MATERIAL SAFETY DATA SHEET

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

Date of issue: 02/04/2013 Version 1.0

SECTION 1. Identification

Product identifier

Product number	804604
Product name	Hydrazin hydrate (80% in water) for synthesis

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

Identified uses	Use restricted under TSCA to research and development or as analytical reagent. Uses regulated under FDA or FIFRA are not affected. Chemical for synthesis

Details of the supplier of the safety data sheet

Company	EMD Millipore Corporation | 290 Concord Road, Billerica, MA 01821, United States of America | SDS Phone Support: +1-978-715-1335 | General Inquiries: +1-978-715-4321 | Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) e-mail: mm_sds@merckgroup.com
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

Carcinogenicity, Category 1B, H350
Acute toxicity, Category 3, Oral, H301
Acute toxicity, Category 3, Inhalation, H331
Acute toxicity, Category 3, Dermal, H311
Skin corrosion, Category 1B, H314
Skin sensitization, Category 1, H317
Acute aquatic toxicity, Category 1, H400
Chronic aquatic toxicity, Category 1, H410

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

GHS-Labeling

Hazard pictograms

Signal Word
Danger

Hazard Statements
H350 May cause cancer.
H301 + H311 Toxic if swallowed or in contact with skin.
H314 Causes severe skin burns and eye damage.
H317 May cause an allergic skin reaction.
H330 Fatal if inhaled.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary Statements
P201 Obtain special instructions before use.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
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.
P309 + P310 IF exposed or if you feel unwell: Immediately call a POISON CENTER or doctor/physician.

Restricted to professional users.

OSHA Hazards
This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Other hazards
None known.

SECTION 3. Composition/information on ingredients

Chemical nature Aqueous solution

Hazardous ingredients
Chemical Name (Concentration)
CAS-No.
Hydrazinium hydroxide (>= 70 % - < 90 %)
7803-57-8

SECTION 4. First aid measures

Description of first-aid measures

General advice

First aider needs to protect himself.

Inhalation

After inhalation: fresh air. If breathing stops: immediately apply artificial respiration, if necessary oxygen. Immediately call in physician. Keep respiratory tract clear.

Skin contact

After skin contact: wash off with plenty of water. Immediately remove contaminated clothing. If available swab with polyethylene glycol 400. Call a physician immediately.

Eye contact

After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist.

Ingestion

If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Subsequently administer: activated charcoal (20 - 40 g in 10% slurry).

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Irritation and corrosion, Allergic reactions, Cough, Shortness of breath, Diarrhea, Nausea, Vomiting, Headache, Convulsions, CNS disorders

Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Water, Carbon dioxide (CO2), Foam, 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 material
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapors possible in the event of fire.
In the event of decomposition: danger of explosion!
Fire may cause evolution of:
nitrous gases

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
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. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders: Protective equipment see section 8.

Environmental precautions
Do not empty into drains.

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 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.

Conditions for safe storage, including any incompatibilities
Requirements for storage areas and containers Tightly closed. Keep in a well-ventilated place.

Store at +15°C to +25°C (+59°F to +77°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Ingredients

Basis	Value	Threshold limits	Remarks
Hydrazinium hydroxide 7803-57-8			
ACGIH	Time Weighted Average (TWA):	0.01 ppm	
	Skin designation:		Can be absorbed through the skin.
NIOSH/GUIDE	Ceiling Limit Value and Time Period (if specified):	0.03 ppm 0.04 mg/m³	Ceiling Limit Value 2-hr
OSHA_TRANS	PEL:	1 ppm 1.3 mg/m³	
	Skin designation:		Can be absorbed through the skin.
Z1A	Time Weighted Average (TWA):	0.1 ppm 0.1 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

Tightly fitting safety goggles

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:

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	ammoniacal
Odor Threshold	No information available.
pH	10.6 - 10.7 at 10 g/l 68 °F (20 °C)
Melting point	-60 °C
Boiling point/boiling range	243 - 246 °F (117 - 119 °C)
Flash point	163 °F (73 °C) Method: open cup
Evaporation rate	No information available.
Flammability (solid, gas)	No information available.
Lower explosion limit	4.7 %(V) (calculated on the pure substance)
Upper explosion limit	> 99 %(V) (calculated on the pure substance)
Vapor pressure	13 hPa at 68 °F (20 °C)
Relative vapor density	No information available.
Relative density	1.02 g/cm³ at 68 °F (20 °C)
Water solubility	at 68 °F (20 °C) soluble
Partition coefficient: n-octanol/water	log Pow: -3.8 (calculated on the pure substance) (External MSDS) Bioaccumulation is not expected (log Pow <1).
Autoignition temperature	No information available.
Decomposition temperature	> 482 °F (> 250 °C)

Viscosity, dynamic	1.33 mPa.s at 68 °F (20 °C)
Explosive properties	No information available.
Ignition temperature	590 °F (310 °C)

SECTION 10. Stability and reactivity

Reactivity

strong reducing agent
has a corrosive effect
highly reactive
Forms explosive mixtures with air on intense heating.

Chemical stability

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

Possibility of hazardous reactions

Caution! In contact with nitrites, nitrates, nitrous acid possible liberation of nitosamines!

Violent reactions possible with:

Oxidizing agents, Heavy metals, Alkali metals, alkalines, Light metals, metallic chlorides, metallic oxides, mercury compounds, halogens, Metals, acids

Risk of ignition or formation of inflammable gases or vapors with:

Organic Substances

Conditions to avoid

Strong heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

Incompatible materials

glass, rubber, various metals

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

Acute oral toxicity
Symptoms: Nausea, Vomiting, Diarrhea, If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute toxicity estimate: 75 mg/kg
Calculation method

Acute inhalation toxicity
absorption
Symptoms: mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract.

Acute dermal toxicity
absorption

Acute toxicity estimate : 375 mg/kg
Calculation method

Skin irritation
Causes skin burns.

Eye irritation
After eye contact: Burns. Risk of blindness!

Sensitization
May cause sensitization by skin contact.

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	Group 2B: Possibly carcinogenic to humans	
	Hydrazinium hydroxide	7803-57-8
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	Anticipated carcinogen.	
	Hydrazinium hydroxide	7803-57-8
ACGIH	Confirmed animal carcinogen with unknown relevance to humans.	
	Hydrazinium hydroxide	7803-57-8

Further information
Further toxicological data:
After absorption:
Systemic effects:
Headache, Convulsions, Cardiac irregularities, CNS disorders
The substance has delayed effects.
Damage to:
Liver, Kidney
Further data:
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Ingredients

Hydrazinium hydroxide

Acute oral toxicity
LD50 rat: 60 mg/kg (calculated on the free base) (External MSDS)
Symptoms: Nausea, Vomiting, Diarrhea, If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.

Acute inhalation toxicity
LC50 rat: 0.75 mg/l; 4 h (calculated on the free base) (External MSDS)
Symptoms: mucosal irritations, Cough, Shortness of breath, Inhalation may lead to the formation of oedemas in the respiratory tract., Symptoms may be delayed.

Acute dermal toxicity
LD50 rabbit: 91 mg/kg (calculated on the free base) (External MSDS)

Skin irritation
mammal
Result: Causes burns.
(Lit.)

Sensitization
Patch test: human
Result: positive
(IUCLID)

Germ cell mutagenicity
Genotoxicity in vitro
Ames test
Salmonella typhimurium
Result: positive
(IUCLID)

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish
LC50 fish: 0.61 - 5.98 mg/l; 96 h (calculated on the pure substance) (External MSDS)

Toxicity to daphnia and other aquatic invertebrates
EC50 Daphnia: 0.18 mg/l; 48 h (calculated on the pure substance) (External MSDS)

Toxicity to algae
IC50 Pseudokirchneriella subcapitata (green algae): 0.0061 mg/l (calculated on the pure substance) (External MSDS)

Toxicity to bacteria
EC5 Pseudomonas putida: 0.019 mg/l; 16 h (calculated on the pure substance) (External MSDS)

Persistence and degradability

No information available.

Bioaccumulative potential

Partition coefficient: n-octanol/water
log Pow: -3.8
(calculated on the pure substance) (External MSDS) Bioaccumulation is not expected (log Pow <1).

Mobility in soil

No information available.

Other adverse effects

Additional ecological information

Discharge into the environment must be avoided.

Ingredients

Hydrazinium hydroxide

Toxicity to fish

LC50 fish: 0.61 - 5.98 mg/l; 96 h (calculated on the free base) (External MSDS)

Toxicity to daphnia and other aquatic invertebrates

EC50 Daphnia: 0.18 mg/l; 48 h (calculated on the free base) (External MSDS)

EC5 E.sulcatum: 0.93 mg/l; 72 h (calculated on the free base) (IUCLID)

Toxicity to algae

IC50 Pseudokirchneriella subcapitata (green algae): 0.0061 mg/l (calculated on the free base) (External MSDS)

Toxicity to bacteria

EC5 Pseudomonas putida: 0.019 mg/l; 16 h (calculated on the free base) (IUCLID)

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 2030
Proper shipping name	HYDRAZINE, AQUEOUS SOLUTION
Class	8 (6.1)
Packing group	II
Environmentally hazardous	--

Air transport (IATA)

UN number	UN 2030
Proper shipping name	HYDRAZINE, AQUEOUS SOLUTION
Class	8 (6.1)
Packing group	II
Environmentally hazardous	--
Special precautions for user	yes
IATA (Passenger)	**Not permitted for transport**

Sea transport (IMDG)

UN number	UN 2030
Proper shipping name	HYDRAZINE, AQUEOUS SOLUTION
Class	8 (6.1)
Packing group	II
Environmentally hazardous	--
Special precautions for user	yes
EmS	F-A S-B

SECTION 15. Regulatory information

United States of America

OSHA Hazards

Combustible Liquid
Toxic by inhalation.
Toxic by ingestion
Highly toxic by skin absorption
Skin sensitizer
Corrosive to skin
Corrosive to eyes
Corrosive by inhalation.
Carcinogen

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

Hydrazinium hydroxide	7803-57-8

SARA 302

The following components are subject to reporting levels established by SARA Title III, Section 302:

Ingredients

Hydrazinium hydroxide	7803-57-8

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.

Massachusetts Right To Know

Ingredients

Hydrazinium hydroxide

Pennsylvania Right To Know

Ingredients
Hydrazinium hydroxide
water

New Jersey Right To Know

Ingredients
Hydrazinium hydroxide
water

Notification status

TSCA:	Not Listed on TSCA inventory. For Research and Development Use only. Not For Manufacturing or Commercial Purposes. *Ingredients* Hydrazinium hydroxide
DSL:	This product contains one or several components that are not on the Canadian DSL nor NDSL. *Ingredients* Hydrazinium hydroxide

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.

H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H317	May cause an allergic skin reaction.
H331	Toxic if inhaled.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

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.

Date of issue:02/04/2013