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Section 5218: Benzene at 1 ppm, 5 ppm and 0.5 ppm

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Title 8, Section 5218 is California's benzene standard. In this note I set out its two exposure limits and the action level, the monitoring schedule, regulated areas, medical surveillance, and the operations that the scope paragraph takes out of the section. Subsection references are to the [text published on dir.ca.gov](https://www.dir.ca.gov).

Three numbers

Section 5218(c)(1) sets the permissible exposure limit: no employee is to be exposed to an 8-hour time-weighted average concentration of airborne benzene above 1 part per million. Section 5218(c)(2) sets the short-term exposure limit at 5 ppm, averaged over a 15-minute sampling period. The action level, defined in subsection (b), is 0.5 ppm as an 8-hour time-weighted average.

The definition of employee exposure in subsection (b) decides how those numbers are measured. It is the exposure that would occur if the employee were not using respiratory protective equipment. A respirator does not lower the result that gets compared with the limits.

What the scope leaves out

Section 5218(a)(1) applies the section to all occupational exposures to benzene, except as provided in (a)(2) and (a)(3). Before I plan any sampling I read the eight exclusions in (a)(2):

- **(A) Fuels downstream of bulk storage.** Storage, transportation, distribution, dispensing, sale or use of gasoline, motor fuels or other fuels containing benzene after final discharge from bulk wholesale storage facilities. Dispensing for more than 4 hours per day in an indoor location stays covered.
- **(B) Bulk loading with vapor control.** Loading and unloading at bulk wholesale storage facilities that use vapor control systems for all loading and unloading.
- **(C) Sealed containers and pipelines.** Storage, transportation, distribution or sale of benzene, or of liquid mixtures containing more than 0.1 percent benzene, in intact containers or in transportation pipelines while sealed so as to contain the vapors and liquid.
- **(D) Low-benzene lines and gas plants.** 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.
- **(E) Low-benzene liquids.** Work where the only exposure is from liquid mixtures containing 0.1 percent or less benzene by volume, or from the vapors those liquids release.

- **(F) Tire building machine operators.** Operators using solvents with more than 0.1 percent benzene remain covered by the medical surveillance subsection.
- **(G) Oil and gas.** Drilling, production and servicing operations.
- **(H) Coke oven batteries.**

The exclusions in (B) and (C) are partial. Both keep the hazard communication provisions and the emergency provisions of subsections (g) and (i)(4) in force. Section 5218(a)(3) treats the cleaning and repair of barges and tankers that have contained benzene differently again. That work is excluded from subsections (f), (e)(1) and (e)(6), and engineering and work practice controls are to keep exposures below 10 ppm unless proven not to be feasible.

Exposure monitoring

Section 5218(e)(1) requires breathing zone air samples that are representative of each employee's average exposure. The 8-hour figure comes from one or more samples representing full-shift exposure for each job classification in each work area. Compliance with the short-term limit is judged from 15-minute breathing zone samples taken where there is reason to believe exposures are high, such as where tanks are opened, filled, unloaded or gauged.

The schedule in (e)(2) through (e)(5) runs as follows:

- **Initial monitoring** is completed within 30 days of the introduction of benzene into the workplace. Earlier monitoring that satisfies the section's other requirements may be relied on.
- **At or above the action level, at or below the PEL:** repeat at least every year.
- **Above the PEL:** repeat at least every six months. The interval may go to annual after two consecutive measurements, taken at least 7 days apart, show exposure at or below the PEL but still at or above the action level.
- **Below the action level:** monitoring for that employee may stop, either on the initial result or after two consecutive periodic measurements at least 7 days apart.
- **Additional monitoring** is required when a change in production, process, control equipment, personnel or work practices may result in new or additional exposure, and after the cleanup or repair of a spill, leak, rupture or other breakdown.

Section 5218(e)(6) requires monitoring accurate to within plus or minus 25 percent at a 95 percent confidence level, which I confirm with the laboratory before sampling. Under (e)(7), employees are notified of results in writing, individually or by posting, within 15 working days after the employer receives them. If the PEL or STEL was exceeded, the notice states the corrective action being taken or refers to a document that does.

Regulated areas

Section 5218(d)(1) requires a regulated area wherever the airborne concentration exceeds, or can reasonably be expected to exceed, the PEL or the STEL. Access is limited to authorized persons under

(d)(2). Under (d)(3) the area is demarcated from the rest of the workplace in any manner that minimizes the number of employees exposed within it. Subsection (j) requires signs at the entrances.

I read the words "can reasonably be expected to exceed" as covering an area where the task and the earlier data predict an exceedance, whether or not one was measured that day.

Medical surveillance

Section 5218(i)(1)(A) requires the employer to make a medical surveillance program available to four groups:

- employees who are or may be exposed at or above the action level 30 or more days per year;
- employees who are or may be exposed at or above the PEL or STEL 10 or more days per year;
- employees who were exposed above 10 ppm for 30 or more days in any year before December 10, 1989 while employed by their current employer;
- tire building machine operators who use solvents containing more than 0.1 percent benzene.

Examinations are performed by or under the supervision of a licensed physician and are provided without cost to the employee, at a reasonable time and place. An initial examination is provided before initial assignment unless adequate records show one within the past twelve months, and Section 5218(i)(3) makes the examination annual after that. Both include a complete blood count.

Emergencies have their own rule in (i)(4). The employee provides a urine sample at the end of the shift, and a urinary phenol test is run within 72 hours. Below 75 mg phenol per liter of urine, no further testing is required. At or above that figure, the employer provides a complete blood count at monthly intervals for three months.

The day counts in (i)(1)(A) are where exposure monitoring and medical surveillance meet. I keep a log of the days each job classification spends at or above 0.5 ppm. That log is what answers who belongs in the program.

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This note is general information about a California regulation and is not legal advice.