# SAFETY DATA SHEET

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

Revision Date 02/17/2015 Version 1.4

## SECTION 1.Identification

### Product identifier

| | |
|---|---|
| Product number | BI0420 |
| Product name | Oxidizing Reagent 0.02 M Iodine <br/>in THF/Pyridine/Water <br/>70/20/10 (v/v/v) For DNA Synthesis Novabiochem® |

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

| | |
|---|---|
| Identified uses | Reagent for analysis |

### 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) |

| | |
|---|---|
| **Emergency telephone** | 800-424-9300 CHEMTREC (USA)<br>+1-703-527-3887 CHEMTREC (International)<br>24 Hours/day; 7 Days/week |

## SECTION 2. Hazards identification

### GHS Classification

Flammable liquid, Category 2, H225
Eye irritation, Category 2A, H319
Carcinogenicity, Category 2, H351
Specific target organ systemic toxicity - single exposure, Category 3, Respiratory system, H335
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.
H319 Causes serious eye irritation.

H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

*Precautionary Statements*
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
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.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353 IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
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 + P313 IF exposed or concerned: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/ attention.
P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
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

Chemical nature Mixture of solvents.

### Hazardous ingredients

*Chemical Name (Concentration)*
CAS-No.
*tetrahydrofuran (>= 50 % - < 70 % )*
109-99-9

Exact percentages are being wihtheld as a trade secret.
*Pyridine (>= 10 % - < 30 % )*
110-86-1

Exact percentages are being wihtheld as a trade secret.

## SECTION 4. First aid measures

### Description of first-aid measures

*Inhalation*
After inhalation: fresh air. Call in physician.

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

*Eye contact*
After eye contact: rinse out with plenty of water. Call in ophthalmologist.

*Ingestion*
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

Never give anything by mouth to an unconscious person.

**Most important symptoms and effects, both acute and delayed**
irritant effects, Nausea, Cough, Shortness of breath, Vomiting, Headache, drowziness, restlessness, insomnia, narcosis, cardiovascular disorders, Circulatory collapse

**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.
Forms explosive mixtures with air at ambient temperatures.
Fire may cause evolution of:
nitrogen oxides

**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*
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. Protected from light.

Store at room temperature.

## SECTION 8. Exposure controls/personal protection

### Exposure limit(s)

*Ingredients*

| Basis | Value | Threshold limits | Remarks |
|---|---|---|---|
| *tetrahydrofuran 109-99-9* | | | |
| ACGIH | Time Weighted Average (TWA): | 50 ppm | |
| | Skin designation: | | Can be absorbed through the skin. |
| | Short Term Exposure Limit (STEL): | 100 ppm | |
| NIOSH/GUIDE | Recommended exposure limit (REL): | 200 ppm<br>590 mg/m³ | |
| | Short Term Exposure Limit (STEL): | 250 ppm<br>735 mg/m³ | |
| OSHA_TRANS | PEL: | 200 ppm<br>590 mg/m³ | |
| Z1A | Short Term Exposure Limit (STEL): | 250 ppm<br>735 mg/m³ | |
| | Time Weighted Average (TWA): | 200 ppm<br>590 mg/m³ | |
| *Pyridine 110-86-1* | | | |
| ACGIH | Time Weighted Average (TWA): | 1 ppm | |
| NIOSH/GUIDE | Recommended exposure limit (REL): | 5 ppm<br>15 mg/m³ | |
| OSHA_TRANS | PEL: | 5 ppm<br>15 mg/m³ | |
| Z1A | Time Weighted Average (TWA): | 5 ppm<br>15 mg/m³ | |

### 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*

Safety glasses

*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:*
Flame retardant antistatic 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 | red |
| Odor | No strong odor known. |
| Odor Threshold | No information available. |
| pH | No information available. |
| Melting point | No information available. |
| Boiling point | No information available. |
| Flash point | 9 °F (-13 °C) |
| Evaporation rate | No information available. |
| Flammability (solid, gas) | No information available. |
| Lower explosion limit | No information available. |
| Upper explosion limit | No information available. |
| Vapor pressure | No information available. |
| Relative vapor density | No information available. |
| Density | No information available. |
| Relative density | No information available. |
| Water solubility | No information available. |
| Partition coefficient: n-octanol/water | No information available. |

| | |
|---|---|
| Autoignition temperature | No information available. |
| Decomposition temperature | No information available. |
| Viscosity, dynamic | No information available. |
| Explosive properties | Not classified as explosive. |
| Oxidizing properties | Oxidizing potential |

## SECTION 10. Stability and reactivity

### Reactivity

Vapors may form explosive mixture with air.
Formation of peroxides possible.
has a corrosive effect

### Chemical stability

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

### Possibility of hazardous reactions

A risk of explosion and/or of toxic gas formation exists with the folllowing substances:

alkali hydroxides, hydrides, Oxidizing agents, Bromine, Oxygen, perchloric acid, nitrogen oxides

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

Fluorine, halogen-halogen compounds, chlorosulfonic acid, chromium(VI) oxide, fuming sulfuric acid, perchromates, Nitric acid, sulfuric acid, silver salt, perchlorates, nitrogen dioxide

Violent reactions possible with:

Acid anhydrides, acid halides

### Conditions to avoid

Warming.

### Incompatible materials

rubber, various plastics, various metals

### Hazardous decomposition products

Peroxides
in the event of fire: See section 5.

## SECTION 11. Toxicological information

### Information on toxicological effects

*Likely route of exposure*
Eye contact, Skin contact

*Target Organs*
Eyes
Skin
Central nervous system

Liver
Kidneys
gastrointestinal tract
Respiratory system

*Acute oral toxicity*
Acute toxicity estimate: > 2,000 mg/kg
Calculation method

Symptoms: Irritation of mucous membranes, Nausea, Vomiting

*Acute inhalation toxicity*
Acute toxicity estimate: > 20 mg/l; 4 h
Calculation method

Symptoms: Cough, Shortness of breath, Possible damages:, mucosal irritations, damage of respiratory tract

*Acute dermal toxicity*
Acute toxicity estimate : > 2,000 mg/kg
Calculation method

absorption

*Skin irritation*
Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

*Eye irritation*
Mixture causes serious eye irritation.

*CMR effects*
Carcinogenicity:
Evidence of a carcinogenic effect.

*Specific target organ systemic toxicity - single exposure*
Target Organs: Respiratory system
Mixture may cause respiratory irritation.

*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 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 | 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 | Confirmed animal carcinogen with unknown relevance to humans. | |
| | Pyridine | 110-86-1 |
| | tetrahydrofuran | 109-99-9 |

**Further information**

In high doses:
drowziness, narcosis, cardiovascular disorders, Circulatory collapse
Systemic effects:
After uptake:
Headache, restlessness, insomnia
Chronic uptake results in damage of:
Liver, Kidney, Good warning effect due to low odor threshold.
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

**Ingredients**

*tetrahydrofuran*

*Eye irritation*
Rabbit
Result: Eye irritation
(IUCLID)

*Sensitization*
Sensitization test: Guinea pig
Result: negative
(IUCLID)

Human experience
Result: negative
(IUCLID)

*Germ cell mutagenicity*
*Genotoxicity in vitro*
Ames test
Result: negative
(IUCLID)

*Reproductive toxicity*
No impairment of reproductive performance suspected. (Lit.)

*Pyridine*

*Acute oral toxicity*
LD50 Rat: 891 mg/kg (RTECS)

*Acute inhalation toxicity*
LC50 Rat: 17.75 mg/l; 4 h
US-EPA

*Acute dermal toxicity*
LD50 Rabbit: 1,121 mg/kg (RTECS)

*Skin irritation*
Rabbit
Result: slight irritation
(RTECS)

*Eye irritation*
Rabbit
Result: Severe irritations
(Lit.)

*Sensitization*
Sensitization test: Guinea pig
Result: negative
(Lit.)

*Germ cell mutagenicity*
*Genotoxicity in vivo*
Micronucleus test
Result: negative
(National Toxicology Program)

Chromosome aberration test
Result: negative
(National Toxicology Program)

*Genotoxicity in vitro*
Ames test
Result: negative
(Lit.)

*Teratogenicity*
Did not show teratogenic effects in animal experiments. (External MSDS)

## SECTION 12. Ecological information

### Ecotoxicity

No information available.

### Persistence and degradability

No information available.

### Bioaccumulative potential

No information available.

### Mobility in soil

No information available.

### Ingredients

*tetrahydrofuran*

*Toxicity to fish*
LC50 Pimephales promelas (fathead minnow): 2,160 mg/l; 96 h (in soft water) (IUCLID)

*Toxicity to daphnia and other aquatic invertebrates*
EC50 Daphnia magna (Water flea): 382 mg/l; 24 h (IUCLID)

*Toxicity to algae*
IC5 Scenedesmus quadricauda (Green algae): 3,700 mg/l; 8 d (maximum permissible toxic concentration) (IUCLID)

*Toxicity to bacteria*
EC5 Pseudomonas putida: 580 mg/l; 16 h (maximum permissible toxic concentration) (IUCLID)

*Biodegradability*
39 %; 28 d
OECD Test Guideline 301D
Not readily biodegradable.

Substance does not meets the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII.

*Pyridine*

*Toxicity to fish*
LC50 Oncorhynchus mykiss (rainbow trout): 4.6 mg/l; 96 h (ECOTOX Database)

*Toxicity to daphnia and other aquatic invertebrates*
EC5 E.sulcatum: 3.5 mg/l; 72 h (Lit.) (maximum permissible toxic concentration)

EC50 Daphnia magna (Water flea): 240 mg/l; 24 h (ECOTOX Database)

*Toxicity to algae*
IC5 Scenedesmus quadricauda (Green algae): 120 mg/l; 7 d (Lit.) (maximum permissible toxic concentration)

*Toxicity to bacteria*
EC5 Pseudomonas putida: 340 mg/l; 16 h (Lit.) (maximum permissible toxic concentration)

## 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 1993 |
| **Proper shipping name** | FLAMMABLE LIQUID, N.O.S. (CONT. TETRAHYDROFURANE, PYRIDINE) |
| **Class** | 3 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |

**Air transport (IATA)**

| | |
|---|---|
| **UN number** | UN 1993 |
| **Proper shipping name** | FLAMMABLE LIQUID, N.O.S. (CONT. TETRAHYDROFURANE, PYRIDINE) |
| **Class** | 3 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |
| **Special precautions for user** | no |

**Sea transport (IMDG)**

| | |
|---|---|
| **UN number** | UN 1993 |
| **Proper shipping name** | FLAMMABLE LIQUID, N.O.S. (CONT. TETRAHYDROFURANE, PYRIDINE) |
| **Class** | 3 |
| **Packing group** | II |
| **Environmentally hazardous** | -- |
| **Special precautions for user** | yes |
| EmS | F-E S-E |

## SECTION 15. Regulatory information

### United States of America

**SARA 313**

The following components are subject to reporting levels established by SARA Title III, Section 313:

*Ingredients*

| | | |
|---|---|---|
| Pyridine | 110-86-1 | *21 %* |

**SARA 302**

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**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.

**DEA List I**

Listed

*Ingredients*

| | |
|---|---|
| Iodine | 7553-56-2 |

**DEA List II**

Not listed

### US State Regulations

**Massachusetts Right To Know**

*Ingredients*

tetrahydrofuran
Pyridine

**Pennsylvania Right To Know**

*Ingredients*
tetrahydrofuran
Pyridine

**New Jersey Right To Know**

*Ingredients*
tetrahydrofuran
Pyridine

**California Prop 65 Components**

WARNING: this product contains a chemical known in the State of California to cause cancer.
*Ingredients*
Pyridine

**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. |
| KOREA: | Not in compliance with the inventory |

## 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.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.
EUH019 May form explosive peroxides.

*Precautionary Statements*
Prevention
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.

P240 Ground/bond container and receiving equipment.
Response
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 + P313 IF exposed or concerned: Get medical advice/ attention.
Storage
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

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

| | |
|---|---|
| H225 | Highly flammable liquid and vapor. |
| H319 | Causes serious eye irritation. |
| H335 | May cause respiratory irritation. |
| H351 | Suspected of causing cancer. |

**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 02/17/2015