



Safety Data Sheet Number: 00004290SDS
Latest Revision Date: October 27, 2011
Revision: B

SECTION 1 – IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 Product identifier

Product Name: Formamide (deionized).
Catalogue Number(s): See Section 16.
Chemical Name: Liquid solution of Formamide.
Synonyms: Carbamaldehyde, (Formic acid, amide), Formimidic acid, (Methanoic acid, amide), and Methanamide.

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

Intended Product Use: This product is intended for use in hybridization applications for *in situ*, southern, northern, dot and slot blot analyses, colony, plaque, and yac screening. Formamide is used primarily as a component in probe hybridization solutions to promote probe hybridization specificity. It denatures nucleic acids by disrupting hydrogen bonds.

1.3 Details of the supplier of the safety data sheet

Manufacturer/Distributor:	Millipore Corporation (EMD Millipore Headquarters)	Millipore S.A.S. (Merck Millipore Headquarters)
Postal Address:	290 Concord Road Billerica MA, 01821 USA	Boite Postale 116 Molsheim Cedex, 67124 France
Telephone Number:	+1-978-715-1335	+33 (0) 3 90 46 90 00
Hours of Operation:	9:00 am to 4:00 pm ET (GMT -5)	9:00 am to 4:00 pm EU CT (GMT +1)
Worldwide Offices:	http://www.millipore.com/offices/cp3/officeshome	
Email:	mm_msds@merckgroup.com	

1.4 Emergency telephone number

CHEMTREC Emergency Telephone Number: International +1-703-527-3887 (collect)
North America 1-800-424-9300 (toll free)

SECTION 2 – HAZARDS IDENTIFICATION

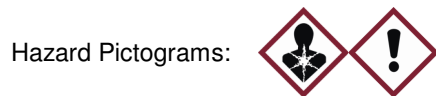
2.1 Classification of the substance or mixture

EC No 1272/2008: Acute Toxicity - Oral, Category 5, H303
Skin Irritation, Category 2, H315
Eye Irritation, Category 2A, H319
Toxic To Reproduction, Category 1B, H360

67/548/EEC or 1999/45/EC: F, Highly Flammable, R11
Xi, Irritant, R36/38

2.2 Label elements

EC No 1272/2008:



Signal Word: Danger

Hazard Statements: H303: May be harmful if swallowed.
H315+H320: Causes skin and eye irritation.
H360: May damage fertility or the unborn child.

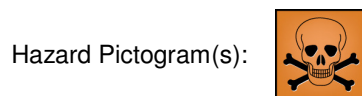
Prevention: P264: Wash hands thoroughly after handling.
P281: Use personal protective equipment as required.

Response: P302+P352: IF ON SKIN: Wash with plenty of water.
P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Storage: P405: Store locked up.

Disposal: P501: Dispose of contents/container in accordance with local/regional/international regulations.

67/548/EEC or 1999/45/EC:



Symbol Letter: T

Hazard: Toxic

Risk Phrase: R61: May cause harm to the unborn child.
R36/38: Irritating to eyes and skin.

2.3 Other hazards

Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1207/2006, Annex XIII.

SECTION 3 – COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name*	EINECS or ELINCS No.	CAS No.	Concentration	EU Hazard Symbol Letters**	R Phrases***
Formamide:	200-842-0	75-12-7	60 - 100 %	T	R61

* Chemical name as listed in Annex I of Directive 67/548/EEC.

** Symbol letters and categories of danger: T+ = Very Toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritant, E = Explosive, F+ = Extremely Flammable, F = Highly Flammable, N = Dangerous for the Environment, O = Oxidising.

*** The full text of each R Phrase is listed in Section 15.

SECTION 4 – FIRST AID MEASURES

4.1 Description of the first aid measures

Contact with Eyes: If the product contacts the eyes, promptly wash (irrigate) the eyes with large amounts of tepid water for at least 15 minutes, occasionally lifting the lower and upper lids. Seek medical attention immediately.

Ingestion: Seek medical attention immediately. Never give an unconscious person anything by mouth. If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration.

Inhalation: If a person inhales large amounts of the product move the exposed person to fresh air at once. If breathing is difficult or stops seek immediate medical attention.

Skin Contact: If the product contacts the skin, immediately flush the contaminated skin with water. If this chemical penetrates clothing immediately remove the clothing and flush the skin with water. Seek medical attention immediately.

4.2 Most important symptoms and effects, both acute and delayed

Contact with Eyes: There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.

Ingestion: Accidental ingestion of the material may be damaging to the health of the individual. Rats fed formamide for up to ten days, at 1.5 g/kg, all died. Autopsy indicated a cumulative effect with changes characteristic of gastritis and malnutrition. Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed.

Inhalation: The material is not thought to produce either adverse health effects or irritation of the respiratory tract following inhalation (as classified using animal models). Nevertheless, adverse effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.

Skin Contact: The material is not thought to be a skin irritant (as classified using animal models). Temporary discomfort, however, may result from prolonged dermal exposures. Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

Chronic Health Effects: Ample evidence exists from results in experimentation that developmental disorders are directly caused by human exposure to the material. Repeated exposure to Formamide may also affect the central nervous system and may cause liver and kidney damage.

4.3 Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5 – FIRE FIGHTING MEASURES

5.1 Extinguishing media

Suitable Extinguishing Media: Use extinguishing media appropriate for the surrounding fire. This product is compatible with commercially available extinguishing media.

Unsuitable Extinguishing Media: For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Combustible when exposed to heat or flame. Forms explosive mixtures with air at ambient temperatures. Development of hazardous combustion gases or vapors possible in the event of fire. Fire may cause evolution of irritating and toxic aerosols.

5.3 Advice for firefighters

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

SECTION 6 – ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Avoid direct contact with substance. Evacuate the immediate area if required. Notify emergency responders. Ensure adequate ventilation. Emergency responders see Section 6.3.

6.2 Environmental precautions

Collect and dispose of contaminated materials according to international, federal, state and local regulations. Keep away from surface and ground water, drains and soil.

6.3 Methods and materials for containment and cleaning up

Identify the spilled material. If necessary, determine personnel evacuation distances and notify appropriate authorities. Barricade the spill area and notify personnel in surrounding areas. Select the appropriate personal protective equipment. Control all sources of ignition and the movement of the spilled product with absorbent spill materials. Collect contaminated spill material and place in container meeting appropriate U.N. packaging requirements. Decontaminate used equipment and affected spill area appropriately.

6.4 Reference to other sections

See Section 8 for appropriate personal protective equipment.

SECTION 7 – HANDLING AND STORAGE

7.1 Precautions for safe handling

Seek appropriate training to safely handle this product under normal conditions. Use the recommended personal protective equipment (See Section 8) to prevent chemical exposures. Wash hands with soap and water before eating, drinking, or touching common items (phone, computer, etc.) to prevent cross contamination. Use this product with adequate ventilation. See product technical data sheet for details.

7.2 Conditions for safe storage, including any incompatibilities

Store at -20°C. Keep cap tightly closed after opening. It is recommended to aliquot and store -20°C. Formamide will degrade at room temperature.

7.3 Specific end uses

See product technical data sheet for details.

SECTION 8 – EXPOSURE CONTROL AND PERSONAL PROTECTION

8.1 Control parameters

	OSHA PEL	NIOSH REL	ACGIH TLV	Other
Formamide:	Not Listed	TWA 10 ppm (15 mg/m ³) [Skin]	TWA 10 ppm (15 mg/m ³) [Skin]	See Below
Australia:		TWA 10 ppm (18 mg/m ³), JUL2008		
Belgium:		TWA 10 ppm (18 mg/m ³), Skin, MAR2002		
Denmark:		TWA 10 ppm (18 mg/m ³), OCT 2002		
Finland:		TWA 20 ppm (37 mg/m ³), STEL 30 ppm (55 mg/m ³), Skin, JAN1999		
France:		VME 20 ppm (30 mg/m ³), FEB2006		
Korea:		TWA 10 ppm (15 mg/m ³), skin, 2006		
Mexico:		TWA 20 ppm (30 mg/m ³); STEL 30 ppm (45 mg/m ³), 2004		
The Netherlands:		MAC-TGG 16 mg/m ³ , 2003		
New Zealand:		TWA 10 ppm (18 mg/m ³), skin, JAN2002		

Norway:	TWA 10 ppm (18 mg/m ³), JAN1999
Russia:	STEL 3 mg/m ³ , JUN2003
Sweden:	TWA 10 ppm (20 mg/m ³); STEL15 ppm (30 mg/m ³), Skin, JUN2005
Switzerland:	MAK- week 10 ppm (18 mg/m ³), Skin, DEC2006
The United Kingdom:	TWA 20 ppm (37 mg/m ³); STEL 30 ppm, 2005

8.2 Exposure controls

	Normal Handling Conditions	Emergency Response Conditions
Engineering Controls:	General room ventilation is adequate for the use of this product.	Provide negative pressure ventilation.
Respiratory Protection	Use appropriate respiratory protection.	Use appropriate respiratory protection.
Eye Protection:	Safety glasses with side shields.	Chemical splash goggles or other face protection as appropriate.
Skin Protection:	Laboratory coat, adequate chemical-resistant gloves.	Chemically resistant boots, clothes, and impermeable gloves as appropriate.
Environmental Exposure Controls:	Not Available.	Not Available.
Other Equipment:	Safety shower, eyewash stations, and hand washing equipment should be available close to the work area as needed.	

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Form:	Liquid
Color:	Colorless
Odor:	Faint Ammonia Odor
Odor Threshold:	150 mg/cu m
pH:	7.1 (0.5 molar aqueous solution)
Melting Point:	2.55 °C
Initial Boiling Point and Boiling Range:	210.5 °C
Evaporation Rate, (Butyl Acetate = 1):	< 1
Flammability (Solid/Gas):	Class IIIB: combustible when exposed to heat or flame.
Flash Point:	154 °C
Explosive Limits:	Not Available. Not Available.
Vapor Pressure:	1 @ 70.5 °C
Vapor Density, 20 °C:	1.55
Relative Density (Water = 1.0):	1.1334 @ 20 C/4 °C
Solubility:	Soluble in Water
Partition Coefficient (n-octanol/water):	-1.51
Auto Ignition Temperature (ASTM D1929):	500 °C
Decomposition Temperature:	Not Available.

Oxidizing Properties: Not Available.

Viscosity, Centipoise: Not Available.

9.2 Other data

Surface Tension: 58.35 dyne/cm @ 20°C

Saturated Concentration In Air: < 0.24 g/cu m @ 30°C

Saturated Concentration In Air: < 0.24 g/cu m @ 30°C

SECTION 10 – STABILITY AND REACTIVITY

10.1 Reactivity

Vapors may form explosive mixture from air.

10.2 Chemical stability

Product is stable under normal operating conditions and use as described in the product technical data sheet.

10.3 Possibility of hazardous reactions

Formamide is hydrolyzed very slowly at room temperature. Acids, bases and elevated temperatures accelerate the hydrolysis.

10.4 Conditions to avoid

Extreme temperatures and exposure to air.

10.5 Incompatible materials

Acids, alkalines, oxidizers, iodine pyridine, copper, brass, lead, pyridine and sulfur trioxide.

10.6 Hazardous decomposition products

Heating to decomposition temperature may produce nitrogen oxides, ammonia, water, carbon monoxide, carbon dioxide and hydrogen cyanide.

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Toxicology Data: Formamide: RTECS #LQ0525000

	Toxicity Test	Exposure Route	Dose	Observed Effect
Acute Toxicity:				
Formamide:	LC ₅₀ (Rat)	Inhalation	>3,900 ppm/6 hour	N/A
	LD ₅₀ (Rat)	Oral	4,000 mg/kg	N/A
	LD ₅₀ (Rat)	Oral	5,577 mg/kg	Gastrointestinal: Gastritis Gastrointestinal: Other changes Kidney, Ureter, and Bladder: Changes in tubules (including acute renal failure, acute tubular necrosis)
Skin Corrosion/Irritation:	Not Available			
Serious Eye Damage/Eye Irritation:				
Formamide:	Eye Irritation (Rabbit)	Eye	100 mg	Severe
Respiratory or Skin Sensitization:	Not Available			

STOT-Single Exposure: Not Available

STOT-Repeated Exposure: Not Available

Aspiration Hazard: Not Available

11.2 Further information

Mutagenicity: Not Available

Reproductive Toxicity:

Formamide:	Lowest Published Toxic Dose (Rat)	Oral	1,400 mg/kg (6-19 day pregnant)	Reproductive: Effects on embryo or fetus: Fetotoxicity (except death, e.g., stunted fetus)
	Lowest Published Toxic Dose (Rat)	Oral	1,460 mg/kg (91 day male)	Reproductive: Paternal effects: Testes, epididymis, sperm duct
	Lowest Published Toxic Dose (Rabbit)	Oral	910 mg/kg (6-18 day pregnant)	Reproductive: Effects on fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants) Reproductive: Effects on embryo or fetus: Fetotoxicity (except death, e.g., stunted fetus) Reproductive: Specific developmental abnormalities: Musculoskeletal system
	Lowest Published Toxic Dose (Rat)	Skin	1,200 mg/kg (10-11 day pregnant)	Reproductive: Effects on embryo or fetus: Fetal death

Carcinogenicity: Carcinogenetic information for this product as a whole does not exist, below is data for the individual components.

Research Agency:	OSHA:	NTP:	IARC:
Formamide:	Not Listed	Not Listed	Not Listed

SECTION 12 – ECOLOGICAL INFORMATION

12.1 Toxicity

LC₅₀ Pimephales Promelas 48 Hours 12,850,000 ug/L

LC₅₀ Pimephales Promelas 72 Hours 11,600,000 ug/L

LC₅₀ Pimephales Promelas 96 Hours 10,500,000 ug/L

12.2 Persistence and degradability

Aerobic: Theoretical BODs were measured for Formamide of 1.6, 4.7, and 11.8% over 6-, 12-, and 24-hr inoculation periods, respectively. Theoretical BODs greater than 30% over a 2 week incubation period, and 22.6 and 57.7% over a 2 week incubation period were noted using the Japanese MITI standard BOD test.

Environmental Abiotic Degradation: The rate constant for the vapor-phase reaction of Formamide with photochemically-produced hydroxyl radicals has been estimated as 2.0×10^{-12} cu cm/molecule-sec at 25°C using a structure estimation method. This corresponds to an atmospheric half-life of about 8 days at an atmospheric concentration of 5×10^5 hydroxyl radicals per cu cm. Formamide is hydrolyzed very slowly at room temperature; the rate of hydrolysis increases rapidly in the presence of acid or bases and is further accelerated at elevated temperature. The rate constant for reaction of Formamide with OH radicals in aqueous solution is $< 5.0 \times 10^{-8}$ cu dm/mol(s).

12.3 Bioaccumulative potential

An estimated BCF of 3 was calculated for Formamide, using a log Kow of -1.51 and a regression-derived equation. According to a classification scheme, this BCF suggests the potential for bioconcentration in aquatic organisms is low.

12.4 Mobility in soil

Terrestrial Fate: Based on a classification scheme, a Koc value of 3.6, indicates that Formamide is expected to have very high mobility in soil. Volatilization of Formamide from moist soil surfaces is not expected to be an important fate process given an estimated Henry's Law constant of 1.4×10^{-9} atm-cu m/mole, derived from its vapor pressure, 6.1×10^{-2} mm Hg, and water solubility, 1.0×10^6 mg/l. Formamide is not expected to volatilize from dry soil surfaces based upon a vapor pressure of 6.1×10^{-2} mm Hg. Several biodegradation screening studies have observed significant biodegradation of Formamide; although these screening studies are not specific to soil media, they suggest that biodegradation in soil may be important.

12.5 Results of PBT and vPvB assessment

Not Available.

12.6 Other adverse effects

Aquatic Fate: Based on a classification scheme, a Koc value of 3.6, indicates that Formamide is not expected to adsorb to suspended solids and sediment. Volatilization from water surfaces is not expected based upon an estimated Henry's Law constant of 1.4×10^{-9} atm-cu m/mole, derived from its vapor pressure, 6.1×10^{-2} mm Hg, and water solubility, 1.0×10^6 mg/l. According to a classification scheme, an estimated BCF of 3, from a log Kow of -1.51 and a regression-derived equation, suggests the potential for bioconcentration in aquatic organisms is low. Formamide is hydrolyzed very slowly at room temperature; the rate of hydrolysis increases rapidly in the presence of acid or bases and is further accelerated at elevated temperature. Biodegradation is an important fate process in water based on its biodegradability in aqueous screening tests.

Atmospheric Fate: According to a model of gas/particle partitioning of semivolatile organic compounds in the atmosphere, Formamide, which has a vapor pressure of 6.1×10^{-2} mm Hg at 25°C, is expected to exist solely as a vapor in the ambient atmosphere. Vapor-phase Formamide is degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 8 days, calculated from its rate constant of 2.0×10^{-12} cu cm/molecule-sec at 25°C determined using a structure estimation method.

SECTION 13 – DISPOSAL CONSIDERATIONS

Substance: Dispose of unused contents in accordance with international, federal, state, and local regulations.

Contaminated Packaging: Dispose of container in accordance with international, federal, state and local requirements.

SECTION 14 – TRANSPORTATION INFORMATION

UN Number: Not Listed.

Class: Not Listed.

Proper Shipping Name: Not Listed.

Packing Group: Not Listed.

Marine Pollutant: Not Listed.

Other Applicable Information: None.

SECTION 15 – REGULATORY INFORMATION

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Australia: Hazchem Code: Not Listed.

Poisons Schedule Number: Not Listed.

California: Proposition 65 Listed: Not Listed.

Canada: WHMIS: D2A, D2B.

European Union: REACH: Chemical Safety Assessment for the substance or substances in the preparation not required.

Substances of Very High Concern (SVHC) - January 13, 2010:	This product does not contain SVHC's in concentrations above 0.1% weight/weight.
Category of Danger:	T: Toxic. Xi: Irritant.
Risk Phrases:	R61: May cause harm to the unborn child. R36/38: Irritating to eyes and skin.
Safety Phrases:	S7/9: Keep container tightly closed and in a well-ventilated place. S20/21: When using do not eat, drink or smoke. S26: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S27/28: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of soap and tepid water. S29/35: Do not empty into drains; dispose of this material and its container in a safe way. S36/37/39: Wear suitable protective clothing, gloves and eye/face protection. S45: In case of accident or if you feel unwell, seek medical advice immediately.
OECD/High Production Volume (HPV) Chemicals:	Formamide.
RoHS:	This product does not contain RoHS listed substances in concentrations above the established thresholds.
Japan: Poisonous and Deleterious Substances Control Law:	Not Listed.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out.

SECTION 16 – ADDITIONAL INFORMATION

Product Number: Product Name:

S4117 Formamide, Deionized, 500 mL.

72477 Formamide, Bulk

Training Advice: Seek effective chemical handling training to reduce the hazards associated with this product prior to use.

Technical Contact: <http://www.millipore.com/support>

Abbreviations Used

ACGIH	American Conference of Government Industrial Hygienists
ADR	European agreement on the international carriage of dangerous goods on road
CAS	Chemical Abstract Service
EINECS	European Inventory of Existing Commercial Chemical Substances
ELINCS	European List of Notified Chemical Substances
EPA	United States Environmental Protection Agency
IARC	International Agency for Research in Cancer.
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
IMDG	Regulations regarding the transportation of dangerous goods on ocean-going vessels issued by the International Maritime Organization.

LC ₅₀	Lethal Concentration 50% is the concentration of a chemical which kills 50% of a sample population
LD ₅₀	Lethal Dose 50% is the dose of a chemical which kills 50% of a sample population.
LDLo	Lowest observed lethal dose
LEL	Lower Explosive Limit
MSFU	Manufacture, Formulation, Supply and Use (Section 13)
NIOSH	National Institute of Occupational Safety and Health (US)
NTP	National Toxicology Program (US)
OSHA	United States Occupational Safety and Health Administration
RID	International regulations concerning the international carriage of dangerous goods by rail.
RTECS	Registry of Toxic Effects of Chemical Substances (US)
STOST	Specific Target Organ Systemic Toxicity
UEL	Upper Explosive Limit
WHMIS	Workplace Hazardous Materials Information System (Canada)

This safety data sheet has been prepared to comply with the requirements of the European Union regulation on the Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) 1906/2006 and ANSI standard Z400.1-1998.

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