

MATERIAL SAFETY DATA SHEET**Oxidizer Solution for DNA Synthesis****Section 1 - Chemical Products & Company Identification**

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For emergency source information (USA) contact: Chemtrec 1-800-424-9300

For emergency source information (Europe) contact: Chemtrec 703 527 3887 (International)

Trade Names/Synonyms: Iodine Solution Chemical Family: Organic Solvent Mixture

Section 2 - Composition/Information On Ingredients - % by Volume

<u>Chemicals:</u>	<u>Composition (w/w) %:</u>	<u>CAS Number:</u>	<u>Classification:</u>	<u>Odor Threshold:</u>
Tetrahydrofuran	65-100%	109-99-9	F; R: 11-19 Xi; R: 36/37	20-50 ppm
Pyridine	0-5%	110-86-1	F; R: 11 Xn; R: 20/21/22	0.17 ppm
Iodine	0-30%	7553-56-2	Xn; R: 20/21	Not Available
Water	0-5%	7732-18-5	None Available	Not Available

Section 3 - Hazards Identification

NFPA (National Fire Protection Association) Ratings (Scale 0-4): **Health: 2 Flammable: 3 Reactivity: 1**

Emergency Overview: Harmful by inhalation, in contact with skin, and if swallowed. Irritating to the eyes, respiratory system and skin. Highly Flammable (EU). The target organs are the kidney, liver, thyroid, skin, and CNS. May form explosive peroxides. Keep away from sources of ignition-No Smoking. Take precautionary measures against static charge.

Potential Health Effects:

Skin Contact:	Short Term Exposure:	Irritant, Harmful
	Long Term Exposure:	Irritant, may cause defatting and dermatitis.
Eye Contact:	Short Term Exposure:	Irritant
	Long Term Exposure:	Irritant, may be harmful
Ingestion:	Short Term Exposure:	Irritant, vomiting, and diarrhea.
	Long Term Exposure:	Systemic effects similar to inhalation. Kidney, thyroid and liver damage.
Inhalation:	Short Term Exposure:	Irritant, Harmful, coughing, and wheezing,
	Long Term Exposure:	Headache, nausea, dizziness, and CNS depression.
Injection:	Short Term Exposure:	No information available
	Long Term Exposure:	No information available

CARCINOGEN/REPRODUCTIVE TOXIN STATUS:

	Tetrahydrofuran	Pyridine	Iodine	Water
OSHA:	Not Listed	Not Listed	Not Listed	Not Listed
NTP:	Not Listed	Not Listed	Not Listed	Not Listed
IARC:	Not Listed	Not Listed	Not Listed	Not Listed

Section 4: First Aid Measures

Skin Contact:	Remove contaminated clothing. Flush affected area with water and then wash with soap or mild detergent and water. Observe for signs of irritation. If irritation is present, get medical attention.
Eye Contact:	Wash eyes with large amounts of water or normal saline for at least 15 minutes. Observe for signs of irritation. If irritation is present, get medical attention.
Ingestion:	Get medical attention.
Inhalation:	Remove from exposure area to fresh air immediately. Get medical attention immediately.
Injection:	If accidentally injected, get medical attention.
Note to Physician:	Treat symptomatically and supportively.

Section 5: Fire Fighting Measures

FIRE AND EXPLOSION HAZARD: Highly flammable liquid (EU). Can form heat-sensitive peroxides, which could explode during concentration or evaporation. Remove all sources of ignition-No Smoking.

EXTINGUISHING MEDIA: Carbon dioxide, dry chemical powder or appropriate foam.

SPECIFIC HAZARDS: Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures with air. Emits toxic fumes under fire conditions.

PROTECTION OF FIREFIGHTERS: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Use water spray to cool fire-exposed containers.

Section 6: Accidental Release Measures

OCCUPATIONAL SPILL: Eliminate all ignition sources. Evacuate area. Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves. Cover spillage with activated carbon adsorbent, take up and place spillage in appropriate closed containers for waste disposal. Ventilate area and wash contaminated spill site. Wash contaminated clothing before reusing.

WASTE DISPOSAL: Follow current federal and local waste disposal regulations.

US CERCLA REPORTABLE QUANTITY (RQ): 1000 lbs. for Pyridine (RCRA code: U196) and 1000 lbs. for Tetrahydrofuran (RCRA code: U213).

Section 7 - Handling and Storage

Observe all federal, state and local regulations. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling. Keep tightly closed. Store in cool dry place. Use prudent laboratory practices when handling and storing chemical substances. Please see section 8 for more information.

Section 8 - Exposure Controls/Personal Protection

Exposure Controls:	Do NOT distill to dryness. Wear appropriate respirator where no engineering controls exist. Use in laboratory hood or other ventilated device. Do NOT breathe vapor. Danger of peroxide formation. Use nonsparking tools. Use prudent laboratory practices for handling chemical substances.
Eye Protection:	Employees must wear splash-proof safety goggles to prevent eye contact with this substance.
Clothing:	Employee must wear appropriate protective clothing (laboratory coat with long sleeves) and equipment to prevent skin contact with this material.
Gloves:	Employee must wear appropriate protective gloves (chemical resistant) to prevent contact with this material.

Permissible Exposure Limits (USA):

	<u>Tetrahydrofuran</u>	<u>Pyridine</u>	<u>Iodine</u>	<u>Water</u>
<u>ACGIH TWA (ppm)</u>	200	5	N/A	N/A
<u>ACGIH STEL/C (ppm)</u>	250	N/A	0.1	N/A
<u>IDHL (ppm)</u>	2000 [10% LEL]	1000	2	N/A
<u>OSHA (ppm)</u>	200	5	0.1	N/A
<u>NIOSH (ppm)</u>	200	5	0.1	N/A

Permissible Exposure Limits (Europe):

	<u>Tetrahydrofuran</u>	<u>Pyridine</u>	<u>Iodine</u>	<u>Water</u>
<u>Germany (ppm)</u>	200	5	0.1	N/A
<u>USSR-UNEP/IRPTC (MAC)</u>	100 mg/ m ³ (work place air)	0.08 mg/m ³ (residential areas)	0.1 ppm	N/A
<u>U. K. TWA (ppm)</u>	200	N/A	0.1	N/A

Section 9 - Physical and Chemical Properties

DESCRIPTION:	Red-brown liquid
FLASH POINT:	-14.0°C for the Mixture
DENSITY:	0.92 g/cm ³ (20.0°C) for the Mixture
SOLUBILITY:	Soluble (20.0°C) for the Mixture
pH:	Not available.

Section 10 - Stability and Reactivity

STABILITY:	Unstable
REACTIVITY:	Peroxide formation when exposed to air or light.
CONDITIONS TO AVOID:	Hydroxides, halogens, hydrides, acids, bases, oxidation reagents, moisture and air.
INCOMPATIBILITIES:	Hydroxides, halogens, hydrides, acids, bases, oxidation reagents, moisture and air.
POLYMERIZATION:	May occur.

Section 11 - Toxicology Information

TOXICITY:	The toxicological properties of this material have not been thoroughly investigated as a mixture. Listed below is the lethal dose and lethal concentration for the individual components of the mixture. <u>Tetrahydrofuran</u> : LD ₅₀ Oral (Rat)=2816 mg/kg LC ₅₀ Inhalation (Rat)=21000 ppm/ 3 hours Human lethal dose 50-500 mg/kg <u>Pyridine</u> : LD ₅₀ Oral (Human) = 1500 mg/kg <u>Iodine</u> : LD ₅₀ Oral (Human) = 25 mg/kg.
CARCINOGEN STATUS:	Not Listed.
LOCAL EFFECTS:	Irritant, Harmful.
TARGET EFFECTS:	Kidney, liver, thyroid, skin, and CNS.
AT INCREASED RISK FROM EXPOSURE:	No information available as a chemical mixture.

Chemical Name:	RTECS Number:
Tetrahydrofuran	LU5950000
Pyridine	UR8400000
Iodine	NN1575000
Water	None Available

Section 12 - Ecological Information

ENVIRONMENTAL IMPACT RATING (0-4):	No data available.
ACUTE AQUATIC TOXICITY:	<u>Pyridine</u> : EPA permissible goal of 207 µg/L. USSR-UNEP/IRPTC (MAC): 200µg/L domestic USSR-UNEP/IRPTC (MAC): 10 µg/L fishery <u>Tetrahydrofuran</u> : EPA no set criteria, permissible ambient goal of 8,100 µg/L. USSR-UNEP/IRPTC (MAC): 0.5 mg/L domestic. <u>Iodine</u> : No set criteria for Iodine, Maine has as set guideline of 340 µg/L (for Iodine).
DEGRADABILITY:	No data available.
LOG BIOCONCENTRATION FACTOR (BCF):	No data available.

Section 13 - Disposal Information

Observed all Federal, State, and Local Regulations.

Section 14 - Transportation Information

Ship as a regulated material. Transportation restrictions apply. The acute toxicity profile does warrant shipment as a hazardous material (DOT) or a dangerous good (IATA). Proper Shipping Name: Flammable Liquid N.O.S. (Tetrahydrofuran, Pyridine, and Iodine)
UN1993 Hazard Class: 3 Label Requirement: Flammable Liquid, n.o.s (Tetrahydrofuran and Pyridine)

For Laboratory R&D Use Only.

Section 15 - Regulatory Information
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	Tetrahydrofuran	Pyridine	Iodine	Water
Europe:				
EINECS/ELINCS:	203-726-8	203-809-9	231-442-4	231-791-2
EC INDEX NO.	603-025-00-0	613-002-00-7	053-001-00-3	None Available
Canada:				
DSL/NDSL:	Yes	Yes	Yes	DSL
United States:				
TSCA STATUS:	Yes, 4/12b, Notice of Export	Yes	Yes	No
CERCLA SECTION 103 (40 CFR 302.4):	1000 lbs.	1000 lbs.	No	No
SARA SECTION 302 (40 CFR 355.30):	No	No	No	No
SARA SECTION 304 (40 CFR 355.40):	No	No	No	No
SARA SECTION 313 (40 CFR 372.65):	No	Yes	No	No
OSHA PROCESS SAFETY (29 CFR 1910.119):	No	No	No	No
CALIFORNIA PROPOSITION 65	No	No	No	No
SARA ACUTE HAZARD (40 CFR 370.21)	Yes	Yes	Yes	No
CHRONIC HAZARD:	Yes	Yes	Yes	No
FIRE HAZARD:	Yes	Yes	Yes	No
REACTIVITY HAZARD:	Yes	Yes	Yes	No
SUDDEN RELEASE HAZARD:	No	No	No	No

Classification: Mixture**F; R:11-19****Xn; R: 20/21/22****Xi; R: 36/37**

Symbols: F (Flammable) and Xn (Harmful)

Safety Phrases: Mixture**S:16**

Keep away from sources of ignition- No Smoking.

S:26

In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

S:28

After contact with skin, wash immediately with plenty of soapy water.

S:33

Take precautionary measures against static discharges.

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Section 16 - Other

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