Material Safety Data Sheet

Dimethylformamide (DMF) (RXSOL-60-6023-100)

1. Product and Company Identifaction

Product Name	N,N-Dimethylformamide
Product Type	RXSOL-60-6023-100
Chemical Formula	HCON(CH3)2

Company Details:
RX MARINE INTERNATIONAL
105, A wing , BSEL , TECH PARK.
VASHI ,NEW BOMBAY 400703 INDIA

Stock Point : Kolkata, Mumbai, Gandhidham, Chennai, Visakhapatnam, Fujairah

Phone	+91 22 27815541 / 42
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Email	mail@rxmarine.com

2. Composition / informationon ingredients

Name	CAS #	% by Weight
N,N- Dimethylformamide	68-12-2	100

Toxicological Data on Ingredients: N,N-Dimethylformamide: ORAL (LD50): Acute: 2800 mg/kg [Rat]. 2900 mg/kg [Mouse]. 5000 mg/kg [Rabbit]. DERMAL (LD50): Acute:4720 mg/kg [Rabbit].

3. Hazards Identification

Potential Acute Health Effect	Hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion, of inhalation.
Potential Chronic Health Effects	CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. The substance is toxic to kidneys, liver, central nervous system (CNS). The substance may be toxic to blood, the nervous system. Repeated or prolonged exposure to the substance can produce target organs damage.

4. First Aid Measures

Description of first aid measures:

Eye Contact	Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Serious Skin Contact	Wash with a disinfectant soap and cover the contaminated skin with an anti bacterial cream. Seek immediate medical attention.
Inhalation	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.
Serious Inhalatio	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to- resuscitation. WARNING: It may be hazardousto the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention. material is toxic, infectious or corrosive. Seek medical attention.

Ingestion	Do NOT induce vomiting unless dirDo NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar,tie, belt or waistband. Get medical attention if symptoms appear.
Serious Ingestion	Not available

5. Fire-fighting Measures

Flammability of the Product	Flammability of the Product
Auto-Ignition Temperature	445°C (833°F)
Flash Points	CLOSED CUP: 57.778°C (136°F). (Tagliabue.) OPEN CUP: 67°C (152.6°F).
Flammable Limits	LOWER: 2.2% UPPER: 15.2%
Products of Combustion	These products are carbon oxides (CO, CO2), nitrogen oxides (NO, NO2...)
Fire Hazards in Presence of Various Substances	Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.
Explosion Hazards in Presence of Various Substances	Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion.Special Remarks on Fire Hazards: Not available.
Special Remarks on Explosion Hazards	A mixture of triethylaluminum and DMF explodes when heated. DMF + potassium permanganate may explode.

6. Accidental Release Measures

Small Spill	Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.
Large Spill	Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

7. Handling and Storage

Precautions for safe handling

Keep locked up. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids

Storage:
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. Exposure controls and personal protection

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Engineering Controls	Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.
Personal Protection in Case of a Large Spill	Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits	TWA: 10 (ppm) from ACGIH (TLV) [United States] TWA: 30 (mg/m3) from ACGIH (TLV) [United States] Consult local authorities for acceptable exposure limits.

9. Physical and chemical properties

Physical state and appearance	Liquid.
Odor	Amine like. (Slight.).
Taste	Not available.
Molecular Weight	73.09 g/mole
Color	Colorless to light yellow.
pH (1% soln/water)	Not available
Boiling Point	153°C (307.4°F)
Melting Point	-61°C (-77.8°F)
Critical Temperature	374°C (705.2°F)
Specific Gravity	0.949 (Water = 1)
Vapor Pressure	0.3 kPa (@ 20°C)
Vapor Density	2.51 (Air = 1)
Volatility	Not available
Odor Threshold	100 ppm
Water/Oil Dist. Coeff	The product is more soluble in water; log(oil/water) = -1
Ionicity (in Water)	Not available
Dispersion Properties	See solubility in water, diethyl ether, acetone
Solubility	Easily soluble in cold water, hot water. Soluble indiethyl ether, acetone. Miscible organic solvents. Soluble in benzene, and chloroform.

10. Stability and reactivity

Stability	The product is stable.
Instability Temperature	Not available
Conditions of Instability	Heat, ignition sources (sparks, flames), incompatible materials
Incompatibility with various substances	Reactive with oxidizing agents, acids.
Corrosivity	Non-corrosive in presence of glass.
Special Remarks on Reactivity	Can react vigorously with oxidizing agents, halogenated hydrocarbons, and inorganic nitrates. Incompatible with carbon tetrachloride, alkyl aluminums, sodium tetrahydroborate, nitrates, chromic acid, diisocyanatomethane, triethylaluminum, sodium hydride, lithium azide, metallic sodium, bromine, magnesium nitrate, potassium permanganate, nitric acid, chromium trioxide, borohydrides, phosphorus trioxide, diborane, octafluoroisobutyrate, sodium nitrite, perchloryl fluoride, postassium methyl 4,4' dinitrobutyrate. Reaction with inorganic acid chlorides, such as phosphorous oxychloride and thionyl chloride, may form dimethylcarbamoyl, a suspect carcinogen. May release dimethylamine and carbon monoixde if heated above 350 C (662 F).
Special Remarks on Corrosivity	Pure dimethylformamide is essentially non-corrosive to metals. However copper, tin and their alloys should be avoided.
Polymerization	Will not occur.

11. Toxicological information

Routes of Entry	Absorbed through skin.Dermal contact. Eye contact. Inhalation.Ingestion.
Toxicity to Animals	WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4 HOUR EXPOSURE. Acute oral toxicity (LD50): 2800 mg/kg [Rat]. Acute dermal toxicity (LD50): 4720 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 9400 1 hours [Mouse]

Chronic Effects on Humans	CARCINOGENIC EFFECTS: 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified POSSIBLE for human. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. Causes damage to the following organs: kidneys, liver, central nervous system (CNS). May cause damage to the following organs: blood, the nervous system.
Other Toxic Effects on Humans	Hazardous in case of skin contact (irritant, permeator),of ingestion, of inhalation.
Special Remarks on Toxicity to Animals	Lowest Published Lethal Dose: LCL[Rat] - Route: Inhalation; Dose: 5000 ppm/6H
Special Remarks on Chronic Effects on Humans	May affect genetic material. May cause adverse reproductive effects(paternal and maternal) and birth defects. Embryotoxic and/or foetotoxic in animal. Passes through the placental barrier in animal. May cause cancer although IARC evidence for cancer in humans shows inadequate data.
Special Remarks on other Toxic Effects on Humans	Acute Potential Health Effects: Skin: Causes skin irritation with itching, burning,redness,swelling, or rash. It may be absorbed through the skin in toxic amounts and cause systemic effects similar to that of ingestion. It may facilitate the absorption of other chemical substances through the skin. If there is significant potential for skin contact, monitoring should be done to measure the level of DMF metabolites in urine specimans at the end of the shift. It is common practice to limit end-of-shift metabolites at or below 40 ppm expressed as n-monomethylformamide or a single individual or at or below 20 ppm MMF for several workers doing the same job. Eyes: Causes eye irritation (possibly severe) with tearing pain or blurred vision. Inhalation: May cause respiratory tract irritation. Short-term overexposure by inhalation may affect behavior/central nervous system (convulsions,muscle weakness and other symptoms similar to that of acute ingestion), respiration (dyspnea). Ingestion: It can cause gastrointestinal tract irritation with heartburn, abdominal pain, nausea, vomiting or diarrhea. It may also affect the cardiovascular system (hypertension, tachycardia, ECG abnormalities), blood (elevated white blood cell counts), and liver damage (hepatomegaly, jaundice, altered liver enzymes, fatty liver.

12. Ecological information

Ecotoxicity	Not available.
BOD5 and COD	Not available
Products of Biodegradation	Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.
Toxicity of the Products of Biodegradation	The products of degradation are less toxic than the product itself.
Special Remarks on the Products of Biodegradation	Not available.

13. Disposal considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14. Transport information

DOT Classification: CLASS 3: Flammable liquid.

Identification: : N,N-Dimethylformamide UNNA: 2265 PG:

Special Provisions for Transport:Not available.

15. Regulatory information

Federal and State Regulations	Illinois toxic substances disclosure to employee act: N,N-Dimethylformamide Illinois chemical safety act: N,N-Dimethylformamide New York release reporting list: N,N Dimethylformamide Rhode Island RTK hazardous substances: N,N-Dimethylformamide Pennsylvania RTK: N,N-Dimethylformamide Minnesota: N,N-Dimethylformamide Massachusetts RTK: N,N-Dimethylformamide Massachusetts spill list: N,N Dimethylformamide New Jersey: N,N-Dimethylformamide New Jersey spill list: N,N Dimethylformamide Louisiana spill reporting: N,N-Dimethylformamide California Director's List of Hazardous Substances: N,N-Dimethylformamide TSCA 8(b) inventory:N,N-Dimethylformamide TSCA 8(d) H and S data reporting: N,N-Dimethylformamide:12/19/95 SARA 313 toxic chemical notification and release reporting: N,N Dimethylformamide CERCLA: Hazardous substances.: N,N-Dimethylformamide: 100 lbs.(45.36 kg)