



## Dimethyl formamide

### Section 1: Chemical Product and Company Identification

**Product Name:** Dimethyl formamide

Catalog Codes: 114

Synonym: N, N-Dimethyl formamide

Chemical Name: Dimethyl formamide

Chemical Formula: C<sub>3</sub>H<sub>7</sub>NO

**Contact Information:**

Expresolv Ltd.

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CIN No.: U51909GJ2016PLC092972

### Section 2: Composition and Information on Ingredients

#### Composition:

Name	CAS No.	% by Weight
Dimethyl formamide	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].

### Section 3: Hazards Identification

#### Potential Acute Health Effects:

Slightly hazardous in case of inhalation (lung irritant). Slightly hazardous in case of skin contact (irritant, permeator), of eye contact (irritant), of ingestion.

#### Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (irritant, sensitizer, permeator), of ingestion. CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, liver, mucous membranes, skin, eyes. Repeated or prolonged exposure to the substance can produce target organs damage.

### Section 4: 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 if irritation occurs.

#### Skin Contact:

Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops. Cold water may be used.

**Serious Skin Contact:** Not available.

#### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do 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.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**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, CO<sub>2</sub>), nitrogen oxides (NO, NO<sub>2</sub>...).

**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 triethylaluminium and DMF explodes when heated. DMF + potassium permanganate may explode.

## Section 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. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Combustible material. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. If the product is in its solid form: Use a shovel to put the material into a convenient waste disposal container. If the product is in its liquid form: Absorb with an inert material and put the spilled material in an appropriate waste disposal. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system.

## Section 7: Handling and Storage

### Precautions:

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. Keep away from incompatibles such as oxidizing agents.

### Storage:

Store in segregated,, well-ventilated area & approved area. Keep container tightly closed . Avoid all possible sources of ignition .

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapours below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

### Personal Protection:

Safety glasses. Synthetic apron. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves (impervious).

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust 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.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odour:** Amine like. (Slight.)

**Taste:** Not available.

**Molecular Weight:** 73.09 g/mole

**Colour:** Colourless 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.

**Odour 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 in diethyl ether, acetone. Miscible organic solvents. Soluble in benzene, and chloroform.

#### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents.

**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 aluminium, sodium tetra hydroborate, nitrates, chromic acid, diisocyanato methane, triethylaluminium, sodium hydride, lithium azide, metallic sodium, bromine, magnesium nitrate, potassium permanganate, nitric acid, chromium trioxide, borohydrides, phosphorus trioxide, diborane, octafluoroisobutyrate, sodium nitrite, perchloric fluoride, potassium methyl 4,4'-dinitrobutyrate. Reaction with inorganic acid chlorides, such as phosphorous oxychloride and thionyl chloride, may form dimethyl carbamoyl, a suspect carcinogen. May release dimethylamine and carbon monoxide if heated above 350 C (662 F).

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

#### Section 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 fetotoxic 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 specimens at the end of the shift. It is common practice to limit end-of shift metabolites at or below 40 ppm expressed as n-monomethyl formamide 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 behaviour/central nervous system (convulsions, muscle weakness and other symptoms similar to that of acute ingestion), respiration (dyspnoea). Ingestion: It can cause gastrointestinal tract irritation with heartburn, abdominal pain, nausea, vomiting or diarrhoea. 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

## Section 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 product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

Consult with Local and Regional (State) authorities (waste regulators). Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not available.

**Special Provisions for Transport:** Not available.

## Section 15: Other 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)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:****WHMIS (Canada):**

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R20/21- Harmful by inhalation and in contact with skin. R36- Irritating to eyes. R61- May cause harm to the unborn child. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 2

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 2

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall *Expresolv Limited* be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages.

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