



**U.S. Department of Labor**  
Occupational Safety & Health Administration

[www.osha.gov](http://www.osha.gov)



Search  Advanced Search | A

**Regulations (Standards - 29 CFR)**

**Benzene. - 1910.1028**

[← Regulations \(Standards - 29 CFR\) - Table of Contents](#)

• <b>Part Number:</b>	1910
• <b>Part Title:</b>	Occupational Safety and Health Standards
• <b>Subpart:</b>	Z
• <b>Subpart Title:</b>	Toxic and Hazardous Substances
• <b>Standard Number:</b>	<u>1910.1028</u>
• <b>Title:</b>	Benzene.
• <b>Appendix:</b>	<u>A</u> , <u>B</u> , <u>C</u> , <u>D</u> , <u>E</u>

1910.1028(a)

Scope and application.

1910.1028(a)(1)

This section applies to all occupational exposures to benzene. Chemical Abstracts Service Registry No. 71-43-2, except as provided in paragraphs (a)(2) and (a)(3) of this section.

1910.1028(a)(2)

This section does not apply to:

[1910.1028\(a\)\(2\)\(i\)](#)

The storage, transportation, distribution, dispensing, sale or use of gasoline, motor fuels, or other fuels containing benzene subsequent to its final discharge from bulk wholesale storage facilities, except that operations where gasoline or motor fuels are dispensed for more than 4 hours per day in an indoor location are covered by this section.

1910.1028(a)(2)(ii)

Loading and unloading operations at bulk wholesale storage facilities which use vapor control systems for all loading and unloading operations, except for the provisions of 29 CFR 1910.1200 as incorporated into this section and the emergency provisions of paragraphs (g) and (i)(4) of this section.

1910.1028(a)(2)(iii)

The storage, transportation, distribution or sale of benzene or liquid mixtures containing more than 0.1 percent benzene in intact containers or in transportation pipelines while sealed in such a manner as to contain benzene

vapors or liquid, except for the provisions of 29 CFR 1910.1200 as incorporated into this section and the emergency provisions of paragraphs (g) and (i)(4) of this section.

1910.1028(a)(2)(iv)

Containers and pipelines carrying mixtures with less than 0.1 percent benzene and natural gas processing plants processing gas with less than 0.1 percent benzene.

1910.1028(a)(2)(v)

Work operations where the only exposure to benzene is from liquid mixtures containing 0.5 percent or less of benzene by volume, or the vapors released from such liquids until September 12, 1988; work operations where the only exposure to benzene is from liquid mixtures containing 0.3 percent or less of benzene by volume or the vapors released from such liquids from September 12, 1988, to September 12, 1989; and work operations where the only exposure to benzene is from liquid mixtures containing 0.1 percent or less of benzene by volume or the vapors released from such liquids after September 12, 1989; except that tire building machine operators using solvents with more than 0.1 percent benzene are covered by paragraph (i) of this section.

1910.1028(a)(2)(vi)

Oil and gas drilling, production and servicing operations.

1910.1028(a)(2)(vii)

Coke oven batteries.

1910.1028(a)(3)

The cleaning and repair of barges and tankers which have contained benzene are excluded from paragraph (f) methods of compliance, paragraph (e)(1) exposure monitoring-general, and paragraph (e)(6) accuracy of monitoring. Engineering and work practice controls shall be used to keep exposures below 10 ppm unless it is proven to be not feasible.

1910.1028(b)

Definitions.

"Action level" means an airborne concentration of benzene of 0.5 ppm calculated as an 8-hour time-weighted average.

"Assistant Secretary" means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

"Authorized person" means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under paragraph (l) of this section, or any other person authorized by the Act or regulations issued under the Act.

"Benzene" (C<sub>6</sub>H<sub>6</sub>) (CAS Registry No. 71-43-2) means liquefied or gaseous benzene. It includes benzene contained in liquid mixtures and the benzene vapors released by these liquids. It does not include trace amounts of unreacted benzene contained in solid materials.

"Bulk wholesale storage facility" means a bulk terminal or bulk plant where fuel is stored prior to its delivery to wholesale customers.

"Container" means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, or the like, but does not include piping systems.

"Day" means any part of a calendar day.

"Director" means the Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

"Emergency" means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which may or does result in an unexpected significant release of benzene.

"Employee exposure" means exposure to airborne benzene which would occur if the employee were not using respiratory protective equipment.

"Regulated area" means any area where airborne concentrations of benzene exceed or can reasonably be expected to exceed, the permissible exposure limits, either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

"Vapor control system" means any equipment used for containing the total vapors displaced during the loading of gasoline, motor fuel or other fuel tank trucks and the displacing of these vapors through a vapor processing system or balancing the vapor with the storage tank. This equipment also includes systems containing the vapors displaced from the storage tank during the unloading of the tank truck which balance the vapors back to the tank truck.

#### 1910.1028(c)

Permissible exposure limits (PELs) -

#### 1910.1028(c)(1)

Time-weighted average limit (TWA). The employer shall assure that no employee is exposed to an airborne concentration of benzene in excess of one part of benzene per million parts of air (1 ppm) as an 8-hour time-weighted average.

#### 1910.1028(c)(2)

Short-term exposure limit (STEL). The employer shall assure that no employee is exposed to an airborne concentration of benzene in excess of five (5) ppm as averaged over any 15 minute period.

#### 1910.1028(d)

Regulated areas.

## 1910.1028(d)(1)

The employer shall establish a regulated area wherever the airborne concentration of benzene exceeds or can reasonably be expected to exceed the permissible exposure limits, either the 8-hour time weighted average exposure of 1 ppm or the short-term exposure limit of 5 ppm for 15 minutes.

## 1910.1028(d)(2)

Access to regulated areas shall be limited to authorized persons.

## 1910.1028(d)(3)

Regulated areas shall be determined from the rest of the workplace in any manner that minimizes the number of employees exposed to benzene within the regulated area.

## 1910.1028(e)

Exposure monitoring -

## 1910.1028(e)(1)

General.

## 1910.1028(e)(1)(i)

Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's average exposure to airborne benzene.

## 1910.1028(e)(1)(ii)

Representative 8-hour TWA employee exposures shall be determined on the basis of one sample or samples representing the full shift exposure for each job classification in each work area.

## 1910.1028(e)(1)(iii)

Determinations of compliance with the STEL shall be made from 15 minute employee breathing zone samples measured at operations where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded or gauged; where containers or process equipment are opened and where benzene is used for cleaning or as a solvent in an uncontrolled situation. The employer may use objective data, such as measurements from brief period measuring devices, to determine where STEL monitoring is needed.

## 1910.1028(e)(1)(iv)

Except for initial monitoring as required under paragraph (e)(2) of this section, where the employer can document that one shift will consistently have higher employee exposures for an operation, the employer shall only be required to determine representative employee exposure for that operation during the shift on which the highest exposure is expected.

## 1910.1028(e)(2)

Initial monitoring.

## 1910.1028(e)(2)(i)

Each employer who has a place of employment covered under paragraph (a)(1) of this section shall monitor each of these workplaces and work operations to determine accurately the airborne concentrations of benzene to which employees may be exposed.

## 1910.1028(e)(2)(ii)

The initial monitoring required under paragraph (e)(2)(i) of this section shall be completed by 60 days after the effective date of this standard or within 30 days of the introduction of benzene into the workplace. Where the employer has monitored within one year prior to the effective date of this standard and the monitoring satisfies all other requirements of this section, the employer may rely on such earlier monitoring results to satisfy the requirements of paragraph (e)(2)(i) of this section.

## 1910.1028(e)(3)

Periodic monitoring and monitoring frequency.

## 1910.1028(e)(3)(i)

If the monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure at or above the action level but at or below the TWA, the employer shall repeat such monitoring for each such employee at least every year.

## 1910.1028(e)(3)(ii)

If the monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure above the TWA, the employer shall repeat such monitoring for each such employee at least every six (6) months.

## 1910.1028(e)(3)(iii)

The employer may alter the monitoring schedule from every six months to annually for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to the TWA or below, but is at or above the action level.

## 1910.1028(e)(3)(iv)

Monitoring for the STEL shall be repeated as necessary to evaluate exposures of employees subject to short term exposures.

## 1910.1028(e)(4)

Termination of monitoring.

## 1910.1028(e)(4)(i)

If the initial monitoring required by paragraph (e)(2)(i) of this section reveals employee exposure to be below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5) of this section.

## 1910.1028(e)(4)(ii)

If the periodic monitoring required by paragraph (e)(3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by paragraph (e)(5).

## 1910.1028(e)(5)

Additional monitoring.

## 1910.1028(e)(5)(i)

The employer shall institute the exposure monitoring required under paragraphs (e)(2) and (e)(3) of this section when there has been a change in the production, process, control equipment, personnel or work practices which may result in new or additional exposures to benzene, or when the employer has any reason to suspect a change which may result in new or additional exposures.

## 1910.1028(e)(5)(ii)

Whenever spills, leaks, ruptures or other breakdowns occur that may lead to employee exposure, the employer shall monitor (using area or personal sampling) after the cleanup of the spill or repair of the leak, rupture or other breakdown to ensure that exposures have returned to the level that existed prior to the incident.

## 1910.1028(e)(6)

Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of benzene.

## 1910.1028(e)(7)

Employee notification of monitoring results.

## 1910.1028(e)(7)(i)

The employer must, within 15 working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to employees.

## 1910.1028(e)(7)(ii)

Whenever the PELs are exceeded, the written notification required by paragraph (e)(7)(i) of this section shall contain the corrective action being taken by the employer to reduce the employee exposure to or below the PEL, or shall refer to a document available to the employee which states the corrective actions to be taken.

1910.1028(f)

Methods of compliance -

1910.1028(f)(1)

Engineering controls and work practices.

1910.1028(f)(1)(i)

The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to benzene at or below the permissible exposure limits, except to the extent that the employer can establish that these controls are not feasible or where the provisions of paragraph (f)(1)(iii) or (g)(1) of this section apply.

1910.1028(f)(1)(ii)

Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of paragraph (g) of this section.

1910.1028(f)(1)(iii)

Where the employer can document that benzene is used in a workplace less than a total of 30 days per year, the employer shall use engineering controls, work practice controls or respiratory protection or any combination of these controls to reduce employee exposure to benzene to or below the PELs, except that employers shall use engineering and work practice controls, if feasible, to reduce exposure to or below 10 ppm as an 8-hour TWA.

1910.1028(f)(2)

Compliance program.

1910.1028(f)(2)(i)

When any exposures are over the PEL, the employer shall establish and implement a written program to reduce employee exposure to or below the PEL primarily by means of engineering and work practice controls, as required by paragraph (f)(1) of this section.

1910.1028(f)(2)(ii)

The written program shall include a schedule for development and implementation of the engineering and work practice controls. These plans shall

be reviewed and revised as appropriate based on the most recent exposure monitoring data, to reflect the current status of the program.

1910.1028(f)(2)(iii)

Written compliance programs shall be furnished upon request for examination and copying to the Assistant Secretary, the Director, affected employees and designated employee representatives.

1910.1028(g)

***Respiratory protection.***

1910.1028(g)(1)

***General.*** For employees who use respirators required by this section, the employer must provide respirators that comply with the requirements of this paragraph. Respirators must be used during:

1910.1028(g)(1)(i)

(i) Periods necessary to install or implement feasible engineering and work-practice controls.

1910.1028(g)(1)(ii)

Work operations for which the employer establishes that compliance with either the TWA or STEL through the use of engineering and work-practice controls is not feasible; for example, some maintenance and repair activities, vessel cleaning, or other operations for which engineering and work-practice controls are infeasible because exposures are intermittent and limited in duration.

1910.1028(g)(1)(iii)

Work operations for which feasible engineering and work-practice controls are not yet sufficient, or are not required under paragraph (f)(1)(iii) of this section, to reduce employee exposure to or below the PELs.

1910.1028(g)(1)(iv)

Emergencies.

1910.1028(g)(2)

***Respirator program.***

1910.1028(g)(2)(i)

Employers must implement a respiratory protection program in accordance with 29 CFR 1910.134 (b) through (d) (except (d)(1)(iii)), and (f) through (m).

1910.1028(g)(2)(ii)

For air-purifying respirators, the employer must replace the air-purifying



element at the expiration of its service life or at the beginning of each shift in which such elements are used, whichever comes first.

1910.1028(g)(2)(iii)

If NIOSH approves an air-purifying element with an end-of- service-life indicator for benzene, such an element may be used until the indicator shows no further useful life.

1910.1028(g)(3)

***Respirator selection.***

1910.1028(g)(3)(i)

Employers must:

1910.1028(g)(3)(i)(A)

Select, and provide to employees, the appropriate respirators specified in paragraph (d)(3)(i)(A) of 29 CFR 1910.134.

1910.1028(g)(3)(i)(B)

Provide employees with any organic vapor gas mask or any self-contained breathing apparatus with a full facepiece to use for escape.

1910.1028(g)(3)(i)(C)

Use an organic vapor cartridge or canister with powered and non-powered air-purifying respirators, and a chin-style canister with full facepiece gas masks.

1910.1028(g)(3)(i)(D)

Ensure that canisters used with non-powered air-purifying respirators have a minimum service life of four hours when tested at 150 ppm benzene at a flow rate of 64 liters per minute (LPM), a temperature of 25 [deg]C, and a relative humidity of 85%; for canisters used with tight-fitting or loose-fitting powered air-purifying respirators, the flow rates for testing must be 115 LPM and 170 LPM, respectively.

1910.1028(g)(3)(ii)

Any employee who cannot use a negative-pressure respirator must be allowed to use a respirator with less breathing resistance, such as a powered air-purifying respirator or supplied-air respirator.

1910.1028(h)

Protective clothing and equipment. Personal protective clothing and equipment shall be worn where appropriate to prevent eye contact and limit dermal exposure to liquid benzene. Protective clothing and equipment shall be provided by the employer at no cost to the employee and the employer shall assure its use where appropriate. Eye and face protection shall meet the requirements of

29 CFR 1910.133.

1910.1028(i)

Medical surveillance -

1910.1028(i)(1)

General.

1910.1028(i)(1)(i)

The employer shall make available a medical surveillance program for employees who are or may be exposed to benzene at or above the action level 30 or more days per year; for employees who are or may be exposed to benzene at or above the PELs 10 or more days per year; for employees who have been exposed to more than 10 ppm of benzene for 30 or more days in a year prior to the effective date of the standard when employed by their current employer; and for employees involved in the tire building operations called tire building machine operators, who use solvents containing greater than 0.1 percent benzene.

1910.1028(i)(1)(ii)

The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and that all laboratory tests are conducted by an accredited laboratory.

1910.1028(i)(1)(iii)

The employer shall assure that persons other than licensed physicians who administer the pulmonary function testing required by this section shall complete a training course in spirometry sponsored by an appropriate governmental, academic or professional institution.

1910.1028(i)(1)(iv)

The employer shall assure that all examinations and procedures are provided without cost to the employee and at a reasonable time and place.

1910.1028(i)(2)

Initial examination.

1910.1028(i)(2)(i)

Within 60 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by paragraph (i)(1)(i) of this section with a medical examination including the following elements:

1910.1028(i)(2)(i)(A)

A detailed occupational history which includes:

## 1910.1028(i)(2)(i)(A)(1)

Past work exposure to benzene or any other hematological toxins,

## 1910.1028(i)(2)(i)(A)(2)

A family history of blood dyscrasias including hematological neoplasms;

## 1910.1028(i)(2)(i)(A)(3)

A history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, abnormal function of formed blood elements;

## 1910.1028(i)(2)(i)(A)(4)

A history of renal or liver dysfunction;

## 1910.1028(i)(2)(i)(A)(5)

A history of medicinal drugs routinely taken;

## 1910.1028(i)(2)(i)(A)(6)

A history of previous exposure to ionizing radiation and

## 1910.1028(i)(2)(i)(A)(7)

Exposure to marrow toxins outside of the current work situation.

## 1910.1028(i)(2)(i)(B)

A complete physical examination.

## 1910.1028(i)(2)(i)(C)

Laboratory tests. A complete blood count including a leukocyte count with differential, a quantitative thrombocyte count, hematocrit, hemoglobin, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC). The results of these tests shall be reviewed by the examining physician.

## 1910.1028(i)(2)(i)(D)

Additional tests as necessary in the opinion of the examining physician, based on alterations to the components of the blood or other signs which may be related to benzene exposure; and

## 1910.1028(i)(2)(i)(E)

For all workers required to wear respirators for at least 30 days a year, the physical examination shall pay special attention to the cardiopulmonary system and shall include a pulmonary function test.

## 1910.1028(i)(2)(ii)

No initial medical examination is required to satisfy the requirements of paragraph (i)(2)(i) of this section if adequate records show that the employee has been examined in accordance with the procedures of paragraph (i)(2)(i) of this section within the twelve months prior to the effective date of this standard.

1910.1028(i)(3)

Periodic examinations.

1910.1028(i)(3)(i)

The employer shall provide each employee covered under paragraph (i)(1)(i) of this section with a medical examination annually following the previous examination. These periodic examinations shall include at least the following elements:

1910.1028(i)(3)(i)(A)

A brief history regarding any new exposure to potential marrow toxins, changes in medicinal drug use, and the appearance of physical signs relating to blood disorders:

1910.1028(i)(3)(i)(B)

A complete blood count including a leukocyte count with differential, quantitative thrombocyte count, hemoglobin, hematocrit, erythrocyte count and erythrocyte indices (MCV, MCH, MCHC); and

1910.1028(i)(3)(i)(C)

Appropriate additional tests as necessary, in the opinion of the examining physician, in consequence of alterations in the components of the blood or other signs which may be related to benzene exposure.

1910.1028(i)(3)(ii)

Where the employee develops signs and symptoms commonly associated with toxic exposure to benzene, the employer shall provide the employee with an additional medical examination which shall include those elements considered appropriate by the examining physician.

1910.1028(i)(3)(iii)

For persons required to use respirators for at least 30 days a year, a pulmonary function test shall be performed every three (3) years. A specific evaluation of the cardiopulmonary system shall be made at the time of the pulmonary function test.

1910.1028(i)(4)

Emergency examinations.

1910.1028(i)(4)(i)

In addition to the surveillance required by (i)(1)(i), if an employee is exposed to benzene in an emergency situation, the employer shall have the employee provide a urine sample at the end of the employee's shift and have a urinary phenol test performed on the sample within 72 hours. The urine specific gravity shall be corrected to 1.024.

1910.1028(i)(4)(ii)

If the result of the urinary phenol test is below 75 mg phenol/L of urine, no further testing is required.

1910.1028(i)(4)(iii)

If the result of the urinary phenol test is equal to or greater than 75 mg phenol/L of urine, the employer shall provide the employee with a complete blood count including an erythrocyte count, leukocyte count with differential and thrombocyte count at monthly intervals for a duration of three (3) months following the emergency exposure.

1910.1028(i)(4)(iv)

If any of the conditions specified in paragraph (i)(5)(i) of this section exists, then the further requirements of paragraph (i)(5) of this section shall be met and the employer shall, in addition, provide the employees with periodic examinations if directed by the physician.

1910.1028(i)(5)

Additional examinations and referrals.

1910.1028(i)(5)(i)

Where the results of the complete blood count required for the initial and periodic examinations indicate any of the following abnormal conditions exist, then the blood count shall be repeated within 2 weeks.

1910.1028(i)(5)(i)(A)

The hemoglobin level or the hematocrit falls below the normal limit [outside the 95% confidence interval (C.I.)] as determined by the laboratory for the particular geographic area and/or these indices show a persistent downward trend from the individual's pre-exposure norms; provided these findings cannot be explained by other medical reasons.

1910.1028(i)(5)(i)(B)

The thrombocyte (platelet) count varies more than 20 percent below the employee's most recent values or falls outside the normal limit (95% C.I.) as determined by the laboratory.

1910.1028(i)(5)(i)(C)

The leukocyte count is below 4,000 per mm<sup>3</sup> or there is an abnormal differential count.

## 1910.1028(i)(5)(ii)

If the abnormality persists, the examining physician shall refer the employee to a hematologist or an internist for further evaluation unless the physician has good reason to believe such referral is unnecessary. (See Appendix C for examples of conditions where a referral may be unnecessary.)

## 1910.1028(i)(5)(iii)

The employer shall provide the hematologist or internist with the information required to be provided to the physician under paragraph (i)(6) of this section and the medical record required to be maintained by paragraph (k)(2)(ii) of this section.

## 1910.1028(i)(5)(iv)

The hematologist's or internist's evaluation shall include a determination as to the need for additional tests, and the employer shall assure that these tests are provided.

## 1910.1028(i)(6)

Information provided to the physician. The employer shall provide the following information to the examining physician:

## 1910.1028(i)(6)(i)

A copy of this regulation and its appendices;

## 1910.1028(i)(6)(ii)

A description of the affected employee's duties as they relate to the employee's exposure;

## 1910.1028(i)(6)(iii)

The employee's actual or representative exposure level:

## 1910.1028(i)(6)(iv)

A description of any personal protective equipment used or to be used; and

## 1910.1028(i)(6)(v)

Information from previous employment-related medical examinations of the affected employee which is not otherwise available to the examining physician.

## 1910.1028(i)(7)

Physician's written opinions.

## 1910.1028(i)(7)(i)

For each examination under this section, the employer shall obtain and provide the employee with a copy of the examining physician's written opinion within 15 days of the examination. The written opinion shall be limited to the following information:

1910.1028(i)(7)(i)(A)

The occupationally pertinent results of the medical examination and tests;

1910.1028(i)(7)(i)(B)

The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee's health at greater than normal risk of material impairment from exposure to benzene;

1910.1028(i)(7)(i)(C)

The physician's recommended limitations upon the employee's exposure to benzene or upon the employee's use of protective clothing or equipment and respirators.

1910.1028(i)(7)(i)(D)

A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from benzene exposure which require further explanation or treatment.

1910.1028(i)(7)(ii)

The written opinion obtained by the employer shall not reveal specific records, findings and diagnoses that have no bearing on the employee's ability to work in a benzene-exposed workplace.

1910.1028(i)(8)

Medical removal plan.

1910.1028(i)(8)(i)

When a physician makes a referral to a hematologist/internist as required under paragraph (i)(5)(ii) of this section, the employee shall be removed from areas where exposures may exceed the action level until such time as the physician makes a determination under paragraph (i)(8)(ii) of this section.

1910.1028(i)(8)(ii)

Following the examination and evaluation by the hematologist/internist, a decision to remove an employee from areas where benzene exposure is above the action level or to allow the employee to return to areas where benzene exposure is above the action level shall be made by the physician in consultation with the hematologist/internist. This decision shall be communicated in writing to the employer and employee. In the case of removal, the physician shall state the required probable duration of removal from occupational exposure to benzene above the action level and the requirements for future medical examinations to review the decision.

## 1910.1028(i)(8)(iii)

For any employee who is removed pursuant to paragraph (i)(8)(ii) of this section, the employer shall provide a follow-up examination. The physician, in consultation with the hematologist/internist, shall make a decision within 6 months of the date the employee was removed as to whether the employee shall be returned to the usual job or whether the employee should be removed permanently.

## 1910.1028(i)(8)(iv)

Whenever an employee is temporarily removed from benzene exposure pursuant to paragraph (i)(8)(i) or (i)(8)(ii) of this section, the employer shall transfer the employee to a comparable job for which the employee is qualified (or can be trained for in a short period) and where benzene exposures are as low as possible, but in no event higher than the action level. The employer shall maintain the employee's current wage rate, seniority and other benefits. If there is no such job available, the employer shall provide medical removal protection benefits until such a job becomes available or for 6 months, whichever comes first.

## 1910.1028(i)(8)(v)

Whenever an employee is removed permanently from benzene exposure based on a physician's recommendation pursuant to paragraph (i)(8)(iii) of this section, the employee shall be given the opportunity to transfer to another position which is available or later becomes available for which the employee is qualified (or can be trained for in a short period) and where benzene exposures are as low as possible but in no event higher than the action level. The employer shall assure that such employee suffers no reduction in current wage rate, seniority or other benefits as a result of the transfer.

## 1910.1028(i)(9)

Medical removal protection benefits.

## 1910.1028(i)(9)(i)

The employer shall provide to an employee 6 months of medical removal protection benefits immediately following each occasion an employee is removed from exposure to benzene because of hematological findings pursuant to paragraphs (i)(8)(i) and (ii) of this section, unless the employee has been transferred to a comparable job where benzene exposures are below the action level.

## 1910.1028(i)(9)(ii)

For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the current wage rate, seniority and other benefits of an employee as though the employee had not been removed.

## 1910.1028(i)(9)(iii)

The employer's obligation to provide medical removal protection benefits to a



removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or from employment with another employer made possible by virtue of the employee's removal.

1910.1028(j)

Communication of benzene hazards to employees -

1910.1028(j)(1)

Signs and labels.

1910.1028(j)(1)(i)

The employer shall post signs at entrances to regulated areas. The signs shall bear the following legend:

DANGER  
BENZENE  
CANCER HAZARD  
FLAMMABLE - NO SMOKING  
AUTHORIZED PERSONNEL ONLY  
RESPIRATOR REQUIRED

1910.1028(j)(1)(ii)

The employer shall ensure that labels or other appropriate forms of warning are provided for containers of benzene within the workplace. There is no requirement to label pipes. The labels shall comply with the requirements of 29 CFR 1910.1200(f) and in addition shall include the following legend:

DANGER  
CONTAINS BENZENE  
CANCER HAZARD

1910.1028(j)(2)

Material safety data sheets.

1910.1028(j)(2)(i)

Employers shall obtain or develop, and shall provide access to their employees, to a material safety data sheet (MSDS) which addresses benzene and complies with 29 CFR 1910.1200.

1910.1028(j)(2)(ii)

Employers who are manufacturers or importers shall:

1910.1028(j)(2)(ii)(A)

Comply with paragraph (a) of this section, and

## 1910.1028(j)(2)(ii)(B)

Comply with the requirement in OSHA's Hazard Communication Standard, 29 CFR 1910.1200, that they deliver to downstream employers an MSDS which addresses benzene.

## 1910.1028(j)(3)

Information and training.

## 1910.1028(j)(3)(i)

The employer shall provide employees with information and training at the time of their initial assignment to a work area where benzene is present. If exposures are above the action level, employees shall be provided with information and training at least annually thereafter.

## 1910.1028(j)(3)(ii)

The training program shall be in accordance with the requirements of 29 CFR 1910.1200(h)(1) and (2), and shall include specific information on benzene for each category of information included in that section.

## 1910.1028(j)(3)(iii)

In addition to the information required under 29 CFR 1910.1200, the employer shall:

## 1910.1028(j)(3)(iii)(A)

Provide employees with an explanation of the contents of this section, including Appendices A and B, and indicate to them where the standard is available; and

## 1910.1028(j)(3)(iii)(B)

Describe the medical surveillance program required under paragraph (i) of this section, and explain the information contained in Appendix C.

## 1910.1028(k)

Recordkeeping -

## 1910.1028(k)(1)

Exposure measurements.

## 1910.1028(k)(1)(i)

The employer shall establish and maintain an accurate record of all measurements required by paragraph (e) of this section, in accordance with 29 CFR 1910.1020.

## 1910.1028(k)(1)(ii)

This record shall include:

1910.1028(k)(1)(ii)(A)

The dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

1910.1028(k)(1)(ii)(B)

A description of the sampling and analytical methods used;

1910.1028(k)(1)(ii)(C)

A description of the type of respiratory protective devices worn, if any; and

1910.1028(k)(1)(ii)(D)

The name, social security number, job classification and exposure levels of the employee monitored and all other employees whose exposure the measurement is intended to represent.

1910.1028(k)(1)(iii)

The employer shall maintain this record for at least 30 years, in accordance with 29 CFR 1910.1020.

1910.1028(k)(2)

Medical surveillance.

1910.1028(k)(2)(i)

The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by paragraph (i) of this section, in accordance with 29 CFR 1910.1020.

1910.1028(k)(2)(ii)

This record shall include:

1910.1028(k)(2)(ii)(A)

The name and social security number of the employee;

1910.1028(k)(2)(ii)(B)

The employer's copy of the physician's written opinion on the initial, periodic and special examinations, including results of medical examinations and all tests, opinions and recommendations;

1910.1028(k)(2)(ii)(C)

Any employee medical complaints related to exposure to benzene;

1910.1028(k)(2)(ii)(D)

A copy of the information provided to the physician as required by paragraphs (i)(6)(ii) through (v) of this section; and

1910.1028(k)(2)(ii)(E)

A copy of the employee's medical and work history related to exposure to benzene or any other hematologic toxins.

1910.1028(k)(2)(iii)

The employer shall maintain this record for at least the duration of employment plus 30 years, in accordance with 29 CFR 1910.1020.

1910.1028(k)(3)

Availability.

1910.1028(k)(3)(i)

The employer shall assure that all records required to be maintained by this section shall be made available upon request to the Assistant Secretary and the Director for examination and copying.

1910.1028(k)(3)(ii)

Employee exposure monitoring records required by this paragraph shall be provided upon request for examination and copying to employees, employee representatives, and the Assistant Secretary in accordance with 29 CFR 1910.1020 (a) through (e) and (g) through (i).

1910.1028(k)(3)(iii)

Employee medical records required by this paragraph shall be provided upon request for examination and copying, to the subject employee, to anyone having the specific written consent of the subject employee, and to the Assistant Secretary in accordance with 29 CFR 1910.1020.

1910.1028(k)(4)

Transfer of records.

1910.1028(k)(4)(i)

The employer shall comply with the requirements involving transfer of records set forth in 29 CFR 1910.1020(h).

1910.1028(k)(4)(ii)

If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall

notify the Director, at least three (3) months prior to disposal, and transmit them to the Director if required by the Director within that period.

1910.1028(l)

Observation of monitoring -

1910.1028(l)(1)

Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to benzene conducted pursuant to paragraph (e) of this section.

1910.1028(l)(2)

Observation procedures. When observation of the measuring or monitoring of employee exposure to benzene requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

1910.1028(m)


[Reserved]


1910.1028(n)

**Appendices.** The information contained in Appendices A, B, C, and D is not intended, by itself, to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[61 FR 5507, Feb. 13, 1996; 63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998; 70 FR 1142, Jan. 5, 2005; 71 FR 16673, April 3, 2006; 71 FR 50189, August 24, 2006]

---

 [Next Standard \(1910.1028 App A\)](#)

 [Regulations \(Standards - 29 CFR\) - Table of Contents](#)

---

 [Back to Top](#)

[www.osha.gov](http://www.osha.gov)

---

[Contact Us](#) | [Freedom of Information Act](#) | [Customer Survey](#)  
[Privacy and Security Statement](#) | [Disclaimers](#)

---

Occupational Safety & Health Administration  
200 Constitution Avenue, NW  
Washington, DC 20210