

SAFETY DATA SHEET

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

Revision Date 10/23/2017

Version 1.3

SECTION 1. Identification**Product identifier**

| | |
|----------------|------------------------|
| Product number | 845111 |
| Product name | Piperidine Msynth@plus |
| CAS-No. | 110-89-4 |

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

| | |
|-----------------|---|
| Identified uses | Pharmaceutical production, 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 General Inquiries: +1-978-715-4321 Monday to Friday, 9:00 AM to 4:00 PM Eastern Time (GMT-5) MilliporeSigma is a business of Merck KGaA, Darmstadt, Germany. |
|---------|---|

| | |
|----------------------------|--|
| 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**

Flammable liquid, Category 2, H225
Acute toxicity, Category 4, Oral, H302
Acute toxicity, Category 3, Inhalation, H331
Acute toxicity, Category 3, Dermal, H311
Skin corrosion, Category 1B, H314
Serious eye damage, Category 1, H318

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

GHS-Labeling*Hazard pictograms*

Signal Word
Danger

Hazard Statements
H225 Highly flammable liquid and vapor.

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H302 Harmful if swallowed.
H311 + H331 Toxic in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary Statements

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 IF INHALED: Remove person to fresh air and keep 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.
P310 Immediately call a POISON CENTER/doctor.
P322 Specific measures (see supplemental first aid instructions on this label).
P361 Remove/Take off immediately all contaminated clothing.
P363 Wash contaminated clothing before reuse.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P403 + P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

None known.

SECTION 3. Composition/information on ingredients

Formula $C_5H_{11}N$ (Hill)
Molar mass 85.15 g/mol

Hazardous ingredients

Chemical name (Concentration)
CAS-No.
Piperidine (>= 90 % - <= 100 %)
110-89-4

Exact percentages are being withheld as a trade secret.

SECTION 4. First aid measures

Description of first-aid measures

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General advice

First aider needs to protect himself.

Inhalation

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

Skin contact

In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.

Eye contact

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

Ingestion

After swallowing: make victim drink water (two glasses at most), avoid vomiting (risk of perforation!). Call a physician immediately. Do not attempt to neutralize.

Never give anything by mouth to an unconscious person.

Most important symptoms and effects, both acute and delayed

Irritation and corrosion, Cough, respiratory paralysis, Shortness of breath, Thirst, Nausea, Vomiting, Headache, muscular symptoms, Salivation, Impairment of vision, paralysis symptoms, death

Risk of blindness!

Indication of any immediate medical attention and special treatment needed

No information available.

SECTION 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

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.

Pay attention to flashback.

Vapors are heavier than air and may spread along floors.

Development of hazardous combustion gases or vapors possible in the event of fire.

Forms explosive mixtures with air at ambient temperatures.

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.

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Remove container from danger zone and cool with water. 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. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

Advice for emergency responders:

Protective equipment see section 8.

Environmental precautions

Do not let product enter drains. Risk of explosion.

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 carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

SECTION 7. Handling and storage

Precautions for safe handling

Observe label precautions.

Work under hood. Do not inhale substance/mixture. Avoid generation of vapors/aerosols.

Advice on protection against fire and explosion

Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Store below +30°C (+86°F).

SECTION 8. Exposure controls/personal protection

Exposure limit(s)

Contains no substances with occupational exposure limit values.

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.

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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

full contact:

| | |
|---------------------|--------------|
| Glove material: | butyl-rubber |
| Glove thickness: | 0.7 mm |
| Break through time: | 480 min |

splash contact:

| | |
|---------------------|----------------|
| Glove material: | Nitrile rubber |
| Glove thickness: | 0.40 mm |
| Break through time: | 120 min |

The protective gloves to be used must comply with the specifications of EC Directive 89/686/EEC and the related standard EN374, for example KCL 898 Butoject® (full contact), KCL 730 Camatril® - Velours (splash contact).

The breakthrough times stated above were determined by KCL in laboratory tests acc. to EN374 with samples of the recommended glove types.

This recommendation applies only to the product stated in the safety data sheet and supplied by us as well as to the purpose specified by us. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Other protective equipment:

Flame retardant antistatic protective clothing.

Respiratory protection

required when vapors/aerosols are generated.

Recommended Filter type: Filter A (acc. to DIN 3181) for vapors of organic compounds

The entrepreneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are performed according to the instructions of the producer. These measures have to be properly documented.

SECTION 9. Physical and chemical properties

| | |
|----------------|---|
| Physical state | liquid |
| Color | colorless |
| Odor | amine-like |
| Odor Threshold | Do not attempt to smell the product as it is hazardous. |
| pH | 12.6 at 100 g/l 68 °F (20 °C) |

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| Melting point | 12.6 °F (-10.8 °C) at 1,013 hPa |
| Boiling point/boiling range | 223 °F (106 °C) at 1,013 hPa |
| Flash point | 61 °F (16 °C) Method: DIN 51755 Part 1 |
| Evaporation rate | No information available. |
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | 1.5 %(V) |
| Upper explosion limit | 10.3 %(V) |
| Vapor pressure | 34 hPa at 68 °F (20 °C) |
| Relative vapor density | 3.0 |
| Density | 0.86 g/cm ³ at 68 °F (20 °C) Method: OECD Test Guideline 109 |
| Relative density | No information available. |
| Water solubility | at 68 °F (20 °C) miscible |
| Partition coefficient: n-octanol/water | log Pow: 0.84 (experimental) (Lit.) Bioaccumulation is not expected. |
| Autoignition temperature | No information available. |
| Decomposition temperature | > 212 °F (> 100 °C) |
| Viscosity, dynamic | 1.46 mPa.s at 68 °F (20 °C) |
| Explosive properties | Not classified as explosive. |
| Oxidizing properties | none |
| Ignition temperature | 608 °F (320 °C) Method: DIN 51794 |

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Viscosity, kinematic 1.77 mm²/s
at 68 °F (20 °C)
Method: OECD Test Guideline 114

1.23 mm²/s
at 104 °F (40 °C)
Method: OECD Test Guideline 114

SECTION 10. Stability and reactivity

Reactivity

Vapors may form explosive mixture with air.

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 nitrosamines!

Risk of explosion with:

dicyanofurazan, N-nitrosoacetanilide, N-perchlorylpiperidine

Exothermic reaction with:

Strong oxidizing agents, fire-promoting substances

Conditions to avoid

Warming.

Incompatible materials

no information available

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

LD50 Rat: 740 mg/kg

US-EPA

Symptoms: Nausea, Vomiting, Burns of: , mouth, oesophagus, Gastrointestinal tract

Acute inhalation toxicity

LC50 Rat: 4.8 mg/l; 4 h ; vapor

OECD Test Guideline 403

Corrosive to respiratory system.

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Symptoms: mucosal irritations, Cough, Shortness of breath, Lung edema, damage of respiratory tract, The substance has delayed effects.

Acute dermal toxicity

LD50 Rabbit: 275 mg/kg
(External MSDS)

Skin irritation

Rabbit
Result: Corrosive
OECD Test Guideline 404

Causes burns.

Eye irritation

Rabbit
Result: Irreversible effects on the eye
OECD Test Guideline 405

Causes serious eye damage.
Risk of blindness!

Sensitization

Buehler Test Guinea pig
Result: negative
Method: US-EPA

Genotoxicity in vivo

Micronucleus test
Mouse
Result: negative
Method: OECD Test Guideline 474

Genotoxicity in vitro

In vitro mammalian cell gene mutation test
Chinese hamster lung cells
Result: negative
Method: OECD Test Guideline 476

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 | No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| OSHA | No component of this product present at levels greater than or |

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| | |
|-------|---|
| NTP | equal to 0.1% is on OSHA's list of regulated carcinogens. No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| ACGIH | No ingredient of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH. |

Further information

After absorption:

Salivation, Shortness of breath, muscular symptoms, rise in blood pressure, Impairment of vision, Thirst, Headache, paralysis symptoms, respiratory paralysis, death

Under given conditions, contact with nitrites or nitric acid can lead to the formation of nitrosamines, which have shown themselves to be carcinogenic in animal experiments.

This substance should be handled with particular care.

SECTION 12. Ecological information

Ecotoxicity

Toxicity to fish

static test LC50 *Leuciscus idus* (Golden orfe): 68.12 mg/l; 96 h
DIN 38412

Toxicity to daphnia and other aquatic invertebrates

static test EC50 *Daphnia magna* (Water flea): 19 mg/l; 48 h

Analytical monitoring: yes

OECD Test Guideline 202

Toxicity to algae

static test ErC50 *Desmodesmus subspicatus* (green algae): 106 mg/l; 72 h

Analytical monitoring: yes

OECD Test Guideline 201

static test EC10 *Desmodesmus subspicatus* (green algae): 8.25 mg/l; 72 h

Analytical monitoring: yes

OECD Test Guideline 201

Toxicity to bacteria

static test EC20 activated sludge: > 2,000 mg/l; 0.5 h

OECD Test Guideline 209

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)

semi-static test NOEC *Daphnia magna* (Water flea): 3.8 mg/l; 21 d

Analytical monitoring: yes

OECD Test Guideline 211

Persistence and degradability

Biodegradability

ca. 67 %; 14 d; aerobic

OECD Test Guideline 301C

Readily biodegradable.

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Bioaccumulative potential

Partition coefficient: n-octanol/water

log Pow: 0.84

(experimental)

(Lit.) Bioaccumulation is not expected.

Mobility in soil

No information available.

Additional ecological information

Hazard for drinking water supplies.

Harmful effect due to pH shift.

Discharge into the environment must be avoided.

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 2401 |
| Proper shipping name | PIPERIDINE |
| Class | 8 (3) |
| Packing group | I |
| Environmentally hazardous | -- |

Air transport (IATA)

| | |
|------------------------------|------------|
| UN number | UN 2401 |
| Proper shipping name | PIPERIDINE |
| Class | 8 (3) |
| Packing group | I |
| Environmentally hazardous | -- |
| Special precautions for user | no |

Sea transport (IMDG)

| | |
|------------------------------|------------|
| UN number | UN 2401 |
| Proper shipping name | PIPERIDINE |
| Class | 8 (3) |
| Packing group | I |
| Environmentally hazardous | -- |
| Special precautions for user | yes |
| EmS | F-E S-C |

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SECTION 15. Regulatory information

United States of America

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.

SARA 302

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

Ingredients

Piperidine 110-89-4

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.

This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307

DEA List I

Listed

Ingredients

Piperidine 110-89-4

DEA List II

Not listed

US State Regulations

Massachusetts Right To Know

Ingredients

Piperidine

Pennsylvania Right To Know

Ingredients

Piperidine

New Jersey Right To Know

Ingredients

Piperidine

California Prop 65 Components

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

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Notification status

TSCA: All components of the product are listed in the TSCA-inventory.
DSL: All components of this product are on the Canadian DSL

SECTION 16. Other information

Training advice

Provide adequate information, instruction and training for operators.

Labeling

Hazard pictograms



Signal Word

Danger

Hazard Statements

H225 Highly flammable liquid and vapor.
H302 Harmful if swallowed.
H311 + H331 Toxic in contact with skin or if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary Statements

Prevention

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P240 Ground/bond container and receiving equipment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response

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.
P308 + P310 IF exposed or concerned: immediately call a POISON CENTER or doctor/ physician.

Storage

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

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Full text of H-Statements referred to under sections 2 and 3.

| | |
|------|--|
| H225 | Highly flammable liquid and vapor. |
| H302 | Harmful if swallowed. |
| H311 | Toxic in contact with skin. |
| H314 | Causes severe skin burns and eye damage. |
| H318 | Causes serious eye damage. |
| H331 | Toxic if inhaled. |

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.

Revision Date 10/23/2017

The information contained herein is based on the present state of our knowledge. It characterizes the product with regard to appropriate safety precautions. It does not represent a warranty of any product properties and we assume no liability for any loss or injury which may result from the use of this information. Users should conduct their own investigations to determine the suitability of the information.

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