

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

SECTION 1. IDENTIFICATION

Product name : Oxidation Solution

Number : 000000011429

Product Use Description : Laboratory chemicals, Oxidation Reagent for DNA/RNA Synthesis

Manufacturer or supplier's details : Honeywell International Inc.
1953 South Harvey Street
Muskegon, MI 49442

For more information call : 1-800-368-0050
+1-231-726-3171

(Monday-Friday, 9:00am-5:00pm)

In case of emergency call : **Medical: 1-800-498-5701 or +1-303-389-1414**
: **Transportation (CHEMTREC): 1-800-424-9300 or**
: **+1-703-527-3887**
:
: (24 hours/day, 7 days/week)

SECTION 2. HAZARDS IDENTIFICATION**Emergency Overview**

Form : liquid, clear

Color : colourless to yellowish

Odor : strong pungent

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Classification of the substance or mixture

Classification of the substance or mixture : Flammable liquids, Category 3
Acute toxicity, Category 4, Oral
Acute toxicity, Category 4, Inhalation
Acute toxicity, Category 4, Dermal
Eye irritation, Category 2A
Carcinogenicity, Category 2

GHS Label elements, including precautionary statements

Symbol(s)



Signal word

: Warning

Hazard statements

: Flammable liquid and vapour.
Harmful if swallowed, in contact with skin or if inhaled.
Causes serious eye irritation.
Suspected of causing cancer.

Precautionary statements

: **Prevention:**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ ventilating/ lighting/ equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
Wash skin thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Wear protective gloves/protective clothing/eye protection/face protection.

Response:

IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

IF exposed or concerned: Get medical advice/ attention.

If eye irritation persists: Get medical advice/ attention.

Wash contaminated clothing before reuse.

In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.

Storage:

Store in a well-ventilated place. Keep cool.

Store locked up.

Disposal:

Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity

ACGIH: Pyridine 110-86-1
A3: Confirmed animal carcinogen

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature : Mixture

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Chemical name	CAS-No.	Concentration
Pyridine	110-86-1	88.70 %
Water	7732-18-5	10.00 %
Iodine	7553-56-2	1.30 %

SECTION 4. FIRST AID MEASURES

- Inhalation : Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Use oxygen as required, provided a qualified operator is present. Call a physician.
- Skin contact : Wash off immediately with plenty of water for at least 15 minutes. Take off contaminated clothing and shoes immediately. Wash contaminated clothing before re-use. Call a physician.
- Eye contact : Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Call a physician.
- Ingestion : Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician.

Notes to physician

- Indication of immediate medical attention and special treatment needed, if necessary : Treat symptomatically.

SECTION 5. FIREFIGHTING MEASURES

- Suitable extinguishing media : Carbon dioxide (CO2)
Dry chemical
Alcohol-resistant foam

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

- Cool closed containers exposed to fire with water spray.
- Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.
- Specific hazards during firefighting : Flammable.
Vapours may form explosive mixtures with air.
Vapours are heavier than air and may spread along floors.
Vapors may travel to areas away from work site before igniting/flashing back to vapor source.
In case of fire hazardous decomposition products may be produced such as:
Hydrogen cyanide (hydrocyanic acid)
Ammonia
Carbon dioxide (CO₂), carbon monoxide (CO), oxides of nitrogen (NO_x), dense black smoke.
- Special protective equipment for firefighters : Wear self-contained breathing apparatus and protective suit.

SECTION 6. ACCIDENTAL RELEASE MEASURES

- Personal precautions, protective equipment and emergency procedures : Wear personal protective equipment.
Immediately evacuate personnel to safe areas.
Keep people away from and upwind of spill/leak.
Ensure adequate ventilation.
Remove all sources of ignition.
Do not swallow.
Avoid breathing vapours, mist or gas.
Avoid contact with skin, eyes and clothing.
- Environmental precautions : Prevent further leakage or spillage if safe to do so.
Prevent product from entering drains.
Discharge into the environment must be avoided.
Do not flush into surface water or sanitary sewer system.
Do not allow run-off from fire fighting to enter drains or water courses.
- Methods and materials for : Ventilate the area.

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

containment and cleaning
up

No sparking tools should be used.
Use explosion-proof equipment.
Contain and collect spillage with non-combustible absorbent materials, e.g. sand, earth, vermiculite, diatomaceous earth and place in container for disposal according to local regulations (see section 13).

SECTION 7. HANDLING AND STORAGE**Handling**

Precautions for safe handling : Wear personal protective equipment.
Use only in well-ventilated areas.
Keep container tightly closed.
Do not smoke.
Do not swallow.
Avoid breathing vapours, mist or gas.
Avoid contact with skin, eyes and clothing.

Advice on protection against fire and explosion : Keep away from fire, sparks and heated surfaces.
Take precautionary measures against static discharges.
Ensure all equipment is electrically grounded before beginning transfer operations.
Keep product and empty container away from heat and sources of ignition.
No sparking tools should be used.
Use explosion-proof equipment.
No smoking.

Storage

Conditions for safe storage, including any incompatibilities : Store in area designed for storage of flammable liquids. Protect from physical damage.
Keep containers tightly closed in a dry, cool and well-ventilated place.
Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Keep away from heat and sources of ignition.
Keep away from direct sunlight.
Store away from incompatible substances.

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Container hazardous when empty.
Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- Protective measures : Ensure that eyewash stations and safety showers are close to the workstation location.
- Engineering measures : Use with local exhaust ventilation.
Prevent vapour buildup by providing adequate ventilation during and after use.
- Eye protection : Do not wear contact lenses.
Wear as appropriate:
Safety glasses with side-shields
If splashes are likely to occur, wear:
Goggles or face shield, giving complete protection to eyes
- Hand protection : Solvent-resistant gloves
Gloves must be inspected prior to use.
Replace when worn.
- Skin and body protection : Wear as appropriate:
Solvent-resistant apron
Flame retardant antistatic protective clothing.
If splashes are likely to occur, wear:
Protective suit
- Respiratory protection : In case of insufficient ventilation wear suitable respiratory equipment.
For rescue and maintenance work in storage tanks use self-contained breathing apparatus.
Use NIOSH approved respiratory protection.
- Hygiene measures : When using, do not eat, drink or smoke.
Wash hands before breaks and immediately after handling the product.
Keep working clothes separately.
Remove and wash contaminated clothing before re-use.

Oxidation Solution

BR664-2.5GL

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Do not swallow.
Avoid breathing vapours, mist or gas.
Avoid contact with skin, eyes and clothing.

Exposure Guidelines

Components	CAS-No.	Value	Control parameters	Update	Basis
Pyridine	110-86-1	TWA : Time weighted average	(1 ppm)	2008	ACGIH:US. ACGIH Threshold Limit Values
Pyridine	110-86-1	REL : Recommended exposure limit (REL):	15 mg/m3 (5 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Pyridine	110-86-1	PEL : Permissible exposure limit	15 mg/m3 (5 ppm)	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Pyridine	110-86-1	TWA : Time weighted average	15 mg/m3 (5 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)
Iodine	7553-56-2	STEL : Short term exposure limit	(0.1 ppm)	03 2014	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Vapor and aerosol.			

Oxidation Solution

BR664-2.5GL

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Iodine	7553-56-2	TWA : Time weighted average	(0.01 ppm)	03 2014	ACGIH:US. ACGIH Threshold Limit Values
Further information	:	Form of exposure : Inhalable fraction and vapor.			
Iodine	7553-56-2	Ceil_Tim e : Ceiling Limit Value and Time Period (if specified) :	1 mg/m3 (0.1 ppm)	2005	NIOSH/GUIDE:US. NIOSH: Pocket Guide to Chemical Hazards
Iodine	7553-56-2	Ceiling : Ceiling Limit Value:	1 mg/m3 (0.1 ppm)	02 2006	OSHA_TRANS:US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)
Iodine	7553-56-2	Ceiling : Ceiling Limit Value:	1 mg/m3 (0.1 ppm)	1989	Z1A:US. OSHA Table Z-1-A (29 CFR 1910.1000)

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state	: liquid, clear
Color	: colourless to yellowish
Odor	: strong pungent
pH	: Note: Not applicable
Melting point/range	: -42.2 °C

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

	Note: The physical data is that of the main component.
Boiling point/boiling range	: 115.25 °C at 1,013 hPa Note: The physical data is that of the main component.
Flash point	: 81 °F (27 °C) Method: closed cup
Lower explosion limit	: 1.8 %(V) Note: The physical data is that of the main component.
Upper explosion limit	: 12.4 %(V) Note: The physical data is that of the main component.
Vapor pressure	: 21.3 hPa at 20 °C(68 °F)Note: The physical data is that of the main component.
Vapor density	: 2.7 Note: (Air = 1.0), The physical data is that of the main component.
Density	: 0.983 g/cm ³ at 20 °C Note: The physical data is that of the main component.
Water solubility	: Note: completely soluble
Ignition temperature	: 482 °C Method: The physical data is that of the main component.

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

SECTION 10. STABILITY AND REACTIVITY

Chemical stability	: Stable under recommended storage conditions.
Possibility of hazardous reactions	: Hazardous polymerisation does not occur. Forms highly explosive by-product with Trifluoromethyl hypofluorite in reactions where used as an acid receptor.
Conditions to avoid	: Heat, flames and sparks. Keep away from direct sunlight.
Incompatible materials	: Strong oxidizing agents Strong acids Acid chlorides Chloroformates Fluorine May attack many plastics, rubbers and coatings.
Hazardous decomposition products	: In case of fire hazardous decomposition products may be produced such as: Carbon dioxide (CO ₂), carbon monoxide (CO), oxides of nitrogen (NO _x), dense black smoke. Hydrogen cyanide (hydrocyanic acid) Ammonia

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity
Pyridine : LD50: 800 - 1,600 mg/kg
Species: Rat

Acute inhalation toxicity

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Pyridine	: LC50: 5400 ppm, vapour Exposure time: 4 h Species: Rat, male
Iodine	: LC50: > 4.588 mg/l , dust/mist Exposure time: 4 h Species: Rat
Acute dermal toxicity Pyridine	: LD50: > 1,000 - < 2,000 mg/kg Species: Rabbit Method: OECD Test Guideline 402
Iodine	: LD50: 1,425 mg/kg Species: Rabbit, male
Skin irritation Iodine	: Species: reconstructed human epidermis (RhE) Result: Irritating to skin.
Eye irritation Pyridine	: Species: Rabbit Result: Irritating to eyes.
Pyridine	: Test Method: Ames test Result: negative
	: Test Method: Chromosome aberration test in vitro Cell type: Chinese Hamster Ovary Cells Result: negative
	: Test Method: Cell Transformation Test Result: negative
Further information Pyridine	: Note:

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Confirmed animal carcinogen with unknown relevance to humans.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity to fish

Pyridine

: flow-through test
LC50: 99 mg/l
Exposure time: 96 h
Species: Pimephales promelas (fathead minnow)

Iodine

: LC50: 1.67 mg/l
Exposure time: 96 h
Species: Oncorhynchus mykiss (rainbow trout)

Toxicity to daphnia and other aquatic invertebrates

Pyridine

: EC50: 320 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)
Method: OECD Test Guideline 202

Iodine

: LC50: 0.55 mg/l
Exposure time: 48 h
Species: Daphnia magna (Water flea)

Toxicity to algae

Iodine

: Growth inhibition
EC50: 0.13 mg/l
Exposure time: 72 h
Species: Desmodesmus subspicatus (green algae)
Method: OECD Test Guideline 201

Further information on ecology

Additional ecological information

Pyridine

: Harmful to aquatic organisms.

Oxidation Solution

BR664-2.5GL

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Iodine : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods : Observe all Federal, State, and Local Environmental regulations.

Disposal methods : Dispose according to legal requirements.

Packaging : Legal requirements are to be considered in regard of reuse or disposal of used packaging materials

SECTION 14. TRANSPORT INFORMATION

DOT UN/ID No. : UN 1993
 Proper shipping name : Flammable liquids, n.o.s. (Pyridine)
 Class : 3
 Packing group : III
 Hazard Labels : 3

IATA UN/ID No. : UN 1993
 Description of the goods : Flammable liquids, n.o.s. (Pyridine)
 Class : 3
 Packaging group : III
 Hazard Labels : 3
 Packing instruction (cargo aircraft) : 366
 Packing instruction (passenger aircraft) : 355
 Packing instruction (passenger aircraft) : Y344

IMDG UN/ID No. : UN 1993

Oxidation Solution**BR664-2.5GL**

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

Description of the goods : Flammable liquids, n.o.s.
(PYRIDINE)
Class : 3
Packaging group : III
Hazard Labels : 3
EmS Number : F-E, S-E
Marine pollutant : no

SECTION 15. REGULATORY INFORMATION**Inventories**

US. Toxic Substances Control Act : On TSCA Inventory

Australia. Industrial Chemical (Notification and Assessment) Act : On the inventory, or in compliance with the inventory

Canada. Canadian Environmental Protection Act (CEPA). Domestic Substances List (DSL) : All components of this product are on the Canadian DSL

Japan. Kashin-Hou Law List : On the inventory, or in compliance with the inventory

Korea. Existing Chemicals Inventory (KECI) : On the inventory, or in compliance with the inventory

Philippines. The Toxic Substances and Hazardous and Nuclear Waste Control Act : On the inventory, or in compliance with the inventory

China. Inventory of Existing Chemical Substances : On the inventory, or in compliance with the inventory

New Zealand. Inventory of Chemicals (NZIoC), as published by ERMA New Zealand : On the inventory, or in compliance with the inventory

Oxidation Solution

BR664-2.5GL

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

National regulatory information

US. Drug Enforcement Administration (DEA) Listed Precursor and Essential Chemicals (21 CFR 1310) : On the United States Drug Enforcement Authority (DEA) List of Precursors and Essential Chemicals
:

US. EPA CERCLA Hazardous Substances (40 CFR 302) : Iodine 7553-56-2
: The following component(s) of this product is/are subject to release reporting under 40 CFR 302 when release exceeds the Reportable Quantity (RQ):


Reportable quantity: 1000 lbs
: Pyridine 110-86-1

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

SARA 313 Components : The following components are subject to reporting levels established by SARA Title III, Section 313:
: Pyridine 110-86-1

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

CERCLA Reportable Quantity : 1127 lbs

California Prop. 65 :  **WARNING:** This product can expose you to chemicals, listed below, known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Pyridine 110-86-1

Massachusetts RTK : Pyridine 110-86-1

Oxidation Solution

BR664-2.5GL

Version 2.0

Revision Date 08/07/2018

Print Date 10/17/2019

	: Iodine	7553-56-2
New Jersey RTK	: Pyridine	110-86-1
	: Iodine	7553-56-2
Pennsylvania RTK	: Pyridine	110-86-1
	: Iodine	7553-56-2

SECTION 16. OTHER INFORMATION

	HMIS III	NFPA
Health hazard	: 2*	2
Flammability	: 3	3
Physical Hazard	: 0	
Instability	:	0

* - Chronic health hazard

Hazard rating and rating systems (e.g. HMIS® III, NFPA): This information is intended solely for the use of individuals trained in the particular system.

Further information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text. Final determination of suitability of any material is the sole responsibility of the user. This information should not constitute a guarantee for any specific product properties.

Changes since the last version are highlighted in the margin. This version replaces all previous versions.

Previous Issue Date: 05/13/2014

Prepared by Honeywell Performance Materials and Technologies Product Stewardship Group