

# Fact Sheet

## Ethidium Bromide

Ethidium bromide (EtBr) is a dark red, crystalline, odorless, non-volatile solid that is moderately soluble in water. It is a powerful mutagen widely used in biochemical research laboratories for visualizing nucleic acids. The compound forms fluorescent complexes by intercalation and these compounds are readily visible under ultraviolet (UV) light.



### Health Hazards/Toxicity

Ethidium bromide is a powerful mutagen and is considered highly toxic. Exposure routes of ethidium bromide are inhalation, ingestion, and skin absorption.

Acute effects: primarily irritation of the mouth, upper respiratory tract, skin, and eyes. Ingestion can cause nausea, vomiting, and diarrhea. It may also cause methemoglobinemia, which is characterized by dizziness, drowsiness, headache, shortness of breath, cyanosis, rapid heart rate, unconsciousness, and possible death.

Chronic effects: ethidium bromide is strongly mutagenic and is regarded as a possible carcinogen and reproductive toxin.

### Exposure Limits

There is no exposure limit established for ethidium bromide. However, if airborne exposure is suspected, stop work and contact DEHS for assistance in conducting a work hazard assessment and hazard mitigation and monitoring protocol.

### Safe Storage and Handling

- Keep away from strong oxidizers. Keep container tightly closed in a cool, dry area.
- Whenever possible, replace EtBr with a less hazardous product
  - [SYBR Safe](#)
  - [Gel Red and Gel Green](#)
  - [Midori Green](#)
- Avoid using powdered EtBr. Use tablets or pre-made solutions. Always purchase the smallest amount needed.
- If EtBr powder must be used, it should always be handled in a chemical fume hood.
- Wear personal protective equipment (PPE) when handling any amount of EtBr. Equipment includes nitrile gloves, goggles, close-toed shoes, and a lab coat.

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## Accidental Exposure and Spill Response

- *Inhalation:* Remove person to fresh air and seek immediate medical attention.
- *Eyes:* Rinse eyes for 15 minutes in the eyewash. Seek medical attention.
- *Skin contact:* If the chemical contacts exposed skin, flush with water continuously for at least 15 minutes. If the chemical contacts the clothed portion of the body, remove the contaminated clothes as quickly as possible. Bag contaminated clothing for appropriate disposal. Seek medical attention.
- *Accidental Ingestion:* Do not induce vomiting. Immediately dial 911.

In the event of a large EtBr spill (more than 50 mL), call 911 and request AHERPS. Do not attempt to clean up the spill yourself.

If small amounts (50 mL or less) of EtBr are spilled, prevent any liquid from entering the sewer. Apply absorbent pads for larger amounts of liquid. Wearing appropriate PPE, carefully scoop wetted absorbent material into a container. The container should be disposed of as hazardous waste.

## Chemical Waste and Clean-Up Procedures

Aqueous solutions of less than 10mg/L EtBr may be disposed of in the sanitary sewer. Acrylamide and agarose gels containing less than 10mg/L EtBr can be disposed of in the trash. Gels that are put in the trash should be put in double-lined trash bags and labeled as non-hazardous.

For solutions and gels containing higher concentrations, and for all other guidelines on ethidium bromide disposal, follow the directions in the Hazardous Waste Guidebook.

## Additional Information

- For general information regarding the safe use of ethidium bromide, please contact your Research Safety Specialist, or call DEHS at (612) 626-6002.
- If you have any concerns regarding the stability or testing of a chemical, contact the Hazardous Waste Program at (612) 624-1604.

## References

- [Prudent Practices in the Laboratory](#)
- [University of Iowa](#)
- [University of Alberta](#)
- [Brigham-Young University](#)