

School Material Safety Data Sheet

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IODINE

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SECTION 1. INTRODUCTORY INFORMATION

MATERIAL NAME AND FORMULA: IODINE; I_2
SYNONYMS: Iodine Crystals; Iodine Sublimed

CAS NUMBER: 7553-56-2
INGREDIENTS: Iodine, ~100%

MANUFACTURERS: Always request material safety data sheets from your chemical supplier. These should indicate the manufacturer of the substance and include an emergency phone number to call. The manufacturers section of this book contains a listing of some of the larger manufacturers and available emergency numbers.

DESCRIPTION: Bluish black or violet elemental solid with a metallic luster. Vaporizes to a blue-violet gas with a characteristic pungent, irritating, halogenlike odor. (Odor is considered inadequate for hazardous exposure warning.)

PRELIMINARY INFORMATION: Iodine is a strong oxidizing agent whose vapors can be severely irritating to skin, eyes, and mucous membranes. A commonly found reagent in the chemistry lab. Iodine reacts with starch to give a blue-black-colored solid -- a characteristic effect that is used to identify either free iodine or starch.



SECTION 2. USE AND STORAGE INFORMATION

-- PRELIMINARY PLANNING CONSIDERATIONS --

- Safety glasses or goggles and protective clothing (rubberized apron, etc.) should be worn for all experiments.
- Be sure eyewash station and safety shower are in good working order and readily available.
- Provide adequate ventilation or restrict use to fume hood.
- No smoking in storage or use area.
- Heating produces iodine vapors and fumes.
- Iodine is a strong oxidizing agent, but the least reactive of the halogens; $F_2 > Cl_2 > Br_2 > I_2$.
- Direct exposure to iodine vapors above 10 ppm is immediately dangerous.
- Prevent eye or skin contact with solid or solutions (especially above 7%). DO NOT BREATHE VAPORS!
- Individuals with disease of the thyroid, lungs, or kidneys may be at increased risk from iodine exposure.

-- USAGE PRECAUTIONS AND PROCEDURES --

- READ THE LABEL and follow all precautions.
- Maintain good housekeeping practices to avoid unintentional mixing with incompatible materials.
- Always provide for safe disposal of all chemical waste generated in the lab. Check applicable regulations prior to use.
- After working with this material, always wash hands and face before eating, drinking, or smoking.
- 10% Sodium thiosulfate solution may be used to remove stains from clothing.

-- ADDITIONAL INFORMATION --

- Contact lens wearers: Soft lenses may absorb and all lenses may concentrate irritants. For safety, contact lenses should not be worn in the laboratory. Particles can adhere to contact lenses and cause corneal damage.
- Iodine does not polymerize.
- Iodine is incompatible with ammonia, with powdered metals and alkali metals, sulfur, phosphorus, and with strong reducing agents.
- Reaction can be violent or explosive with acetaldehyde and acetylene.
- Ammonium hydroxide forms iodides which are shock sensitive and explosive when dry.
- Certain individuals may develop sensitization to iodine.
- This is a stable material in suitable closed containers at room temperature under normal storage and handling conditions.

-- PREFERRED STORAGE LOCATION AND METHODS --

- Storage area should be cool and well ventilated. Containers should be tightly closed.
- Do not store chemicals alphabetically by name; store by chemical family instead to keep compatibles together.
- All chemical containers should be protected from physical damage and kept out of direct sunlight.
- Purchase only amounts equivalent to one year's needs.
- Store with compatible materials on sturdy shelving. Store separately from reactive or combustible materials and out of direct sunlight.
- No smoking in storage or use area. Store separately from reactive or combustible materials and out of direct sunlight.
- May oxidize metal containers or shelving in close proximity.

SECTION 3. SPILLS & DISPOSAL PROCEDURES

IF MATERIAL IS SPILLED:

- Provide optimum ventilation. Cleanup personnel should have protection from vapor inhalation or skin contact.
- Carefully pick up as much of the solid as possible. Cover spill area with excess reducing agent (hypo, bisulfate, or ferrous salt and 3M H_2SO_4), neutralize with soda ash. Collect slurry and flush with copious amounts of water to drain (regulations permitting).

DISPOSAL OF SMALL QUANTITIES:

- Treat with reducing agent (as above) or dispose of by way of licensed handler.

DISPOSAL OF LARGER AMOUNTS OF UNWANTED CHEMICALS: Contact a licensed disposal company.

*** FOLLOW ALL APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS FOR ALL WASTE DISPOSAL ***

SECTION 4: HEALTH HAZARDS

Iodine is not listed as a carcinogen by OSHA, IARC, or NTP.

- Current (1985-86) OSHA PEL and ACGIH TLV: 8-hr. TWA: 0.1 ppm.; (1 mg/m³) ceiling level.
- Dog, Oral, LDLo: 800 mg/kg
- Iodine vapors can severely irritate the respiratory tract, mucous membranes, eyes, and skin. Excessive tears, tightness in the chest, sore throat, headache, and delayed pulmonary edema can result.
- Iodine as solid, vapor, or solution can stain, irritate, damage, and penetrate the skin. Allergic sensitization can occur.
- Ingestion causes burning sensations, severe corrosive gastroenteritis, abdominal pain, diarrhea, fever, vomiting, stupor and shock. (Fatal dose in 2-4 g.) Chronic poisoning effects can occur. Delayed onset of pulmonary edema may occur 24-36 hours after an acute exposure.
- TLV's were established at levels to prevent systemic effects but not to prevent eye irritation.

SECTION 5: FIRST AID PROCEDURES

Eye contact:

- Flush eyes promptly with plenty of running water for at least 15 minutes, including under the eyelids.
- Get prompt medical attention.

Skin contact:

- Wash exposed areas of skin with soap and water and/or 5% thiosulfate solution.
- Remove contaminated clothing promptly.
- Get medical help when area of skin exposure is large or if irritation persists.

Inhalation:

- Remove patient to fresh air; restore and/or support breathing as necessary.
- Get medical help for coughing or breathing difficulty. Observe for development of pulmonary edema.

Ingestion:

- Get prompt medical attention.
- Give three glasses of milk, water, or 1% sodium thiosulfate to drink. Do not induce vomiting unless instructed by a physician to do so.
- If physician is not immediately available, induce vomiting -- but ONLY if victim is conscious and alert.
- Never give anything by mouth to a person who is unconscious or convulsing.

* Get medical help (in plant, paramedic, community) for treatment, observation, and support after first aid.

SECTION 6: FIRE PROCEDURES AND DATA

- Iodine is noncombustible. Extinguishing media: Use media appropriate to surrounding fire conditions.
- Iodine is an oxidizing agent that will support combustion and can react with explosive violence when heated in combination with some materials (see sect. 2).
- For major fires, or if large quantities of this material are involved, fire fighters should wear appropriate protective clothing and use respiratory protection. Self-contained breathing apparatus is recommended.
- A water spray may be used to cool fire-exposed containers and disperse vapors.

FLASH POINT AND METHOD(S) (CC) ... Noncombustible

AUTOIGNITION TEMPERATURE ... Noncombustible

FLAMMABILITY LIMITS IN AIR (vol. %):

Lower ... Noncombustible

Upper ... Noncombustible

SECTION 7: PHYSICAL DATA

BOILING POINT (@ 1 atm.) ... 184°C (363°F) (Sublimes @ 100°C - Blue-violet vapors)

VAPOR PRESSURE 20°C, mm Hg ... 0.3

VAPOR DENSITY (air = 1) ... 9

SOLUBILITY IN WATER (@ 20°C) ... 0.03

SPECIFIC GRAVITY (H₂O = 1) ... 4.93

MELTING POINT ... 113.6°C (237°F)

MOLECULAR WEIGHT (I₂) ... 253.8

DATA SOURCES: Genium's Industrial MSDS #114 (12/82) and references 1, 2, 4-12, 14, 16, 25, 31, 34, 37, 38, 47-49, 501, 502, 503, 505, 509, 510, 512.
(see glossary for tides)

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Medical Review