

Section Contents

YOUR RESPONSIBILITY:

To measure and minimize employee exposure to benzene

IMPORTANT:

- To determine which requirements to follow for your work tasks, go to Table 1 in the scope of this chapter, WAC 296-849-100.

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Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11010

Preventive practices

You must

- Make sure containers of benzene in the workplace are labeled, tagged, or marked with this warning:

**DANGER
CONTAINS BENZENE
CANCER HAZARD**



Note:

- You should keep containers tightly covered when not in use to prevent unnecessary exposure and accidental spills.



References:

- Additional requirements are found in other chapters as follows:
 - For spills, leaks, or other releases of benzene, go to Emergency Response, Chapter 296-824 WAC.
 - For labeling go to:
 - The Safety and Health Core Rules, Chapter 296-800 WAC, and find the section, Label containers holding hazardous chemicals, WAC 296-800-17025
 - and**
 - Material Safety Data Sheet and Label Preparation, Chapter 296-839 WAC.

WAC 296-849-11020

Exposure control areas

You must

- Establish temporary or permanent exposure control areas where airborne concentrations of benzene are above, or can be reasonably expected to be above the permissible exposure limits (PELs) for benzene by doing all the following:
 - Post signs at access points to exposure control areas that include this warning:

**DANGER
Benzene
Cancer Hazard
Flammable - No Smoking
Authorized Personnel Only
Respirator Required**

- Distinguish the boundaries of exposure control areas from the rest of the workplace in any way that minimizes employee access.
- Allow only authorized personnel to enter exposure control areas.

 **Note:**

- You may use permanent or temporary enclosures, caution tape, ropes, painted lines on surfaces, or other materials to visibly distinguish exposure control areas or separate them from the rest of the workplace.
- When distinguishing exposure control areas you should consider factors such as:
 - The level and duration of airborne exposure
 - Whether the area is permanent or temporary
 - The number of employees in adjacent areas.

 **Reference:**

- If exposure control areas are established, go to Respirators, WAC 296-849-13045.



Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11030

Exposure evaluations

IMPORTANT:

- When you conduct an exposure evaluation in a workplace where an employee uses a respirator, the protection provided by the respirator isn't considered.
- Following this section will fulfill the requirements to identify and evaluate respiratory hazards found in chapter 296-841 WAC, Airborne contaminants.

You must

- Conduct an employee exposure evaluation to accurately determine airborne concentrations of benzene by completing Steps 1 through 7 of the exposure evaluation process, each time any of the following apply:
 - No evaluation has been conducted
 - You have up to 30 days to complete an evaluation once benzene is introduced into your workplace
 - Changes have occurred in any of the following areas that may result in new or increased exposures:
 - Production
 - Processes
 - Exposure controls such as ventilation systems or work practices
 - Personnel
 - You have any reason to suspect new or increased exposure may occur
 - Spills, leaks, or other releases have been cleaned up.



Note:

- As part of your exposure evaluation after cleanup, you will make sure exposure monitoring results have returned to prerelease levels.

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WAC 296-849-11030 (Continued)

EXPOSURE EVALUATION PROCESS

IMPORTANT:

- If you are evaluating employee exposures during cleaning and repair of barges and tankers that contained benzene:
 - Collect samples that effectively measure benzene concentrations that employees may be exposed to
 - and**
 - Skip to Step 7
- Following the exposure evaluation process isn't necessary when you have documentation conclusively demonstrating benzene exposures for a particular operation and material can't exceed the action level (AL) during any conditions reasonably anticipated.
 - Documentation can be based on data or qualitative information, such as information about:
 - The material
 - How the material is handled
 - The work conditions
 - Retain this documentation for as long as you rely on it.



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Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11030 (Continued)

Step 1: Identify all employees who have potential airborne exposure to benzene in your workplace.

Step 2: Identify operations where 15-minute exposures could exceed benzene's short-term exposure limit (STEL) of 5 parts per million (ppm).

- Include operations where it's reasonable to expect high, 15-minute exposures, such as operations where:
 - Tanks are opened, filled, unloaded, or gauged
 - Containers or process equipment are opened
 - Benzene is used as a solvent for cleaning.



Note:

- You may use monitoring devices such as colorimetric indicator tubes or real-time monitors to screen for activities where employee exposure monitoring results could be high.

Step 3: Select employees from those working in the operations you identified in Step 2 who will have their 15-minute exposures measured.

Step 4: Select employees from those identified in Step 1 who will have their 8-hour exposures monitored.

- Make sure the exposures of the employees selected represent 8-hour exposures for all employees identified at Step 1, including each job classification, work area, and shift.



Note:

- A written description of the procedure used for obtaining representative employee exposure monitoring results needs to be kept as part of your exposure records required by this chapter in Exposure records, WAC 296-849-11090. This description can be created while completing Steps 3 through 6 of this exposure evaluation process.

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WAC 296-849-11030 (Continued)

Step 5: Determine how you will obtain employee monitoring results.

- Select and use a method that is accurate to $\pm 25\%$, with a confidence level of 95%.



Note:

- Here are examples of methods that meet this accuracy requirement:
 - OSHA Method 12 for air samples, found by going to <http://www.osha.gov/dts/sltc/methods/toc.html>.
 - NIOSH Method 1500, found by going to <http://www.cdc.gov/niosh/homepage.html> and link to the NIOSH Manual of Analytical Methods.

Step 6: Obtain employee exposure monitoring results by collecting air samples representing employees identified at Step 1.

- Collect 15-minute samples from employees selected at Step 3
- Sample at least one shift representative of the 8-hour exposure for each employee selected at Step 4
- Make sure samples are collected from each selected employee's breathing zone
- Collecting area samples is permitted after emergency releases.

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Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11030 (Continued)



Note:

- You may use any sampling method that meets the accuracy specified in Step 5. Examples of these methods include:
 - Real-time monitors that provide immediate exposure monitoring results
 - Equipment that collects samples that are sent to a laboratory for analysis.
- The following are examples of methods of monitoring representative of 8-hour exposures:
 - Collect one or more continuous samples, for example, a single 8-hour sample or four 2-hour samples.
 - Take a minimum of 5 brief samples, such as 15-minute samples, during the work shift and at times selected randomly.
- For work shifts longer than 8 hours, monitor the continuous 8-hour portion of the shift expected to have the highest average exposure concentration.

- Step 7:** Have the samples you collected analyzed to obtain monitoring results representing 8-hour and 15-minute exposures.
- Go to the scope of this chapter, WAC 296-849-100, and compare employee exposure monitoring results to the **values** found in Step 2a and follow Step 2b to determine if additional sections of this chapter apply.



Note:

- You may contact your local WISHA consultant for help:
 - Interpreting data or other information
 - Obtaining 8-hour or 15-minute employee exposure monitoring results.
- To contact a WISHA consultant:
 - Go to another chapter, the Safety and Health Core Rules, Chapter 296-800 WAC, and find the resources section, and under “other resources,” find service location for Labor and Industries.



WAC 296-849-11040

Personal protective equipment (PPE)

You must

- Make sure employees use appropriate PPE as protection from skin or eye contact with liquid benzene.



Note:

- Harmful amounts of benzene can enter the body through skin and eye contact.



Reference:

- To see additional personal protective equipment requirements, go to the Safety and Health Core Rules, Chapter 296-800 WAC.

WAC 296-849-11050

Training

You must

- Provide training and information to employees:
 - At the time of initial assignment to a work area where benzene is present**and**
 - At least every 12 months after initial training for employees exposed to airborne concentrations at or above the action level (AL) of 0.5 parts per million (ppm).

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Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11050 (Continued)

- Make sure training and information includes all of the following:
 - Specific information on benzene for each hazard communication training topic. For the list of hazard communication training topics, go to the Safety and Health Core Rules, Chapter 296-800 WAC, and find, Inform and train your employees about hazardous chemicals in your workplace, WAC 296-800-17030
 - and**
 - An explanation of the contents of this chapter and guidance about where to find a copy.
 - and**
 - A description of the medical evaluation requirements of this chapter found in:
 - Medical evaluations, WAC 296-849-12030
 - and**
 - Medical removal, WAC 296-849-12050.
-  **Reference:**
 - To see additional training and information requirements in other chapters, go to the:
 - Respirators rule, Chapter 296-842 WAC, and find the Training section, WAC 296-842-16005.
 - Safety and Health Core Rules, Chapter 296-800 WAC, and find the section titled, Inform and train your employees about hazardous chemicals in your workplace, WAC 296-800-17030.



WAC 296-849-11065

Exposure monitoring observation

You must

- 1) Provide affected employees and their designated representatives an opportunity to observe exposure monitoring during Step 6 of the exposure evaluation process found in Exposure evaluations, WAC 296-849-11030.
- 2) Make sure observers who enter areas with benzene exposure:
 - Are provided with and use the same protective clothing, respirators, and other personal protective equipment (PPE) that employees working in the area are required to use
 - and**
 - Follow safety and health requirements that apply.

WAC 296-849-11070

Notification

You must

- Provide written notification of exposure monitoring results to the employees represented by your exposure evaluation within 5 business days after the monitoring results become known to you.

In addition, when employee exposure monitoring results are above a permissible exposure limit (PEL), provide written notification of all of the following within 15 business days after these exposure monitoring results become known to you:

- Corrective actions being taken and a schedule for completion

and

- Any reason why exposures can't be lowered to below the PELs for benzene.

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Basic Rules

WAC 296-849-110

Rule

WAC 296-849-11070 (Continued)



Note:

- You can notify employees either individually or post the notifications in areas readily accessible to affected employees.
- Posted notification may need specific information that allows affected employees to determine which monitoring results apply to them.
- Notification may be in any written form, such as handwritten or e-mail.
- Notification may be limited to the required information, such as exposure monitoring results.
- When notifying employees about corrective actions, your notification may refer them to a separate document that's available and provides the required information.

WAC 296-849-11090

Exposure records

You must

- Establish and keep complete and accurate records for all exposure monitoring conducted under this chapter. Make sure the record includes at least:
 - The name, Social Security number, or other unique identifier, and job classification of the employee sampled and all other employees represented by the sampled employee
 - A description of the methods used to obtain exposure monitoring results
 - A description of the procedure used to obtain representative employee exposure monitoring results
 - The date, number, duration, and the result of each sample taken.

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WAC 296-849-11090 (Continued)

You must

- The type of respirator worn, if any



Note:

- It is useful to record any personal protective equipment worn by the employee, in addition to the type of respirator worn.

- Keep exposure monitoring records for at least 30 years.



Reference:

- To see additional requirements for employee exposure records including access, and transfer requirements, go to another chapter, Employee Medical and Exposure Records, Chapter 296-802 WAC.
- Exposure monitoring records need to be kept longer than 30 years for employees participating in medical monitoring. Go to Medical records, WAC 296-849-12080, found within this chapter.

