

ETHIDIUM BROMIDE

GHS SAFETY DATA SHEET

Version No:2.0

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

ETHIDIUM BROMIDE

OTHER NAMES

C21-H20-N3.Br, C21-H20-Br-N3, "phenanthridinium, 3, 8-diamino-5-ethyl-6-phenyl-, bromide", "phenanthridinium, 3, 8-diamino-5-ethyl-6-phenyl-, bromide", "2, 7-diamino-10-ethyl-9-phenylphenanthridinium bromide", "2, 7-diamino-10-ethyl-9-phenylphenanthridinium bromide", "3, 8-diamino-5-ethyl-6-phenylphenanthridinium bromide", "3, 8-diamino-5-ethyl-6-phenylphenanthridinium bromide", "2, 7-diamino-9-phenyl-10-ethylphenanthridinium bromide", "2, 7-diamino-9-phenyl-10-ethylphenanthridinium bromide", "2, 7-diamino-9-phenylphenanthridine ethobromide", "2, 7-diamino-9-phenylphenanthridine ethobromide"

PROPER SHIPPING NAME

TOXIC SOLID, ORGANIC, N.O.S.
(contains ethidium bromide)

PRODUCT USE

Frame-shift mutagen which intercalates double-stranded DNA and RNA.
Fluorescent label for DNA; nucleic acid stain.
Has been used in veterinary practice as a the treatment of trypanosomiasis (a protozoan infection).

SUPPLIER

Company: S D FINE- CHEM LIMITED
Address:
315- 317, T.V. INDUSTRIAL ESTATE,
248, WORLI,
MUMBAI- 400030.INDIA.
technical@sdfine.com
Telephone: 91- 22- 24959898
Telephone: 91- 22- 24959899
Fax: 91- 22- 24937232

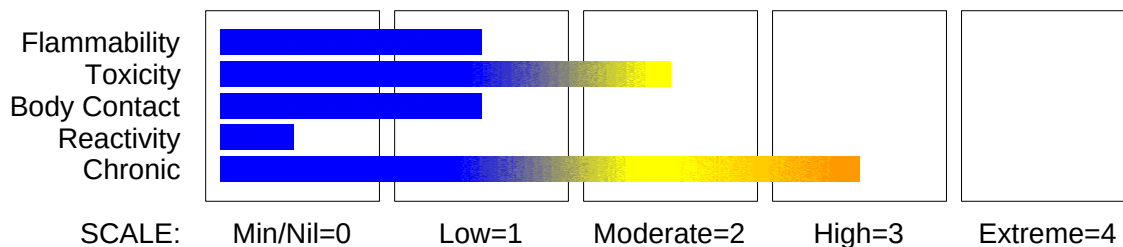
HAZARD RATINGS

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION



Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Aquatic Hazard Category 2
Reproductive Toxicity Category 1B



EMERGENCY OVERVIEW

HAZARD

DANGER
Determined by using GHS criteria:
H360 H401
May damage the unborn child
Toxic to aquatic life

PRECAUTIONARY STATEMENTS

Prevention

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use personal protective equipment as required.

Response

If exposed or concerned: Get medical attention advice.

Storage

Store locked up.

Disposal

Dispose of contents and container in accordance with relevant legislation.

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Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
ethidium bromide	1239-45-8	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.

- IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY.

- For advice, contact a Poisons Information Centre or a doctor.

Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

- Induce vomiting with fingers down the back of the of the throat, ONLY IF CONSCIOUS.

- Lean patient forward or place on left side (head-down position if possible) to maintain open airway and prevent aspiration.

NOTE: Wear a protective glove when inducing vomiting by mechanical means.

- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.

- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.

- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

EYE

If this product comes in contact with eyes:

- Wash out immediately with water.

- If irritation continues, seek medical attention.

- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear.

- Flush skin and hair with running water (and soap if available).

- Seek medical attention in event of irritation.

INHALED

- If dust is inhaled, remove from contaminated area.

- Encourage patient to blow nose to ensure clear passage of breathing.

- If irritation or discomfort persists seek medical attention.

NOTES TO PHYSICIAN

For exposures to quaternary ammonium compounds;

- For ingestion of concentrated solutions (10% or higher): Swallow promptly a large quantity of milk, egg whites / gelatin solution. If not readily available, a slurry of activated charcoal may be useful. Avoid alcohol. Because of probable mucosal damage omit gastric lavage and emetic drugs.

- For dilute solutions (2% or less): If little or no emesis appears spontaneously, administer syrup of Ipecac or perform gastric lavage.

- If hypotension becomes severe, institute measures against circulatory shock.

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- If respiration laboured, administer oxygen and support breathing mechanically. Oropharyngeal airway may be inserted in absence of gag reflex. Epiglottic or laryngeal edema may necessitate a tracheotomy.
 - Persistent convulsions may be controlled by cautious intravenous injection of diazepam or short-acting barbiturate drugs. [Gosselin et al, Clinical Toxicology of Commercial Products].
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Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Water spray or fog.
- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- Wear breathing apparatus plus protective gloves for fire only.
- Prevent, by any means available, spillage from entering drains or water courses.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

FIRE/EXPLOSION HAZARD

- Solid which exhibits difficult combustion or is difficult to ignite.
 - Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
 - Dry dust can also be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
 - Build-up of electrostatic charge may be prevented by bonding and grounding.
 - Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.
 - All movable parts coming in contact with this material should have a speed of less than 1-metre/sec.
- Decomposes on heating and produces toxic fumes of nitrogen oxides (NO_x) and ammonia (NH₃).
- Other decomposition products include: hydrogen bromide.

FIRE INCOMPATIBILITY

Flammable.

Personal Protective Equipment

- Breathing apparatus.
- Gas tight chemical resistant suit.
- Limit exposure duration to 1 BA set 30 mins.

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Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Clean up all spills immediately.
- Avoid contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Sweep up or
- Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).
- Place in clean drum then flush area with water.

MAJOR SPILLS

- Environmental hazard - contain spillage.
- Clear area of personnel and move upwind.
 - Alert Fire Brigade and tell them location and nature of hazard.
 - Wear full body protective clothing with breathing apparatus.
 - Prevent, by any means available, spillage from entering drains or water course.
 - Stop leak if safe to do so.
 - Contain spill with sand, earth or vermiculite.
 - Collect recoverable product into labelled containers for recycling.
 - Neutralise/decontaminate residue.
 - Collect solid residues and seal in labelled drums for disposal.
 - Wash area and prevent runoff into drains.
 - After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
 - If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

ethidium bromide 20 mg/m³

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

ethidium bromide 4 mg/m³

other than mild, transient adverse effects without perceiving a clearly defined odour is:

ethidium bromide 0.5 mg/m³

The threshold concentration below which most people will experience no appreciable risk of health effects:

ethidium bromide 0.15 mg/m³

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	>= 0.1%	Toxic (T)	>= 3.0%
R50	>= 0.25%	Corrosive (C)	>= 5.0%

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R51 $\geq 2.5\%$
else $\geq 10\%$
where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+ X + X 0 +

+: May be stored together
O: May be stored together with specific precautions
X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid generating and breathing dust.
- Limit all unnecessary personal contact.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

SUITABLE CONTAINER

- Glass container.
- Plastic container.
- Multi-ply woven plastic or paper bag with sealed plastic liner
- NOTE: Bags should be stacked, blocked, interlocked, and limited in height so that they are stable and secure against sliding or collapse.
- Check that containers are clearly labelled.
- Packaging as recommended by manufacturer.

STORAGE INCOMPATIBILITY

- Avoid reaction with oxidising agents.

STORAGE REQUIREMENTS

- Store in original containers.
- Keep containers securely sealed.
- No smoking, naked lights or ignition sources.
- Store in a cool, dry, well-ventilated area.

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- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

The following materials had no OELs on our records

- ethidium bromide: CAS:1239- 45- 8

MATERIAL DATA

No exposure limits set by NOHSC or ACGIH.

PERSONAL PROTECTION



EYE

- Safety glasses with side shields
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

Wear general protective gloves: i.e. Disposable polythene gloves or Cotton gloves or Light weight rubber gloves, with Barrier cream preferably Safety footwear.

OTHER

- Overalls.
- Barrier cream
- Eyewash unit.

RESPIRATOR

Protection Factor	Half- Face Respirator	Full- Face Respirator	Powered Air Respirator
10 x ES	P1 Air- line*	- -	PAPR- P1 -
50 x ES	Air- line**	P2	PAPR- P2

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

100 x ES	-	P3	-
		Air- line*	-
100+ x ES	-	Air- line**	PAPR- P3

* - Negative pressure demand ** - Continuous flow.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult

your

Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

Use in a well-ventilated area.

· Local exhaust ventilation is required where solids are handled as powders or crystals; even when particulates are relatively large, a certain proportion will be powdered by mutual friction.

· Exhaust ventilation should be designed to prevent accumulation and recirculation of particulates in the workplace.

· If in spite of local exhaust an adverse concentration of the substance in air could occur, respiratory protection should be considered. Such protection might consist of:

(a): particle dust respirators, if necessary, combined with an absorption cartridge;

(b): filter respirators with absorption cartridge or canister of the right type;

(c): fresh-air hoods or masks

· Build-up of electrostatic charge on the dust particle, may be prevented by bonding and grounding.

· Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to efficiently remove the contaminant.

Type of Contaminant:

direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)

grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).

Air Speed:

1- 2.5 m/s (200- 500 f/min.)

2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance value only

3: Intermittent, low production.

4: Large hood or large air mass in motion

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

3: High production, heavy use

4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 4-10 m/s (800-2000 f/min) for extraction of crusher dusts generated 2 metres distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Dark purple to maroon powder; mixes with water (1:5).

PHYSICAL PROPERTIES

Solid.

Mixes with water.

Molecular Weight: 394.33

Melting Range (°C): 260- 262 (decomp)

Solubility in water (g/L): Miscible

pH (1% solution): Not available

Volatile Component (%vol): Negligible

Relative Vapour Density (air=1): Not available

Lower Explosive Limit (%): Not available

Autoignition Temp (°C): 260

State: Divided solid

Boiling Range (°C): Not applicable

Specific Gravity (water=1): Not available

pH (as supplied): Not applicable

Vapour Pressure (kPa): Negligible

Evaporation Rate: Not available

Flash Point (°C): Not available

Upper Explosive Limit (%): Not available

Decomposition Temp (°C): Not available

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerisation will not occur.

Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be damaging to the health of the individual.

Considered an unlikely route of entry in commercial/industrial environments.

Acute oral poisoning due to bromide salts (bromism) is rare as vomiting promptly rejects the dose. Blood levels of 125 mg/100 ml are regarded as the minimum intoxicating level.

Systemic effects of the bromide ion include drowsiness, irritability, ataxia (loss of muscle co-ordination), vertigo, confusion, mania, hallucinations and coma. Other effects

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include skin rash, neurological symptoms, sensory disturbances and increased spinal fluid. Bromides depress the central nervous system and were once used as sedatives. They also exhibit anticonvulsant activity and were formerly employed against generalised tonic clonic seizures. Both therapeutic uses have been largely discontinued due to substitution by less toxic agents. Toxic levels of bromide can be reached very rapidly if dietary intake of chloride is reduced. Repeated ingestion of bromides may produce bromism a condition characterised by acneform eruptions, confusion, irritability, tremor, memory loss, anorexia, emaciation, headache, slurred speech, delusions, stupor, psychotic behaviour and coma.

Concentrated solutions of many cationics may cause corrosive damage to mucous membranes and the oesophagus. Nausea and vomiting (sometimes bloody) may follow ingestion. Serious exposures may produce an immediate burning sensation of the mouth, throat and abdomen with profuse salivation, ulceration of mucous membranes, signs of circulatory shock (hypotension, laboured breathing, and cyanosis) and a feeling of apprehension, restlessness, confusion and weakness. Weak convulsive movements may precede central nervous system depression. Erosion, ulceration, and petechial haemorrhage may occur through the small intestine with glottic, brain and pulmonary oedema. Death may result from asphyxiation due to paralysis of the muscles of respiration or cardiovascular collapse. Fatal poisoning may arise even when the only pathological signs are visceral congestion, swallowing, mild pulmonary oedema or varying signs of gastrointestinal irritation. Individuals who survive a period of severe hypertension may develop kidney failure. Cloudy swelling, patchy necrosis and fatty infiltration in such visceral organs as the heart, liver and kidneys shows at death.

EYE

The dust may produce eye discomfort causing transient smarting, blinking.

SKIN

Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.

Toxic effects may result from skin absorption.

INHALED

Inhalation may produce health damage*.

Not normally a hazard due to non-volatile nature of product.

Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Principal routes of exposure are usually by skin contact and inhalation of generated dust.

On the basis, primarily, of animal experiments, concern has been expressed that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

The substance produces frame-shift mutations in genetic material and must be considered as a potential mutagen in higher organisms.

Chronic intoxication with ionic bromides, historically, has resulted from medical use of bromides but not from environmental or occupational exposure; depression, hallucinosis, and schizophreniform psychosis can be seen in the absence of other signs of intoxication.

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Section 11 - TOXICOLOGICAL INFORMATION

Bromides may also induce sedation, irritability, agitation, delirium, memory loss, confusion, disorientation, forgetfulness (aphasias), dysarthria, weakness, fatigue, vertigo, stupor, coma, decreased appetite, nausea and vomiting, diarrhoea, hallucinations, an acne like rash on the face, legs and trunk (seen in 25-30% of case involving bromide ion), and a profuse discharge from the nostrils (coryza). Ataxia and generalised hyperreflexia have also been observed. Correlation of neurologic symptoms with blood levels of bromide is inexact. The use of substances such as brompheniramine, as antihistamines, largely reflect current day usage of bromides; ionic bromides have been largely withdrawn from therapeutic use due to their toxicity. Several cases of foetal abnormalities have been described in mothers who took large doses of bromides during pregnancy.

TOXICITY AND IRRITATION

TOXICITY

Subcutaneous (mouse) LD50: 110 mg/kg

Mammalian cell mutagen

NOTE: Substance has been shown to be mutagenic in at least one assay, or belongs to a family of chemicals producing damage or change to cellular DNA.

IRRITATION

Nil Reported

Section 12 - ECOLOGICAL INFORMATION

Marine Pollutant: Not Determined

Cationic substances, and their polymers and those polymers that are reasonably anticipated to become cationic in the natural aquatic environment (pH range 4-9) may be environmental hazards.

Exempt from this concern are those polymers to be used only in solid phase, such as ion-exchange resins, and where the FGEW (Functional Group Equivalent Weight) of cationic groups is not 5000 and above.

Cationic groups such as alkylsulfoniums, alkylphosphoniums and quaternary ammonium polymers are highly toxic to fish and other aquatic organisms. Similarly potentially cationic groups such as amines and isocyanates are of concern. Some cationics, however, may fall into the category of PLCs (polymers of low concern) provided they possess low charge density, and/or are not water-soluble or are not self-dispersing polycarboxylates or poly- (aromatic or aliphatic) sulfonate polymers.

Section 13 - DISPOSAL CONSIDERATIONS

For small quantities:

- Treat a dilute basic solution (pH 10-11) of the material with a 50% excess of commercial laundry bleach.
- Control temperature by rate of bleach addition.
- Adjust pH if necessary.
- Stand overnight, then cautiously adjust pH to 7.
- Evolution of gas may occur.
- Filter solids for disposal to land-fill (subject to local regulation).
- Precipitate any heavy metals by addition of sulfide.

Disposal may require prior inactivation. Reaction with chlorine bleach produces 2-carboxybenzophenone a substance which does not show excess mutagenicity over standards in the Ames test (Armour et al, University & Colleges Hazardous Waste Conference, 1992, Columbia, Missouri).

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Section 13 - DISPOSAL CONSIDERATIONS

To a solution of 34 mg ethidium bromide in 100 ml water, add 300 ml of household chlorine bleach and stir overnight at room temperature.

Avoid acid conditions.

In a reported incident, inactivation was carried out in a winchester containing acid residue, which reacted with the bleach to form chlorine gas. The winchester was then sealed causing a buildup of chlorine gas to an explosive pressure.

WASTE DISPOSAL PROCEDURES

- Collect and package recoverable quantities of ethidium bromide in labelled containers for incineration. Dissolve or mix the material with a flammable solvent and burn in a furnace fitted with a scrubber and afterburner. Wear protective clothing, protective gloves and goggles to control personal contact from small quantities of ethidium bromide. Work in a well ventilated area. Add 300mL of household chlorine bleach, to 34mg of ethidium chloride n 100mL of water. Stir the mixture at room temperature for 2 hours. Wash the solution into the drain with water [Armour 1996].

Section 14 - TRANSPORTATION INFORMATION



Labels Required: TOXIC
HAZCHEM: 2X

UNDG:

Dangerous Goods Class:	6.1	Subrisk:	None
UN Number:	2811	Packing Group:	I
Shipping Name: TOXIC SOLID, ORGANIC, N.O.S. (contains ethidium bromide)			

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	2811	Packing Group:	I
ERG Code:	6L		
Shipping name: TOXIC SOLID, ORGANIC, N.O.S. (contains ethidium bromide)			

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	2811	Packing Group:	I
EMS Number:	F- A, S- A	Marine Pollutant:	Not Determined
Shipping name: TOXIC SOLID, ORGANIC, N.O.S. (contains ethidium bromide)			

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Section 15 - REGULATORY INFORMATION

REGULATIONS

No regulations applicable

No data available for ethidium bromide as CAS: 1239-45-8.

Section 16 - OTHER INFORMATION

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

Issue Date: 12-May-2018