

# VOSHA / OSHA Rules

## Federal OSHA Rules

State Specific Rules:

## Permissible Exposure Limits

## Mandatory Appendix to 1910.269 – Lineworker Safety

### VOSHA

### Safety and Health Standards for General Industry

### 1910.1000

### Air Contaminants – Permissible Exposure Limits

(adopted from the 1989 OSHA PEL Project)

### 1910.1000 Air contaminants

An employee's exposure to any substance listed in Tables Z-1-A, Z-2 or Z-3 of this section shall be limited in accordance with the requirements of the following paragraphs of this section.

(a) [Table Z-1-A:\(Click here for a complete list of PELs\) \[PDF\]](#)

*(1) Substances in Transitional Limits Columns with Limits Preceded by "C" – Ceiling Values. An employee's exposure to any substance in Table Z-1-A under the Transitional Limits columns, the exposure limit of which is preceded by a "C", shall at no time exceed the exposure limit given for that substance in Table Z-1-A under the Transitional Limits columns.*

*(2) Other Substances in Transitional Limits Columns-8-hour Time Weighted Average. An employee's exposure to any substance in Table Z-1-A under the Transitional Limits*

columns, the exposure limit of which is not preceded by a "C" shall not exceed the 8-hour Time Weighted Average given for that substance in Table Z-1-A under the Transitional Limits columns in any 8-hour work shift of a 40-hour work week.

(3) *Final Rule Limits Columns.* An employee's exposure to any substance listed in Table Z-1-A shall not exceed the Time Weighted Average (TWA), Short Term Exposure Limit (STEL) and Ceiling Limit specified for that substance in Table Z-1-A under the Revised Limits columns.

(4) *Skin Designation.* To prevent or reduce skin absorption, an employee's skin exposure to substances listed in Table Z-1-A with an "X" in one or both of the Skin Designation columns, the designation "Skin" following the substance name shall be prevented or reduced to the extent necessary in the circumstances through the use of gloves, coveralls, goggles, or other appropriate personal protective equipment, engineering controls or work practices.

(5) *Definitions.* The following definitions are applicable to the Final Rule Limits columns of Table Z-1-A:

(i) *Time Weighted Average (TWA)* is the employee's average airborne exposure in any 8-hour work shift of a 40-hour work week which shall not be exceeded.

(ii) *short term exposure limit (STEL)* is the employee's 15-minute time weighted average exposure which shall not be exceeded at any time during a work day unless another time limit is specified in a parenthetical notation below the limit. If another time period is specified, the time weighted average exposure over that time limit shall not be exceeded at any time during the working day.

*(iii) ceiling is the employee's exposure which shall not be exceeded during any part of the work day. If instantaneous monitoring is not feasible, then the ceiling shall be assessed as a 15-minute time weighted average exposure which shall not be exceeded at any time over a working day.*

*(6) Additional Definition. The terms "substance," "air contaminant," and "material" are equivalent in meaning for 29 CFR 1910.1000.*

**(b) Table Z-2:**

Table Z-2 is applicable for the transitional period and to the extent set forth in paragraph (f) of this section.

*(1) 8-hour time weighted averages. An employee's exposure to any material listed in Table Z-2, in any 8-hour work shift of a 40-hour work week, shall not exceed the 8-hour time weighted average limit given for that material in Table Z-2.*

*(2) Acceptable Ceiling Concentrations. An employee's exposure to a material listed in Table Z-2 shall not exceed at any time during an 8-hour shift the acceptable ceiling concentration limit given for the material in the table, except for a time period, and up to a concentration not-exceeding the maximum duration and concentration allowed in the column under "acceptable maximum peak above the ceiling concentration for an 8-hour shift."*

*(3) Example. During an 8-hour work shift, an employee may be exposed to a concentration of Substance A (with a 10 ppm TWA, 25 ppm ceiling and 50 ppm peak) above 25 ppm (but never above 50 ppm) only for a maximum period of 10 minutes. Such exposure must be compensated by exposures to concentrations less than 10 ppm so that the cumulative exposure for the entire 8-hour work shift does not exceed a weighted average*

of 10 ppm

(c) Table Z-3:

Table Z-3 is applicable for the transitional period and to the extent set forth in paragraph (f) of this section. An employee's exposure to any substance listed in Table Z-3 in any 8-hour work shift of a 40-hour work week shall not exceed the 8-hour time weighted average limit given for that substance in the table.

(d) Computation formula:

The computation formula which shall apply to employee exposure to more than one substance for which 8-Hour time weighted averages are listed in Subpart Z of 29 CFR Part 1910 in order to determine whether an employee is exposed over the regulatory limit is as follows:

(1)

*(i) The cumulative exposure for an 8-hour work shift shall be computed as follows:*

$$E = (C_a T_a + C_b T_b \dots\dots\dots C_n T_n) \div 8$$

- *Where: E is the equivalent exposure for the working shift.*
  
- *C is the concentration during any period of time T where the concentration remains constant.*
  
- *T is the duration in hours of the exposure at the concentration C.*

- The value of  $E$  shall not exceed the 8-hour time weighted average specified in Subpart Z of 29 CFR 1910 for the material involved.

(ii) To illustrate the formula prescribed in paragraph (d)(1)(i) of this section,, assume that Substance A has an 8-hour time weighted average limit of 100 ppm noted in Table Z-1-A. Assume that an employee is subject to the following exposure:

- Two hours exposure at 150 p/m
- Two hours exposure at 75 p/m
- Four hours exposure at 50 p/m

Substituting this information in the formula, we have:

$$(2 \times 150 + 2 \times 75 + 4 \times 50) \div 8 = 81.25 \text{ p/m}$$

Since 81.25 ppm is less than 100 ppm the 8-hour time weighted average limit, the exposure is acceptable.

(2)(i) In case of a mixture of air contaminants an employer shall compute the equivalent exposure as follows:

$$E_m = (C_1 \div L_1 + C_2 \div L_2) + \dots + (C_n \div L_n)$$

Where:  $E_m$  is the equivalent exposure for the mixture.

$C$  is the concentration of a particular contaminant.

*L is the exposure limit for that substance specified in Subpart Z of 29 CFR Part 1910.*

*The value of  $E_m$  shall not exceed unity (1) .*

*(ii) To illustrate the formula prescribed in paragraph (d)(2)(i) of this section, consider the following exposures:*

Material	Actual concentration of 8-hour exposure (ppm)	8-hr. TWA PEL (ppm)
Substance B	500	1,000
Substance C	45	200
Substance D	40	200

*Substituting in the formula, we have:*

$$E_m = \frac{500}{1,000} + \frac{45}{200} + \frac{40}{200}$$

$$E_m = 0.500 + 0.225 + 0.200$$

$$E_m = 0.925$$

*Since  $E_m$  is less than unity (1), the exposure combination is within acceptable limits.*

(e) To achieve compliance with paragraphs (a) through (d) of this section, administrative or engineering controls must first be determined and implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or any other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in this section. Any equipment and/or technical measures used for this purpose must be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with Section 1910.134.

(f) Effective dates; start-up dates and transitional provisions:

*(1) Effective date: The effective date for the permissible exposure limits specified in the Final Rule Limits columns of Table Z-1-A is November 30 IV. 1990.*

*(2) Start-up dates:*

*(i) The permissible exposure limits specified in the Final Rule Limits columns of Table Z-1-A shall be achieved by any reasonable combination of engineering controls, work practices and personal protective equipment effective November 30, 1990, through December 30, 1992.*

*(ii)*

*(a) The permissible exposure limits specified in the Final Rule Limits columns of Table Z-1-A shall be achieved by the methods of compliance specified in paragraph (e) of this section effective December 31, 1992, if by December 31, 1991 a final rule has been published in the Federal Register amending or determining not to amend paragraph (e) of this*

section.

*(b) If no final rule has been published in the Federal Register by December 31, 1991, amending or determining not to amend paragraph (e) of this section, then the permissible limits specified in the Final Rule Limits columns of Table Z-1-A shall be achieved by the methods of compliance specified by paragraph (e) of this section effective December 31, 1993, and paragraph (f)(2)(i) of this section shall remain in effect through December 30, 1993.*

*(iii) The skin designations in the Final Rule Limits columns become effective September 1, 1989. The skin designations in the Transitional Limits columns are in effect from March 1, 1989 through November 30, 1990.*

*(3) Transitional provisions:*

*(i) The permissible exposure limits specified in the Transitional Limits column of Table Z-1-A, Table Z-2 and Table Z-3 shall continue to be achieved by the methods of compliance specified in paragraph (e) of this section through December 30, 1992. If paragraph (f)(2)(ii)(b) of this section takes effect, this provision is extended through December 30, 1993.*

*(ii) The permissible exposure limits specified in the Transitional Limits column of Table Z-1-A, Z-2 and Z-3 shall be applicable to the extent cross referenced in 29 CFR 1915, 1917 and 1918.*

*(iii) If any new or amended provisions or new or revised limits for any substance or substances are either administratively stayed or judicially stayed or vacated, then the existing provisions or limits for those substances*



*specified in the Transitional Limits columns of Table Z-1-A, Table Z-2 or Table Z-3 shall remain in effect until such stay is lifted, or indefinitely, if the limit is vacated.*

(4) Enforcement of the limits are indefinitely stayed for: aluminum alkyls; ethylidene norbornene; hexafluoroacetone; mercury (alkyl compounds); oxygen difluoride; phenylphosphine; and sulfur pentafluoride; until OSHA publishes in the Federal Register a notice that a sampling and analytical technique is available.

#### Appendix A-1 Mandatory to Section 1910.269

##### (a) Application

(1) The Occupational Safety and Health Information contained in this mandatory appendix to 1910.269 shall apply to the maintenance, operations, alterations, and removal of electric transmission and distribution line and equipment.

(2) The standards set forth in this appendix provide minimum requirements for safety and health. Employers may require adherence to additional standards which are not in conflict with the standards contained in this appendix.

##### (b) Personnel

Utility contractors shall provide a list of qualified employees and registered apprentices to electric utilities prior to beginning any work for the electric utility. This list shall include the name of each qualified employee a recitation of their qualifications, training and experience, an updated accounting of the training and safety education completed, and when such training and safety education was completed.

(1) This list shall be updated annually or within 15 days of the hiring of a qualified employee.

(a) Working aloft from a pole. On energized conductors of more than 600 volts there shall be not less than two qualified

employees. Both shall be trained and proficient in current pole-top rescue procedures, first-aid and CPR.

Note: The following exceptions apply for routine maintenance and non-emergency situations:

- 1) When operating switches, fuses or test equipment from the ground by means of an insulated operating handle or stick;
- 2) When a registered apprentice with a minimum of 2000 hours experience who shall have completed training in and be proficient at pole-top rescue techniques, first-aid and CPR is assigned to work with a qualified lineworker

for the purpose of training;

Note: The following exceptions apply for emergency situations and storm restoration work:

- 1) Where life or public safety are in immediate danger, one qualified employees may remove only the immediate hazard if no other qualified employees are immediately available and in the judgement of the qualified employee at the site the work can be performed safely alone; or,
- 2) When restoring power during widespread storm outages provided that the minimum working distance and the minimum clear hot stick distance can be maintained, and in the judgement of the qualified employee at the site the work can be performed safely alone, and another person is present to observe and assist in ground activities.

(2) Working aloft from a bucket. on energized conductors of more than 600 volts, there shall be not less than two qualified employees. Both shall be trained and proficient in operating the lower bucket controls, removing an injured employee from the bucket, first-aid and CPR. There shall be provided a mechanical means for removing an injured employee from the bucket.

Note: The following exceptions to the rules apply, provided that there is a second person proficient in the operation of the lower bucket controls, first-aid and CPR present:

- 1) When re-fusing circuits or equipment with a hot stick;
- 2) When operating switches by means of operating handles or

switch sticks;

3) When a qualified apprentice is assigned to work with a journeyman for the purpose of training;

4) When installing or removing a hot line clamp connection with a hot stick, provided the connection or disconnection does not interrupt a load;

5) Where life or the public safety are in immediate danger, one worker may remove only the immediate hazard if no other workers are immediately available and in the judgement of the qualified employee at the site the work can be performed safely alone.