects) : Keep away from heat and sources of ignition. Take measures to prevent the build up of electrostatic charge.

Dust explosion class : No applicable data available.
Storage : Keep containers tightly closed in a dry, cool and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep away from: Polyhalogenated compounds Inorganic acid chlorides
Oxidizing agents

Storage period : No applicable data available.

Storage temperature : < 54.4 °C (< 129.9 °F)

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls : Ensure adequate ventilation. Maintain walking and working surfaces free of liquid product. Local exhaust system is recommended for high temperature processing and open resin handling system. Carbon monoxide will be present in the space above the product.

Personal protective equipment
Respiratory protection : When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. In case of mist, spray or aerosol



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exposure wear suitable personal respiratory protection and protective suit.

Hand protection : Additional protection: Solvent-resistant gloves (butyl-rubber), Neoprene gloves

Hand protection : Additional protection: Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves. Also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion, and the contact time.

Eye protection : Tightly fitting safety goggles

Skin and body protection : Where there is potential for skin contact, have available and wear as appropriate, impervious gloves, apron, pants, jacket, hood and boots.

Exposure Guidelines
Exposure Limit Values

N-Methylformamide AEL *	(DUPONT)	2 ppm	8 & 12 hr. TWA, Skin	
Carbon monoxide Permissible exposure limit:	(OSHA)	35 ppm	40 mg/m3	8 hr. TWA
Permissible exposure limit:	(OSHA)	50 ppm	55 mg/m3	8 hr. TWA
Permissible exposure limit:	(OSHA)	200 ppm	229 mg/m3	Ceiling
TLV	(ACGIH)	25 ppm	TWA	
AEL *	(DUPONT)	25 ppm	8 hr. TWA	
AEL *	(DUPONT)	12 ppm	12 hr. TWA	

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Biological Exposure Indices

Carbon monoxide BEI	(ACGIH)	3.5 % Carboxyhemoglobin/Hemoglobin in blood Sampling time: End of shift.
BEI	(ACGIH)	20 ppm Carbon monoxide/End-exhaled air Sampling time: End of shift.

* AEL is DuPont's Acceptable Exposure Limit. Where governmentally imposed occupational exposure limits which are lower than the AEL are in effect, such limits shall take precedence.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance (Physical state, form, colour, etc.)**

Form	: liquid
Color	: colourless
Odor	: slight, amine-like
Odor threshold	: No applicable data available.
pH	: No applicable data available.
Melting point/freezing point	: -4 °C (25 °F)
Boiling point/boiling range	: 198 - 199 °C (388 - 390 °F) at 760 mm Hg
Flash point	: 119 °C closed cup
Evaporation rate	: < 1 (Butyl Acetate=1.0)
Flammability (solid, gas)	: No applicable data available.
Upper explosion limit	: 19.7 vol%
Lower explosion limit	: 1.8 vol%
Vapor pressure	: 0.2 mm Hg at 25 °C (77 °F)
Vapour density	: No applicable data available.
Density	: No applicable data available.

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Specific gravity (Relative density)	: 1.0 at 25 °C (77 °F)
Bulk density	: No applicable data available.
Water solubility	: soluble
Solubility(ies)	: No applicable data available.
Partition coefficient: n-octanol/water	: No applicable data available.
Auto-ignition temperature	: 323 °C
Self ignition	: No applicable data available.
Decomposition temperature	: No applicable data available.
Viscosity	: No applicable data available.

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: No applicable data available.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	: No applicable data available.
Conditions to avoid	: To avoid thermal decomposition, do not overheat.
Incompatible materials	: Polyhalogenated compounds Inorganic acid chlorides, Oxidizing agents
Hazardous decomposition products	: Carbon monoxide, formic acid, Nitrogen oxides (NOx) , Methylamine

SECTION 11. TOXICOLOGICAL INFORMATION

N-Methylformamide Inhalation	: rat An LC50/inhalation/4h/rat could not be determined because no mortality of rats was observed at the maximum achievable
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concentration.

Dermal LD50	:	1,298 mg/kg , rabbit
Oral LD50	:	340 mg/kg , mouse
Skin irritation	:	No skin irritation, rabbit
Eye irritation	:	Mild eye irritation, rabbit
Skin sensitization	:	Does not cause skin sensitisation., mouse
Repeated dose toxicity	:	Inhalation rat - Liver effects, Reversible, Reduced body weight gain
Mutagenicity	:	Animal testing did not show any mutagenic effects. Did not cause genetic damage in cultured bacterial cells.
Reproductive toxicity	:	Presumed human reproductive toxicant
Teratogenicity	:	Animal testing showed effects on embryo-foetal development at levels below those causing maternal toxicity. Reduced embryo-foetal viability Foetal malformations
Carbon monoxide		
Inhalation 4 h LC50	:	1300 ppm , rat
Inhalation	:	Target Organs: Blood, Central nervous system Reduction of blood's oxygen-carrying capacity Central nervous system effects cardiovascular system effects
Dermal	:	not applicable
Skin sensitization	:	There are no reports of human respiratory sensitization.
Repeated dose toxicity	:	Inhalation multiple species -



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Target Organs: Heart
Cardiac effects, Central nervous system effects

Mutagenicity : Tests on bacterial or mammalian cell cultures did not show mutagenic effects.
Animal testing did not show any mutagenic effects.

Reproductive toxicity : Known human reproductive toxicant

Teratogenicity : Animal testing showed effects on embryo-foetal development at levels below those causing maternal toxicity.
Foetal malformations
Reduced growth

Carcinogenicity

None of the components present in this material at concentrations equal to or greater than 0.1% are listed by IARC, NTP, or OSHA, as a carcinogen.

SECTION 12. ECOLOGICAL INFORMATION

Aquatic Toxicity

Monomethylformamide
96 h LC50

: Pimephales promelas (fathead minnow) > 900 mg/l

N-Methylformamide

72 h ErC50

: Desmodesmus subspicatus (green algae) > 500 mg/l

48 h EC50

: Daphnia magna (Water flea) > 500 mg/l Directive 67/548/EEC, Annex V, C.2.

Environmental Fate

Monomethylformamide
Biodegradability

: OECD Test Guideline 301C
Readily biodegradable.

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SECTION 13. DISPOSAL CONSIDERATIONS

- Waste disposal methods - Product : In accordance with local and national regulations.
- Waste disposal methods - Container : Triple rinse (or equivalent) empty 55 gallon or 208 liters drums before disposal or reuse.
- Contaminated packaging : No applicable data available.

SECTION 14. TRANSPORT INFORMATION

Not classified as dangerous in the meaning of transport regulations.

SECTION 15. REGULATORY INFORMATION

- TSCA : Listed
- SARA 313 Regulated Chemical(s) : SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.
- Title III hazard classification : Acute Health Hazard: Yes
Chronic Health Hazard: Yes
Fire: No
Reactivity/Physical hazard: No
Pressure: No
- CERCLA Reportable Quantity : 50,000 lbs
Based on the percentage composition of this chemical in the product.:
N,N-Dimethylformamide
- California Prop. 65 : WARNING! This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Carbon monoxide



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SECTION 16. OTHER INFORMATION

The DuPont Oval Logo is a registered trademark of E.I. du Pont de Nemours and Company.

Revision Date : 06/24/2014

Contact person : MSDS Coordinator, DuPont Chemicals and Fluoroproducts, Wilmington, DE
19898, (800) 441-7515

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