

These documents are intended to raise your awareness of the health and safety hazards associated with the use, storage and disposal of Benzidine, to provide you with information on how to protect yourself from these hazards and to provide you with the information regarding the regulations governing Benzidine.

BENZIDINE AWARENESS TRAINING

Substance: Benzidine

CAS Registry Number : 92-87-5

Synonyms: 4,4'-DIAMINO-1,1'-BIPHENYL, P,P'-DIANILINE, 4,4'-DIPHENYL-ENEDIAMINE, P,P'-BIANILINE, 4,4'-BIANILINE, 4,4'-BIPHENYLDIAMINE, 4,4'-BIPHENYLENEDIAMINE, P,P'-DIAMINOBIIPHENYL (1,1'-BIPHENYL)-4,4'-DIAMINE, P-DIAMINODIPHENYL, 4,4'-DIAMINOBIIPHENYL, 4,4'-DIAMINODIPHENYL

Physical and Chemical Characteristics: Benzidine is a grayish-yellow, white or reddish-gray crystalline powder. Its melting point is 120 degrees Celsius and its boiling point is 401 degrees Celsius. It is slightly soluble in water with a solubility of 276 mg/L at 20 degrees Celsius. There is no indication of a fire hazard as it does not burn or burns with difficulty. However, it will ignite on contact with red fuming nitric acid. Thermal decomposition may produce carbon monoxide, carbon dioxide, and nitrogen oxides.

Health Effects: An individual working with Benzidine is most likely to be exposed by inhalation to it as dust or vapors. There is less likelihood to be exposed through the skin or ingestion. However, it can still be fatal if inhaled, swallowed or absorbed through the skin. Exposure can cause liver and kidney damage, blood effects, and dermatitis. Acute symptoms include: nausea, vomiting, painful and irregular urination.

Benzidine is an OSHA-regulated carcinogen covered under CFR Title 29 Part 1910.1010. Inhalation or absorption through the skin of the dust has been recognized as a cause of bladder tumors. Target organs include the liver, kidney, urethra, bladder, blood, and skin.

Regulatory Limits: While OSHA strictly regulates Benzidine under 29CFR1910 it does not set limits on exposure to Benzidine.

Personal Protective Equipment: Employees shall be provided with, and are required to wear, clean, full body protective clothing (laboratory coat, coveralls, or long-sleeved shirt and pants), shoe covers and gloves, prior to entering the regulated area.

Employees engaged in handling operations involving Benzidine must be provided with, and are required to wear and use a half-face filter-type respirator with filters for dusts, mists, and fumes, or air-purifying canisters or cartridges. A respirator affording higher levels of protection than this respirator may be substituted.

Medical Surveillance: At no cost to the employee, a program of medical surveillance shall be established and implemented for employees considered for assignment to enter regulated areas, and for authorized employees.

Examinations: Before an employee is assigned to enter a regulated area, a pre-assignment physical examination by a physician shall be provided. The examination shall include the personal history of the employee, family and occupational background, including genetic and environmental factors.

Authorized employees shall be provided periodic physical examinations, not less often than annually, following the pre-assignment examination.

In all physical examinations, the examining physician shall consider whether there exist conditions of increased risk, including reduced immunological competence, those undergoing treatment with steroids or cytotoxic agents, pregnancy, and cigarette smoking.

Records: Employers of employees examined pursuant to this paragraph shall cause to be maintained, complete and accurate records of all such medical examinations. Records shall be maintained for the duration of the employee's employment. Upon termination of the employee's employment, including retirement or death, or in the event that the employer ceases business without a successor, records, or notarized true copies thereof, shall be forwarded by registered mail to the Director.

Records required by this paragraph shall be provided upon request to employees, designated representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020 (a) through (e) and (g) through (i). These records shall also be provided upon request to the Director. Any physician who conducts a medical examination required by this paragraph shall furnish to the employer, a statement of the employee's suitability for employment in the specific exposure.

Regulated Areas: A regulated area shall be established by an employer where Benzidine is used, handled or stored. Access shall be restricted to authorized employees only. No eating, drinking or smoking is allowed in the regulated areas. Drinking fountains are prohibited in the regulated area.

Each operation shall be provided with continuous local exhaust ventilation (a fume hood) so that air movement is always from ordinary work areas to the operation. Exhaust air shall not be discharged to regulated areas, non-regulated areas or the external environment unless decontaminated. Clean makeup air shall be introduced in sufficient volume to maintain the correct operation of the local exhaust system.

Employees working with Benzidine within an isolated system such as a "glove box" shall wash their hands and arms upon completion of the assigned task and before engaging in other activities not associated with the isolated system.

Employees exposed to Benzidine shall be required to wash hands, forearms, face, and neck upon each exit from the regulated areas, close to the point of exit, and before engaging in other activities.

Prior to each exit from a regulated area, employees shall be required to remove and leave protective clothing and equipment at the point of exit and at the last exit of the day, to place used clothing and equipment in impervious containers at the point of exit for purposes of decontamination or disposal. The contents of such impervious containers shall be identified.

Employees shall be required to wash hands, forearms, face, and neck on each exit from the regulated area, close to the point of exit, and before engaging in other activities.

Hygiene Facilities and Practices:

Storage or consumption of food, storage or use of containers of beverages, storage or application of cosmetics, smoking, storage of smoking materials, tobacco products or other products for chewing, or the chewing of such products are prohibited in regulated areas.

Washing facilities shall be provided for employees using or handling Benzidine.

Shower facilities shall be provide for employees potentially exposed to Benzidine

Clean change rooms shall be provided for employees using or handling Benzidine.

Contamination Control:

Regulated areas shall be maintained under negative pressure with respect to non-regulated areas. Local exhaust ventilation (a fume hood) may be used to satisfy this requirement.

Clean makeup air, in equal volume, shall replace air removed.

Any equipment, material, or other item taken into, or removed from, a regulated area, shall be done so in a manner that does not cause contamination in non-regulated areas or the external environment.

Decontamination procedures shall be established and implemented to remove Benzidine from the surfaces of materials, equipment, and the decontamination facility.

Dry sweeping and dry mopping are prohibited for Benzidine.

Communication to Employees:

Signs: Entrances to regulated areas shall be posted with signs bearing the legend:

CANCER-SUSPECT AGENT
AUTHORIZED PERSONNEL ONLY

Appropriate signs and instructions shall be posted at the entrance to, and exit from, regulated areas, informing employees of the procedures that must be followed in entering and leaving a regulated area.

Labels: Container contents identification: containers of Benzidine that are accessible only to, and handled only by, authorized employees, or by other employees trained in accordance with this paragraph may have contents identification limited to a generic or proprietary name or other proprietary identification of the carcinogen and percent.

Containers of Benzidine that are accessible to, or handled by, employees other than authorized employees or employees trained to handle Benzidine shall have contents identification that includes the full chemical name and Chemical Abstracts Service Registry number.

Containers shall have the warning words "CANCER-SUSPECT AGENT" displayed immediately under, or adjacent to, the contents identification.

Lettering: Lettering on signs and instructions shall be a minimum letter height of 2 inches (5 cm). Labels on containers required under this section shall not be less than one-half the size of the largest lettering on the package, and not less than 8-point type in any instance provided that no such required lettering need be more than 1 inch (2.5 cm) in height.

Training and indoctrination: Each employee, prior to being authorized to enter a regulated area, shall receive a training and indoctrination program including, but not necessarily limited to:

- Specific laboratory procedures for working with Benzidine in the laboratory. These procedures should be written in the workers laboratory notebook.
- The nature of the carcinogenic hazards of Benzidine, including local and systemic toxicity;
- The specific nature of the operation involving a carcinogen addressed by this section that could result in exposure;
- The purpose for and application of the medical surveillance program, including, as appropriate, methods of self-examination;
- The purpose for and application of decontamination practices and purposes;
- The purpose for and significance of emergency practices and procedures;
- The employee's specific role in emergency procedures;

- Specific information to aid the employee in recognition and evaluation of conditions and situations which may result in the release of a carcinogen addressed by this section;
- The purpose for and application of specific first aid procedures and practices;
- A review of this section at the employee's first training and indoctrination program and annually thereafter.

Applicability: This procedure applies to all occupational exposure to Benzidine.

Emergency Procedures: In a medical emergency call 911, then 4111

In an emergency, immediate measures should include, but not be limited to, the following requirements:

- For personal contamination, wash the affected area for a minimum of 15 minutes with luke-warm water and a mild soap.
- The potentially affected area shall be evacuated as soon as the emergency has been determined.
- Hazardous conditions created by the emergency shall be eliminated and the potentially affected area shall be decontaminated prior to the resumption of normal operations.
- Special medical surveillance by a physician shall be instituted within 24 hours for employees present in the potentially affected area at the time of the emergency. A report of the medical surveillance and any treatment shall be included in the incident report.
- Where an employee has a known contact with Benzidine, such employee shall be required to shower as soon as possible, unless contraindicated by physical injuries.
- An incident report on the emergency shall be reported to Employee Health Services and the Department of Environmental Health and Safety.