

# Benzene Protocol

## I. Periodic Medical Examinations

- A. Must occur yearly.
- B. Persons who must participate:
  - 1. Employees performing benzene operations in the current year.
  - 2. Employees who have performed benzene operations in the previous year even if they will not perform benzene operations in the current year.
  - 3. Employees who develop signs and symptoms are commonly associated with toxic exposure to benzene.
- C. Consisting of:
  - 1. Brief history regarding new exposure to potential marrow toxins.
  - 2. Changes in medicinal drug use.
  - 3. Appearances of physical signs relating to blood disorder.
  - 4. CBC with differential reviewed by the examining physician (please note this is not a laboratory test for Benzene Level)
    - a. If found to be abnormal, repeat CBC with differential in 4 weeks, refer to part II. **Additional exams and referral.**
    - b. Follow-up test as deemed necessary by the physician.
    - c. If the employee develops signs and symptoms commonly associated with toxic exposure to benzene, the employee must be provided with an additional medical examination.

## II. Additional exams and referral

- A. Consult 46CFR 197.560 regarding evaluation of abnormalities occur.
  - 1. Respiratory questionnaire (every 3 years only).
  - 2. Pulmonary function test (spirometry).
    - a. specific evaluations of the cardiopulmonary system must be made at least every 3 years.
  - 3. Further testing is deemed necessary by the examining physician.
- B. Definition of Benzene Exposure:
  - 1. Any exposure to benzene regardless of if employee is or is not wearing appropriate personal protective equipment, including personal protective clothing, respirator, and equipment.

## III. Physicians Written Opinion

- A. Standard Physician Written Opinion form for benzene.
- B. Must be completed within 45 days of each examination and must be provided to employee and employer (example included).

## Benzene Questionnaire

Name: \_\_\_\_\_ SS#: xxx-xx- \_\_\_\_\_ Date: \_\_\_\_\_

1. Do you have a history of past exposure to benzene or other hematological toxins? YES  NO

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2. Is there a family history of blood disorders (blood dyscrasias) including genetic hemoglobin abnormalities. (i.e. Von Willebrand; Hemophilia) YES  NO

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3. Have you ever had abnormal blood work? Abnormal function of blood cells? YES  NO

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4. Do you have a history of kidney or liver problems?  
(Including slightly abnormal blood work in the past. renal and liver dysfunction) YES  NO

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5. Do you take medications on a routine basis? If yes, list them, including non-prescribed medications YES  NO

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6. Have you been exposed to ionizing radiation? YES  NO

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7. Have you been exposed to chemical which may be bloodmarrow toxins outside Of your current employment? (Hobbies, second occupation, etc) YES  NO

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8. Please complete a detailed work history.

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## Benzene Exposure Physician Evaluation

Name: \_\_\_\_\_ SS#: xxx-xx- \_\_\_\_\_ Date: \_\_\_\_\_

Examination Type:  Initial       Periodic       Emergency

Blood Test (CBC) (Required Annually)

- |   |   |
|---|---|
| <input type="checkbox"/> Normal                   | <input type="checkbox"/> Low white cell count (WBC) |
| <input type="checkbox"/> Low Hemoglobin (HGB)     | <input type="checkbox"/> Low platelet count         |
| <input type="checkbox"/> Low Hematocrit (HCT)     | <input type="checkbox"/> Other: _____               |
| <input type="checkbox"/> High red cell size (MCV) |   |
| <input type="checkbox"/> Repeat CBC: _____        | _____   |
| (Date Employee Notified)                          | (Date Completed)                                    |

Remarks: \_\_\_\_\_

- Referral to hematologist requested:
- |                          |                  |
|--------------------------|------------------|
| _____                    | _____            |
| (Date Employee Notified) | (Date Completed) |

Remarks: \_\_\_\_\_

- Cleared for benzene exposure without accommodation. No apparent medical conditions placing the employee at increased risk from benzene exposure.
- Not cleared for benzene exposure.

_____	_____	_____
Evaluating Physician Printed Name	Evaluating Physician Signature	Date

Pulmonary Function Test (Required every 3 years for all positions)

- |                                      |                               |                                   |                                 |
|--------------------------------------|-------------------------------|-----------------------------------|---------------------------------|
| <input type="checkbox"/> Normal      |                               |                                   |                                 |
| <input type="checkbox"/> Obstruction | <input type="checkbox"/> Mild | <input type="checkbox"/> Moderate | <input type="checkbox"/> Severe |
| <input type="checkbox"/> Restriction | <input type="checkbox"/> Mild | <input type="checkbox"/> Moderate | <input type="checkbox"/> Severe |

Additional tests performed or specialist referral requested: \_\_\_\_\_

_____	_____
(Date Employee Notified)	(Date Completed)

# Federal Benzene Certification

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Name

xxx-xx-

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DOB

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SSN

The above-named person has been certified in compliance with 46CFR197.560 and has met the Benzene Monitoring procedures required by the United States Coast Guard.

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Date of Exam

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Expiration Date

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Physician Signature

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Date

## Coast Guard, DHS

## § 197.560

(4) The person conducting the tests required by paragraph (c)(1) of this section must certify the results by signing the test report.

(d) *Respirator fitting.* (1) Employees who are being fitted for respirators must be trained in the methods for properly fitting a respirator and informed of the factors which may affect a proper fit, such as beards, sideburns, dentures, eyeglasses, and goggles, and that an unobstructed sealing surface is critical in fitting a respirator. (See appendix E of this subpart).

(2) For employees requiring eye glasses, corrective lenses should be fitted to the respirator faceplate. As a temporary measure, glasses with short temple bars may be taped to the wearer's head. Contact lenses other than soft lenses or gas permeable lenses must not be worn with respirators.

(e) *Respirator use.* Persons wearing a respirator in a regulated area must be permitted to leave the regulated area to wash their face and respirator facepiece, as necessary, in order to prevent skin irritation associated with respirator use or, if an air-purifying respirator is used, to change the filter elements whenever the person wearing the respirator detects a change in breathing resistance or a chemical vapor breakthrough.

(f) *Respirator inspection.* Respirators must be inspected in accordance with ANSI Z88.2—1980, section 8.

(g) *Respirator maintenance.* (1) Respirators must be maintained in accordance with ANSI Z88.2—1980, section 8.

(2) During respirator cleaning, the rubber or elastomer parts of the respirator must be stretched and manipulated with a massaging action to keep the parts pliable and flexible and to keep the parts from taking a set during storage.

(3) The air purifying element of air-purifying respirators must be replaced when the employee detects breakthrough or after a period not to exceed eight hours, whichever comes first. The element must also be replaced at the start of each shift. An air purifying element with an end of useful life indicator approved by MSHA or NIOSH for benzene may be used until the indicator indicates end of useful life even if this exceeds eight hours.

(h) *Respirator storage.* Respirators must be stored in accordance with ANSI Z88.2—1980, section 8.

[CGD 76-009, 43 FR 53683, Nov. 16, 1978, as amended by USCG-2014-0688, 79 FR 58289, Sept. 29, 2014]

### § 197.555 Personal protective clothing and equipment.

(a) When the use of respirators in compliance with § 197.550 and the personal protective clothing and equipment in compliance with this section is chosen as the method or one of the methods required by § 197.545 to be used in meeting the performance standard, the clothing and equipment must meet the requirements of this section.

(b) The employer shall provide employees with the necessary personal protective clothing and equipment without charge and shall ensure that the clothing and equipment are worn or used properly.

(c) Employees must be provided with coveralls or a large apron, boots, gloves, and, if necessary, tight-fitting eye goggles to limit dermal exposure to, and prevent eye contact with, liquid benzene.

### § 197.560 Medical surveillance.

(a) *General.* (1) The employer must provide, and the employees must submit to, the medical surveillance examinations for employees, as required by this section.

(2) All medical surveillance procedures in compliance with this section, other than the pulmonary function test of paragraph (b)(5)(v) of this section and all laboratory tests, must be performed by, or under the supervision of, a licensed physician.

(3) The pulmonary function test of paragraph (b)(5)(v) of this section must be administered by a licensed physician or by a person who has completed a training course in spirometry sponsored by a governmental, academic, or professional institution.

(4) All laboratory tests must be conducted by a laboratory accredited by an accrediting organization acceptable to the Commandant.

(b) *Initial medical examination.* (1) Within March 14, 1992 the employer shall make available to the employees

listed in paragraph (b)(2)(i) of this section an initial medical examination. Within six months all initial medical examinations must be completed, including those for the employees listed in paragraph (b)(2)(ii), and each employee notified of the results of that employee's examination.

(2) The initial medical examination must be made available to the following employees before they are permitted to enter or continue working in a workplace in which they will be or may be exposed to benzene:

(i) Employees who were exposed to more than 10 ppm of benzene as an eight-hour TWA on at least 30 calendar days during the year before January 15, 1992 and who were employed by their present employer during each of the 30 days.

(ii) Employees, other than employees defined in paragraph (b)(2)(i) of this section, who may reasonably be expected to be exposed to benzene at or above the action level on at least 30 calendar days, or at a level above a PEL on at least 10 calendar days, during the coming year.

(3) Exposure to benzene, as referred to in paragraph (b)(2) of this section, means any exposure to benzene, whether or not at the time of the exposure, the employee was or will be wearing an appropriate respirator in compliance with §197.550 and the personal protective clothing and equipment in compliance with §197.555.

(4) An initial medical examination is not required if the employer or employee has adequate records showing that the employee has had, within one year, an examination meeting the requirements of paragraph (b)(5) of this section.

(5) The initial medical examination must include at least the following elements:

(i) A detailed occupational history which includes a history of past work exposure to benzene or any other hematological toxin, a family history of blood dyscrasias including hematological neoplasms, a history of blood dyscrasias including genetic hemoglobin abnormalities, bleeding abnormalities, and abnormal functions of formed blood elements, a history of renal or liver dysfunction, a history of

medicinal drugs routinely taken, a history of previous exposure to ionizing radiation, and a history of exposure to marrow toxins outside of the employee's current work situation. The employee must provide to the examining physician as complete an occupational history as possible for the period prior to the current employment.

(ii) A complete physical examination.

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

(iv) As determined necessary by the examining physician, additional tests based on alterations to the components of the blood or other signs which may be related to benzene exposure.

(v) For employees required to wear respirators for at least 30 days a year, a pulmonary function test.

(c) *Periodic medical examinations.* (1) The employer shall ensure that no one performs a benzene operation exceeding the level criteria of paragraph (b)(2) of this section without having undergone an initial medical examination and periodic medical examinations yearly thereafter. Also, those who in the previous year have performed benzene operations exceeding the level criteria of paragraph (b)(2) of this section shall undergo a periodic medical examination even if they will not perform benzene operations in the current year. Periodic examinations must include, at least, the following elements:

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

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

(iii) As determined necessary by the examining physician, additional tests based on alterations to the components

of the blood or other signs which may be related to benzene exposure.

(2) If the employee develops signs and symptoms commonly associated with toxic exposure to benzene, the employee must be provided with an additional medical examination which includes those elements considered appropriate by the examining physician.

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

(d) *Additional examinations and referrals.* (1) If the results of the complete blood count laboratory test required for the initial or periodic medical examination indicate that any of the following abnormal conditions exist, the blood count must be retaken within four weeks:

(i) The hemoglobin or the hematocrit falls below the normal limit (outside the 95% confidence interval (C.I.)), as determined by the laboratory, or the hemoglobin or hematocrit shows a persistent downward trend from the employee's pre-exposure norms, if these findings cannot be explained by other medical reasons.

(ii) The thrombocyte 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.

(iii) The leukocyte count is below 4,000 per cubic millimeter or there is an abnormal differential count.

(2) If the abnormal conditions persist, the employee must be referred by the examining physician to a hematologist or an internist for further evaluation, unless the physician has good reason to believe that the referral is unnecessary. (See appendix C of this subpart for examples of conditions in which referrals may be unnecessary.)

(3) The hematologist or internist must be provided with the information provided to the physician in compliance with paragraph (f) of this section and with the medical record in compliance with §197.570(b).

(4) If the hematologist or internist determines that additional tests are needed, the employer shall ensure that these additional tests are provided.

These test must be completed in thirty days, whether or not the employee continues to perform benzene operations.

(e) *Emergency medical examinations.* (1) Whenever an employee is exposed to benzene resulting from an emergency, a sample of that employee's urine must be taken at the end of the employee's shift and a urinary phenol test must be performed on the sample within 72 hours. Where due to unavoidable circumstances the sample cannot be tested by a laboratory within 72 hours of exposure, the sample shall be frozen until it can be delivered to the laboratory. The specific gravity of the urine must be corrected to 1.024. Since certain foods and medications can result in elevated phenol levels, the employee must provide the physician with a dietary and medication history.

(2) If the result of the urinary phenol test is below 75 mg phenol/l of urine, no further testing is required.

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

(4) If any of the conditions specified in paragraph (d)(1) of this section exists, the additional examinations and referrals specified in paragraph (d) of this section must be performed and the employee must be provided with periodic medical examinations, if any are recommended by the examining physician.

(f) *Information provided to the physician.* The following information must be provided to the examining physician:

(1) A copy of this subpart and its appendices.

(2) A description of the affected employee's duties as they relate to the employee's exposure.

(3) The employee's actual or representative exposure level.

(4) A description of the respirator and personal protective clothing and equipment used or to be used, if any.

(5) Records of all previous employment-related medical examinations of

§ 197.565

46 CFR Ch. I (10–1–14 Edition)

the affected employee which were conducted while in the employ of the current employer and which have not been provided to the examining physician.

(g) *Physician's written opinion.* (1) The employer shall ensure that, within 45 days of each examination required by this section, the employer and the employee must be provided with a copy of the examining physician's written opinion of the examination.

(2) The written opinion must contain at least the following information:

(i) The occupationally pertinent results of the medical examination and tests.

(ii) All medical conditions, if any, of the employee which the examining physician believes would subject the employee to a greater than normal risk of material impairment of health if the employee is exposed again to benzene.

(iii) The examining physician's recommended limitations, if any, upon the employee's future exposure to benzene or use of respirators or other personal protective clothing or equipment.

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

(3) The physician's written opinion must not reveal specific records, findings, or diagnoses that have no bearing on the employee's ability to work in a benzene-exposed workplace, ability to use a respirator, or ability to use personal protective clothing or equipment.

(h) *Removal from exposure.* (1) From the time an employee is referred to a hematologist or internist in compliance with paragraph (d)(2) of this section, the employee must not be permitted to enter areas where personal exposure may exceed the action level until the physician determines in compliance with paragraph (h)(2) of this section that the employee again may enter those areas.

(2) After examination by and consultation with the hematologist or internist, the examining physician decides whether or not to permit the employee to enter areas where personal exposure may exceed the action level.

The employee must provide the employer with a written copy of the physician's decision signed by the physician. If the decision recommends that the employee not be permitted to enter those areas, the decision must include the examining physician's opinion as to when the employee may be permitted to reenter those areas and the requirements for future medical examinations to review the decision.

(3) Within six months of the date a decision in compliance with paragraph (h)(2) of this section not to permit reentry is made, the employee must be provided with a follow-up examination and a decision of the examining physician (based on the follow-up examination and consultation with a hematologist or internist) as to whether reentry should be permitted and, if so, when, or whether it should be permanently prohibited.

[CGD 88-040, 56 FR 52135, Oct. 17, 1991; 56 FR 65006, Dec. 13, 1991, as amended by USCG-2014-0688, 79 FR 58289, Sept. 29, 2014]

**§ 197.565 Notifying personnel of benzene hazards.**

(a) *Material safety data sheet.* A material safety data sheet (MSDS) addressing benzene must be made available to all persons involved in the benzene operation. The MSDS must describe the physical and chemical characteristics, physical and health hazards, permissible exposure limits, precautions for safe handling and use, control measures such as personal protection equipment, and first aid procedures for benzene. A copy of appendices A and B of this subpart or a MSDS on benzene meeting the requirements of 29 CFR 1910.1200(g) is sufficient.

(b) *Training.* (1) All employees must be provided with training at the time of their initial assignment to a work area where benzene is present and, if exposures are above the action level, at least once a year thereafter. Employees transferring to a new work area must be provided with training specific to that new work area.

(2) The training must provide information on—

(i) Which operations on the vessel involve or may involve exposure to benzene;