

HAWAII ADMINISTRATIVE RULES

TITLE 12

DEPARTMENT OF LABOR AND INDUSTRIAL RELATIONS

SUBTITLE 8

HAWAII OCCUPATIONAL SAFETY AND HEALTH DIVISION

PART 2

GENERAL INDUSTRY STANDARDS

CHAPTER 60

GENERAL SAFETY AND HEALTH REQUIREMENTS

§12-60-1	Application
§12-60-2	Safety and health programs
§12-60-3	Employee responsibilities
§12-60-4	Removal of safety devices
§12-60-5	Use of intoxicants or drugs
§12-60-6	Requirements of competence
§12-60-7	Requirement of quality
§12-60-8	
	thru
§12-60-49	Reserved
§12-60-50	Standards

Historical note: Chapter 60 of title 12 is based upon chapter 201 of the Hawaii Occupational Safety and Health Standards, Rules and Regulations. [Eff 7/11/74; am 6/7/76; am 12/30/76; am 8/22/77; R 12/6/82]

§12-60-1 Application. The general provisions of these standards shall not be used when there are more specific provisions in other sections of the standards. [Eff 12/6/82; am 8/16/84] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-2 Safety and health programs. (a) Scope and application. This standard shall apply to all employers with employees doing business in the State.

- (1) Every employer shall comply with the state laws, standards, and rules regarding a safe place of employment and safe practices, and shall do everything reasonable and necessary to protect the life, safety, and health of the employees.
- (2) Employers involved with construction or related activities shall provide safe and healthful work places and practices that protect the employees and the affected general public as well.
- (3) Every employer shall provide safe work places and practices by elimination or reduction of existing or potential hazards. Elimination of existing or potential hazards by design, process substitution, or other appropriate methods is preferred because it eliminates the need for further employee protection. When elimination is not feasible, reduction of existing or potential hazards to acceptable levels, using methods such as engineering

or administrative controls, isolation, or guarding, shall be promptly used. When these methods are inadequate to reach acceptable levels, personal protective equipment shall be provided and used.

Exception: Employers with less than 25 employees need not comply with (b) (1) below.

(b) Employer duties and responsibilities. An employer subject to this standard shall meet the following requirements:

- (1) Written safety and health program.
 - (A) The employer shall institute and maintain an effective safety and health program to identify, evaluate and control workplace hazards. Employer safety and health programs which were developed prior to the promulgation of this standard may be used to satisfy this requirement so long as they meet the criteria for an acceptable program set forth in (B) below.
 - (B) The program should
 - (i) Set forth policies, procedures, and practices that recognize and protect employees from occupational safety and health hazards.
 - (ii) Establish and communicate a clear goal for the safety and health program and the mechanisms which will be utilized in meeting this goal.
 - (iii) Provide for visible top management leadership in implementing the program and ensure that all workers at the site, including contract workers, are provided equally high quality safety and health protection, so that all will understand that management's commitment is serious.
 - (iv) Provide for and encourage employee involvement in the structure and operation of the program and in decisions that affect their safety and health, so that they will commit their insight and energy to achieving the safety and health program's goal and objectives. Involvement shall be accomplished through employee collective bargaining units, where appropriate.
 - (v) Assign and communicate responsibilities for all aspects of the safety and loss prevention program to managers, supervisors, and employees so that they all know and understand what is expected of them in the implementation of the program.
 - (vi) Provide a system to hold managers, supervisors, and employees accountable for their responsibilities under the safety and health program.
 - (vii) Provide a reliable system for employees to notify management personnel or safety and health committee members of conditions that appear hazardous or of non-compliance with the terms of the safety and health program without fear of reprisal and provide a mechanism to ensure timely and appropriate responses to correct these conditions.
 - (viii) Provide a mechanism to investigate accidents and "near miss" incidents, so that the root cause and means for preventing a recurrence are identified. For the purposes of this rule, the term "accident" means any unexpected happening that interrupts the work sequence or process and that may result in injury, illness, or property damage.

- (ix) Provide a means to review injury and illness trends over time, so that patterns with common causes can be identified and eliminated.
 - (x) Establish a mechanism for the employer to conduct ongoing, periodic in-house safety and health inspections so that new or previously missed hazards or failures in controls are identified. Inspections shall be conducted with a frequency necessary to be effective.
 - (xi) Address the impact of emergency situations and develop written plans and procedures to insure employee safety during emergencies. For the purpose of this standard, the term "emergency situation" means an unforeseen single event or combination of events that calls for immediate action to prevent, control or contain injury or illness to person or damage to property.
 - (xii) Establish procedures for transmitting and enforcing safe work practices in the workplace through training, positive reinforcement, as a reward system, public recognition, etc., correction of unsafe performance, and, if necessary, reinforcement of work practices through a clearly defined and communicated disciplinary system.
- (C) The program shall be made available to the employees or their collective bargaining agent or both, upon request.
- (2) Safe work practices.
- (A) The employer shall eliminate or control all existing and potential hazards within the workplace in a timely manner, using one or more of the following:
 - (i) Engineering and work practice controls designed to control employee exposures to safety and health hazards by modifying the source to reduce exposure.
 - (ii) Administrative controls designed to control employee exposure to safety and health hazards.
 - (iii) Requirements for the distribution and proper use of personal protective equipment.
 - (iv) A program of medical examinations or evaluations conducted by a qualified physician or health practitioner when required by a standard.
 - (B) The employer shall ensure that practices are understood by all employees and are underscored through training, positive reinforcement, correction of unsafe performance, and, if necessary, through a clearly defined and communicated disciplinary system.
- (3) Periodic inspections. The employer shall conduct periodic in-house safety and health inspections so that new or previously missed hazards or failures in engineering, work practice, and administrative controls are identified. The in-house inspections will be conducted by individuals who are trained to recognize hazardous conditions, as members of the safety and health committee or a person designated and trained by the employer for the facility's safety and health program.
- (4) Safety and health training.
- (A) The employer shall develop and institute a safety and health training program for all employees so they have an understanding of the hazards to which they may be exposed, and the procedures or practices needed to protect them from these hazards.

§12-60

- (B) In addition, supervisors and managers shall be trained in the elements of the employer's safety and health program and in the specific responsibilities assigned to them under the program.
- (C) The employer shall ensure that the supervisors and managers understand their responsibilities under the safety and health program and their importance to the safety and health of the workplace. In particular, the training for managers and supervisors shall enable them to:
 - (i) Recognize potential hazards;
 - (ii) Maintain safety and health protection in the work area; and
 - (iii) Reinforce employee training on the nature of the potential hazards and required protective measures.

(c) The use of any machinery, tool, material, or equipment which is not in compliance with any applicable requirement of these standards is prohibited. The machine, tool, material, or equipment shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.

(d) The employer shall permit only those employees qualified by training or experience to operate equipment and machinery.

(e) For procedures in reporting accidents, consult section 12-52-8.

(f) All safety devices and safeguards in use shall be kept sound and operable.

(g) Any employee having knowledge of the existence of any unsafe device, practice, operation, safeguard, equipment, or condition shall promptly inform the supervisor or person in charge. A supervisor or person in charge to whose attention the existence of any unsafe device, practice, operation, safeguard, equipment, or condition is called shall take immediate steps to correct the unsafe condition or practice. [Eff 12/6/82; am 8/16/84; am 9/21/96] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-3 Employee responsibilities. The employee shall not knowingly perform work in an unsafe manner or in an unsafe environment without the safeguards provided for in these standards. The employee shall not tamper with or render ineffective any safety device or safeguard and shall use the safety devices provided for personal protection. [Eff. 12/6/82] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-4 Removal of safety devices. No person shall remove, displace, damage, destroy, or carry off any safety device, safeguard, notice, or warning furnished for use in any employment or place of employment. [Eff. 12/6/82] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-5 Use of intoxicants or drugs. The use of intoxicants or harmful drugs while on duty is prohibited. No person shall be permitted to work under the influence of liquor or drugs and shall be removed from the work premises if found under the influence of liquor or drugs. [Eff. 12/6/82] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-6 Requirements of competence. When work is to be performed by or under the supervision of a designated person, that person shall have the degree of competence necessary to perform or direct the work in a safe

manner. [Eff. 12/6/82] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-7 Requirement of quality. Materials, devices, structures and methods and procedures of operation which are required by these standards, and which are described by general descriptive terms such as adequate, proper, sufficient and the like, shall be of such kind and quality as a reasonable and prudent person experienced in the work would require in order to effect a safe operation. [Eff. 12/6/82] (Auth: HRS §396-4) (Imp: HRS §396-4)

§12-60-8 thru 12-60-49 Reserved.

§12-60-50 Standards. (a) Incorporation of federal standard.

Title 29, Part 1910 of the Code of Federal Regulations, 2012 Edition published as of July 1, 2012, by the U.S. Government Printing Office, U.S. Superintendent of Documents, Washington, DC 20402-0001, is made a part of this chapter except as provided in subsection (b) through (d)

(b) State specific definitions. The following definitions are in addition to those found in section 12-50-2 and subsection (a). Where a definition exists in both subsection (a) and this subsection, the definition contained in this subsection supersedes the definition in subsection (a). This State's adoption of 29 CFR Part 1910.2, Definitions, is amended by adding the following definitions:

"Access" means the right and opportunity to examine and copy.

"Analysis using exposure or medical records" means any compilation of data, or any research, or statistical or other studies based at least in part on information collected from individual employee exposure or medical records or information collected from health insurance claims records, provided that either the analysis has been reported to the employer or no further work is currently being done by the person responsible for preparing the analysis.

"ANSI Z9.2" means ANSI Z9.2-1979, Fundamentals Governing the Design and Operation of Local Exhaust Systems.

"ANSI Z88.2" means ANSI Z88.2-1984, Practices for Respiratory Protection.

"Coal tar pitch volatiles" mean, as used in Exhibit A, the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt, CAS 8052-42-4 and CAS 64742-93-4), wood, and other organic matter.

"Designated representative," means any individual or organization to whom an employee gives written authorization to exercise a right of access. For the purpose of access to employee exposure records and analyses using exposure or medical records, a recognized or certified collective-bargaining agent shall be treated automatically as a designated representative without regard to written employee authorization.

"Employee exposure record" means a record containing any of the following kinds of information:

- (1) Environmental (workplace) monitoring or measuring of a toxic substance or a harmful physical agent, including personal, area, grab, or wipe sampling, or any other form of sampling, as well as related collection and analytical methodologies, calculations, and other background data relevant to interpretation of the results obtained;

- (2) Biological monitoring results which directly assess the absorption of a substance or agent by body systems (e.g., the level of a chemical in the blood, urine, breath, hair, fingernails, etc.) but not including results which assess the biological effect of a substance or agent or which assess an employee's use of alcohol or drugs;
- (3) Material safety-data sheets; and
- (4) A chemical inventory or any other record which reveals where and when used and the identity (e.g., chemical, common, or trade name) of a toxic substance or harmful physical agent.

"Employee medical record" means a record concerning the health status of an employee, which is made or maintained by a physician or nurse, or any other health care personnel or technician, including:

- (1) Medical and employment questionnaires or histories (including job description and occupational exposures);
- (2) The results of medical examinations (pre-employment, pre-assignment, periodic, or episodic) and laboratory tests (including chest and other X-ray examinations taken for the purposes of establishing a base-line or detecting occupational illness, and all biological monitoring not defined as an "employee exposure record");
- (3) Medical opinions, diagnoses, progress notes, and recommendations;
- (4) Descriptions of treatments and prescriptions;
- (5) First-aid records; and
- (6) Employee medical complaints; but does not include medical information in the form of:
 - (A) Physical specimens (e.g., blood or urine samples) which are routinely discarded as a part of normal medical practice; or
 - (B) Records concerning health insurance claims if maintained separately from the employer's medical program and its records, and not accessible to the employer by employee name or other direct personal identifier (e.g., social security number, payroll number, etc.); or
 - (C) Records created solely in preparation for litigation which are privileged from discovery under the applicable rules of procedure or evidence; or
 - (D) Records concerning voluntary employee assistance programs (alcohol, drug abuse, or personal counseling programs) if maintained separately from the employer's medical program and its records.

"Excursion factor" means the magnitude of the permissible excursion above the PEL-TWA for those substances not preceded by a "C" in Exhibit A and not found in Exhibit B.

"Exposure" or "exposed" means that an employee is subjected to a toxic material or harmful physical agent in the course of employment through any route of entry, such as inhalation, ingestion, skin contact, or absorption, and includes past exposure and potential exposure.

"Health professional" means a physician, occupational health nurse, industrial hygienist, toxicologist, or epidemiologist, providing medical or other occupational health services to exposed employees.

"Permissible Exposure Limit (PEL)" means the airborne concentrations of substances to which it is believed that nearly all workers may be exposed with no adverse effect.

"Permissible Exposure Limit-Ceiling (PEL-C)" means the concentration that shall not be exceeded even instantaneously. The PEL-C is the

employee's exposure, which shall not be exceeded during any part of the workday. 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.

"Permissible Exposure Limit-Short Term Exposure Level (PEL-STEL)" means the employee's 15-minute time weighted average exposure, which shall not be exceeded at any time during a workday 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 workday.

"Permissible Exposure Limit-Time Weighted Average (PEL-TWA)" means the employee's average airborne exposure, which shall not be exceeded in any 7- to 8-hour work shift of a 40-hour workweek.

"Record" means any item, collection, or grouping of information regardless of the form or process by which it is maintained (e.g., paper document, microfiche, microfilm, X-ray film, or automated data processing).

"Specific chemical identity" means the chemical name, Chemical Abstracts Service (CAS) Registry Number, or any other information that reveals the precise chemical designation of the substance.

"Specific written consent" means a written authorization containing:

- (1) The name and signature of the employee authorizing the release of medical information;
- (2) The date of the written authorization;
- (3) The name of the individual or organization that is authorized to release the medical information;
- (4) The name of the designated representative (individual or organization) that is authorized to receive the released information;
- (5) A general description of the medical information that is authorized to be released;
- (6) A general description of the purpose for the release of the medical information; and
- (7) A date or condition upon which the written authorization will expire (if less than one year); but A written authorization does not authorize the release of medical information not in existence on the date of written authorization, unless the release of future information is expressly authorized, and does not operate for more than one year from the date of written authorization. A written authorization may be revoked in writing prospectively at any time.

"Toxic material or harmful physical agent" means any chemical substance, biological agent (bacteria, virus, fungus, etc.), or physical stress (noise, heat, cold, vibration, repetitive motion, ionizing and non-ionizing radiation, hypo- or hyperbaric pressure, etc.) which:

- (1) Is listed in the latest printed edition of the National Institute for Occupational Safety and Health (NIOSH) Registry of Toxic Effects of Chemical Substances (RTECS); or
- (2) Has yielded positive evidence of an acute or chronic health hazard in testing conducted by, or known to, the employer; or
- (3) Is the subject of a material safety-data sheet kept by or known to the employer indicating that the material may pose a hazard to human health.

"Trade secret" means any confidential formula, pattern, process, device, or information or compilation of information that is used in an employer's business and that gives the employer an opportunity to

obtain an advantage over competitors who do not know or use it.

(c) State specific standards for Occupational Noise Exposure. The following standards are in effect in addition to those adopted by subsection (a). Where standards on a particular item exist in both subsection (a) and this subsection, the standards contained in this subsection supersede the standards in subsection (a).

(1) 29 CFR 1910.95 Table G-16 is amended to read as follows:

"TABLE G-16-PERMISSIBLE NOISE EXPOSURES¹

Duration per day, hours	Sound level dBA slow response
8.....	90
6.....	92
4.....	95
3.....	97
2.....	100
1-1/2.....	102
1.....	105
1/2.....	110
1/4 or less.....	115

¹When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect shall be considered, rather than the individual effect of each. If the sum of the following fractions: $C_1/T_1 + C_2/T_2 + \dots + C_n/T_n$ exceeds unity, then, the mixed exposure shall be considered to exceed the limit value. C_n indicates the total time of exposure at a specific noise level, an T_n indicates the total time of exposure permitted at that level.

Exposure to impulsive or impact noise shall not exceed 140 dB peak sound pressure level."

(2) 29 CFR 1910.95(c) (1) is amended to read as follows:

(A) The employer shall administer a continuing, effective hearing conservation program, as described in paragraphs (c) through (o) of this section, whenever employee noise exposures equal or exceed an 8-hour time-weighted average sound level (TWA) of 85 decibels measured on the A scale (slow response) or a dose of 50 percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with appendix (a) and table G-16a, and without regard to any attenuation provided by the use of personal protective equipment.

(d) State specific standards for Toxic and Hazardous Substances. The following standards are in effect in addition to those adopted by subsection (a). Where standards on a particular item exist in both subsection (a) and this subsection, the standards contained in this subsection supersede the standards in subsection (a).

(1) 29 CFR 1910.1000 is amended by adding the following:

(A) All employers shall measure, monitor, and record employee exposure to toxic materials or harmful physical agents. The measurement shall determine if any employee may be exposed to concentrations of the toxic materials or harmful physical agents at or above the permissible exposure limit. The determination shall be made each time there is a change in production, process, or control measures which could result in an increase in concentrations of these materials

or agents. A written record of the determination shall be made and shall contain at least:

- (i) Any information, observations, or calculations that may indicate employee exposure to toxic or potentially toxic materials or harmful physical agents;
 - (ii) Any measurements taken;
 - (iii) Any employee complaints of symptoms that may be attributable to exposure to toxic or potentially toxic materials or harmful physical agents;
 - (iv) Date of determination, work being performed at the time, location within work site, name, and social security number of each employee considered; and
 - (v) Any other information that may be relevant to employee exposure.
- (B) When medical examinations are appropriate for adequate employee protection, the employer shall, at the employer's cost, provide examinations to best determine the effect of toxic material or harmful physical agents on the health of employees.
- (2) 29 CFR 1910.1000(a) is amended to read as follows:
- (A) Air Contaminants Limits Column. An employee's exposure to any substance listed in Exhibit A shall not exceed the PEL-TWA, PEL-STEL and PEL-Ceiling specified for that substance shown in Exhibit A.
 - (i) Because many industrial exposures are not continuous, but instead are short-term, or intermittent, to which the PEL-TWAs cannot be applied, PEL-STELs for selected air contaminants are listed in Exhibit A.
 - (ii) The PEL-STELs listed in Exhibit A are 15-minute time-weighted average (TWA) exposures that shall not be exceeded at any time during a workday.
 - (iii) Exposures at the PEL-STEL shall not be longer than 15-minutes and shall not be repeated more than four times per day. There shall be at least 60 minutes between successive exposures at the PEL-STEL.
 - (B) Skin Designation. To prevent or reduce skin absorption, an employee's skin exposure to substances listed in Exhibit A with an "X" in the Skin Designation columns 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.
- (3) 29 CFR 1910.1000(b) is amended to read as follows:
- (A) Exhibit B.
 - (i) PEL-TWA. An employee's exposure to any material listed in Exhibit A, in any 7- to 8-hour work shift of a 40-hour workweek, shall not exceed the PEL-TWA given for that material in Exhibit B
 - (ii) Acceptable ceiling concentration. An employee's exposure to a material listed in Exhibit B shall not exceed at any time during a 7- to 8-hour work shift the acceptable ceiling concentration given for that material in the table.
- (4) The incorporation of Exhibit A at the end of section 12-60-50 entitled "Limits for Air Contaminants" dated July 1, 2011, is made a part of this chapter.

§12-60

- (5) The incorporation of Exhibit B at the end of section 12-60-50 entitled "More Limits for Air Contaminants" dated July 1, 2011, is made a part of this chapter. [Eff 2/13/12, am 11/2/12]
(Auth: HRS §396-4) (Imp: HRS §396-4)

Historical note: §12-60-50 is based substantially upon Part 2. [Eff 6/8/82, am 7/24/94, am 9/30/94, am 8/10/95, am 1/16/96, am 2/8/97, am 10/23/97, am 7/6/98, am 3/29/99, am 7/6/99, am 2/14/00, am 12/29/00, am 12/29/01, am 5/21/04, am 5/5/05, am 9/1/05, am 3/31/06, am 12/21/06, am 4/19/07, am 8/29/07, am 5/2/08, am 7/27/09, R 2/13/12] and Part 8 [Eff 7/12/82, am 5/28/83, am 6/16/84, am 8/5/88, am 3/22/91, am 6/8/92, am 2/26/93, am 7/25/94, am 8/10/95, am 1/26/96, am 9/21/96, am 11/16/96, am 2/8/97, am 5/2/97, am 7/10/97, am 4/11/98, am 7/6/98, am 3/29/99, am 12/29/00, am 8/9/01, am 12/29/01, am 5/21/04, am 3/31/06, am 12/21/06, am 4/19/07, am 7/27/09, R 2/13/12]

Exhibit A (July 1, 2011)
Limits for Contaminants¹

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Acetaldehyde	75-07-0	100	180	150	270	-	-	-
Acetic acid	64-19-7	10	25	15	37	-	-	-
Acetic anhydride	108-24-7	-	-	-	-	5	20	-
Acetone	67-64-1	750	1,780	1,000	2,375	-	-	-
Acetonitrile	75-05-8	40	70	60	105	-	-	X
2-Acetylaminofluorene	53-96-3	See §1910.1003						
Acetylene dichloride		See 1,2-Dichloroethylene						
Acetylene tetrabromide	79-27-6	1	14	1.5	20	-	-	-
Acetylsalicylic acid (Aspirin)	50-78-2	-	5	-	-	-	-	-
Acrolein	107-02-8	0.1	0.25	0.3	0.8	-	-	-
Acrylamide	79-06-1	-	0.03	-	-	-	-	X
Acrylic acid	79-10-7	2	6	-	-	-	-	X
Acrylonitrile	107-13-1	See §1910.1045						
Aldrin	309-00-2	-	0.25	-	0.75	-	-	X
Allyl alcohol	107-18-6	2	5	4	10	-	-	X
Allyl chloride	107-05-1	1	3	2	6	-	-	-
Allyl glycidyl ether (AGE)	106-92-3	5	22	10	44	-	-	X
Allyl propyl disulfide	2179-59-1	2	12	3	18	-	-	-
V- Alumina	1344-28-1							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Aluminum (as Al)	7429-90-5							
Metal & oxide								
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Pyro powders		-	5	-	-	-	-	-
Welding fumes		-	5	-	-	-	-	-
Soluble salts		-	2	-	-	-	-	-
Alkyls		-	2	-	-	-	-	-
4-Aminodiphenyl	92-67-1	See §1910.1003						
2-Aminoethanol		See Ethanolamine						
2-Aminopyridine	504-29-0	0.5	2	2	4	-	-	-
Amitrole	61-82-5	-	0.2	-	-	-	-	-
Ammonia	7664-41-7	25	18	35	27	-	-	-
Ammonium chloride Fume	12125-02-9	-	10	-	20	-	-	-
Ammonium sulfamate	7773-06-0							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
n-Amyl acetate	628-63-7	100	525	150	800	-	-	-
sec-Amyl acetate	626-38-0	125	650	150	800	-	-	-
Aniline and homologs	62-53-3	2	8	5	20	-	-	X

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Anisidine (o-, p-isomers)	29191-52-4	0.1	0.5	-	-	-	-	X
Antimony and compounds (as Sb)	7440-36-0	-	0.5	-	-	-	-	-
Antimony trioxide	1309-64-4	-	0.5	-	-	-	-	-
Handling and use, as Sb		-	0.5	-	-	-	-	-
ANTU (Alpha Naphthylthiourea)	86-88-4	-	0.3	-	0.9	-	-	-
Arsenic, organic compounds (as As)	7440-38-2	-	0.2	-	-	-	-	-
Arsenic, inorganic compounds, (as As)	7440-38-2	See §1910.1018						-
Arsine	7784-42-1	0.05	0.2	-	-	-	-	-
Asbestos	Varies	See §1910.1001 and 1926.1101						-
Asphalt (petroleum) fumes	8052-42-4	-	5	-	10	-	-	-
Atrazine	1912-24-9	-	5	-	-	-	-	-
Azinphos-methyl	86-50-0	-	0.2	-	0.6	-	-	X
Barium, soluble compounds (as Ba)	7440-39-3	-	0.5	-	-	-	-	-
Barium sulfate	7727-43-7	-	-	-	-	-	-	-
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Benomyl	17804-35-2	-	-	-	-	-	-	-
Total dust		0.8	10	1.3	15	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Benzene; see §1910.1028	71-43-2	See Exhibit B for operations excluded						-
Benzidine	92-87-5	See §1910.1003						-
p-Benzoquinone		See Quinone						-
Benzo(a)pyrene		See Coal tar pitch volatiles						-
Benzoyl peroxide	94-36-0	-	5	-	-	-	-	-
Benzyl chloride	100-44-7	1	5	-	-	-	-	-
Beryllium and beryllium compounds (as Be)	7440-41-7	0.002	-	0.005	-	0.025	-	-
		(see Exhibit B)						-
Biphenyl		See Diphenyl						-
Bismuth telluride, Undoped	1304-82-1	-	-	-	-	-	-	-
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Bismuth telluride, Se-doped		-	5	-	10	-	-	-
Borates, tetra, sodium salts		-	-	-	-	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Anhydrous	1330-43-4	-	1	-	-	-	-	-
Decahydrate	1303-96-4	-	5	-	-	-	-	-
Pentahydrate	12179-04-3	-	1	-	-	-	-	-
Boron oxide	1303-86-2							
total dust		-	10	-	20	-	-	-
Respirable fraction		-	-	-	-	-	-	-
Boron tribromide	10294-33-4	-	-	-	-	1	10	-
Boron trifluoride	7637-07-2	-	-	-	-	1	3	-
Bromacil	314-40-9	1	10	2	20	-	-	-
Bromine	7726-95-6	0.1	0.7	0.3	2	-	-	-
Bromine pentafluoride	7789-30-2	0.1	0.7	0.3	2	-	-	-
Bromoform	75-25-2	0.5	5	-	-	-	-	X
Butadiene (1,3-Butadiene)	106-99-0	See	§1910.1051					
Butane	106-97-8	800	1,900	-	-	-	-	-
Butanethiol		See	Butyl mercaptan					
2-Butanone (Methyl ethyl ketone) (MEK)	78-93-3	200	590	300	885	-	-	-
2-Butoxyethanol	111-76-2	25	120	75	360	-	-	X
n-Butyl-acetate	123-86-4	150	710	200	950	-	-	-
sec-Butyl acetate	105-46-4	200	950	250	1,190	-	-	-
tert-Butyl acetate	540-88-5	200	950	250	1,190	-	-	-
Butyl acrylate	141-32-2	10	55	-	-	-	-	-
n-Butyl alcohol	71-36-3	-	-	-	-	50	150	X
sec-Butyl alcohol	78-92-2	100	305	150	455	-	-	-
tert-Butyl alcohol	75-65-0	100	300	150	450	-	-	-
Butylamine	109-73-9	-	-	-	-	5	15	X
tert-Butyl chromate (as CrO ₃)	1189-85-1	-	-	-	-	-	-	X
n-Butyl glycidyl ether (BGE)	2426-08-6	25	135	-	-	-	-	-
n-Butyl lactate	138-22-7	5	25	-	-	-	-	-
Butyl mercaptan	109-79-5	0.5	1.5	-	-	-	-	-
o-sec Butylphenol	89-72-5	5	30	-	-	-	-	X
p-tert-Butyltoluene	98-51-1	10	60	20	120	-	-	-
Cadmium fume (as Cd)	7440-43-9	-	-	-	-	-	0.05	-
Cadmium dust (as Cd)	7440-43-9	-	0.05	-	-	-	0.2	-
Calcium carbonate	1317-65-3							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Calcium cyanamide	156-62-7	-	0.5	-	1	-	-	-
Calcium hydroxide	1305-62-0	-	5	-	-	-	-	-
Calcium oxide	1305-78-8	-	2	-	-	-	-	-
Calcium silicate	1344-95-2							
Total dust		-	10	-	-	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Respirable fraction		-	5	-	-	-	-	-
Calcium sulfate	7778-18-9							
Total dust		-	10	-	-	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Camphor, synthetic	76-22-2	0.3	2	-	-	-	-	-
Caprolactam	105-60-2							
Dust		-	1	-	3	-	-	-
Vapor & Aerosol		5	20	-	40	-	-	-
Captafol (DifolatanR)	2425-06-1	-	0.1	-	-	-	-	-
Captan	133-06-2	-	5	-	15	-	-	-
Carbaryl (Sevin ^R)	63-25-2	-	5	-	10	-	-	-
Carbofuran (Furadan ^R)	1563-66-2	-	0.1	-	-	-	-	-
Carbon black	1333-86-4	-	3.5	-	7	-	-	-
Carbon dioxide	124-38-9	5,000	9,000	15,000	27,000	-	-	-
Carbon disulfide	75-15-0	4	12	12	36	-	-	X
Carbon monoxide	630-08-0	35	40			200	229	-
Carbon tetrabromide	558-13-4	0.1	1.4	0.3	4	-	-	X
Carbon tetrachloride	56-23-5	2	12.6	-	-	-	-	-
Carbonyl fluoride	353-50-4	2	5	5	15	-	-	-
Catechol (Pyrocatechol)	120-80-9	5	20	-	-	-	-	X
Cellulose	9004-34-6							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Cesium hydroxide	21351-79-1	-	2	-	-	-	-	-
Chlordane	57-74-9	-	0.5	-	2	-	-	X
Chlorinated camphene	8001-35-2	-	0.5	-	1	-	-	X
Chlorinated diphenyl Oxide	55720-99-5	-	0.5	-	2	-	-	-
Chlorine	7782-50-5	0.5	1.5	1	3	-	-	-
Chlorine dioxide	10049-04-4	0.1	0.3	0.3	0.9	-	-	-
Chlorine trifluoride	7790-91-2	-	-	-	-	0.1	0.4	-
Chloroacetaldehyde	107-20-0	-	-	-	-	1	3	-
Chloroacetone	78-95-5	-	-	-	-	1	4	X
α -Chloroacetophenone (Phenacyl chloride)	532-27-4	0.05	0.3	-	-	-	-	-
Chloroacetyl chloride	79-04-9	0.05	0.2	-	-	-	-	-
Chlorobenzene	108-90-7	75	350	-	-	-	-	-
<i>o</i> -Chlorobenzylidene malonitrile	2698-41-1	-	-	-	-	0.05	0.4	X
Chlorobromomethane	74-97-5	200	1,050	250	1,300	-	-	-
2-Chloro-1,3-Butadiene				see β -Chloroprene				
Chlorodifluoromethane	75-45-6	1,000	3,500	1,250	4,375	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Chlorodiphenyl (42% chlorine) (PCB)	53469-21-9	-	1	-	2	-	-	X
Chlorodiphenyl (54% Chlorine) (PCB)	11097-69-1	-	0.5	-	1	-	-	X
1-Chloro, 2,3-epoxypropane		See Epichlorohydrin						
2-Chloroethanol		See Ethylene chlorohydrin						
Chloroethylene		See Vinyl chloride						
Chloroform (Trichloromethane)	67-66-3	2	9.78	-	-	-	-	-
bis(Chloromethyl) ether	542-88-1	see §1910.1003						
Chloromethyl methyl ether	107-30-2	see §1910.1003						
1-Chloro-1-nitropropane	600-25-9	2	10	-	-	-	-	-
Chloropentafluoroethane	76-15-3	1,000	6,320	-	-	-	-	-
Chloropicrin	76-06-2	0.1	0.7	0.3	2	-	-	-
β-Chloroprene	126-99-8	10	35	-	-	-	-	X
o-Chlorostyrene	2039-87-4	50	285	75	428	-	-	-
o-Chlorotoluene	95-49-8	50	250	75	375	-	-	X
2-Chloro-6-(trichloromethyl) pyridine	1929-82-4							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Chlorpyrifos	2921-88-2	-	0.2	-	0.6	-	-	X
Chromic acid and chromates (as CrO ₃)	Varies with compound	-	-	-	-	-	0.1	-
Chromite ore processing (Chromate), (as Cr)		-	0.05	-	-	-	-	-
Chromium (II)	7440-47-3	-	0.5	-	-	-	-	-
Chromium (III) compounds (as Cr)	7440-47-3	-	0.5	-	-	-	-	-
Chromium (VI) Water soluble & insoluble		See §1910.1026 and §1926.1126						-
Chromium metal (as Cr)	7440-47-3	-	0.5	-	-	-	-	-
Chromyl chloride	14977-61-8	0.025	0.15	-	-	-	-	-
Chrysene		See Coal tar pitch volatiles						
Clopidol	2971-90-6							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Coal dust (less than 5% SiO ₂), Respirable fraction		-	2	-	-	-	-	-
Coal dust (greater than or equal to 5% SiO ₂), Respirable quartz fraction		-	0.1	-	-	-	-	-
Coal tar pitch volatiles (benzene soluble fraction), anthracene, BaP, phenanthrene, acridine, chrysene, pyrene	65966-93-2	-	0.2f	-	-	-	-	-
Cobalt metal, dust, and fume (as Co)	7440-48-4	-	0.05	-	-	-	-	-
Cobalt carbonyl (as Co)	10210-68-1	-	0.1	-	-	-	-	-
Cobalt hydrocarbonyl (as Co)	16842-03-8	-	0.1	-	-	-	-	-
Coke oven emissions								
Copper Fume (as Cu)	7440-50-8	-	0.1	-	-	-	-	-
Copper Dusts and mists (as Cu)		-	1	-	2	-	-	-
Cotton dust (raw)								
Crag herbicide (Sesone) (Sodium 2,4-dichlorophenoxyethyl sulfate)	136-78-7							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Cresol, all isomers	1319-77-3	5	22	-	-	-	-	X
Crotonaldehyde	123-73-9	2	6	6	18	-	-	-
	4170-30-3							
Crufomate	299-86-5	-	5	-	20	-	-	-
Cumene	98-82-8	50	245	75	365	-	-	X
Cyanamide	420-04-2	-	2	-	-	-	-	-
Cyanides (as CN)	Varies with compound	-	5	-	-	-	-	X
Cyanogen	460-19-5	10	20	-	-	-	-	-
Cyanogen chloride	506-77-4	-	-	-	-	0.3	0.6	-
Cyclohexane	110-82-7	300	1,050	375	1,300	-	-	-
Cyclohexanol	108-93-0	50	200	-	-	-	-	X
Cyclohexanone	108-94-1	25	100	100	400	-	-	X
Cyclohexene	110-83-8	300	1,015	-	-	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Cyclohexylamine	108-91-8	10	40	-	-	-	-	-
Cyclonite	121-82-4		1.5	-	3	-	-	X
Cyclopentadiene	542-92-7	75	200	75	200	-	-	-
Cyclopentane	287-92-3	600	1,720	900	2,580	-	-	-
Cyhexatin	13121-70-5	-	5	-	10	-	-	-
2,4-D (Dichloro- phenoxyacetic acid)	94-75-7	-	10	-	20	-	-	-
DDT (Dichlorodiphenyl- trichloroethane)	50-29-3	-	1	-	3	-	-	X
Decaborane	17702-41-9	0.05	0.3	0.15	0.9	-	-	X
Demeton (Systox ^R)	8065-48-3	-	0.1	0.03	0.3	-	-	X
Diacetone alcohol (4-hydroxy-4-methyl- 2-pentanone)	123-42-2	50	240	75	360	-	-	-
1,2-Diaminoethane		See Ethylenediamine						
Diazinon	333-41-5	-	0.1	-	0.3	-	-	X
Diazomethane	334-88-3	0.2	0.4	-	-	-	-	-
Diborane	19287-45-7	0.1	0.1	-	-	-	-	-
1,2-Dibromo- 3-chloropropane	96-12-8	See §1910.1044						
2-N-Dibutylamino- ethanol	102-81-8	2	14	4	28	-	-	X
Dibutyl phosphate	107-66-4	1	5	2	10	-	-	-
Dibutyl phthalate	84-74-2	-	5	-	10	-	-	-
Dichloroacetylene	7572-29-4	-	-	-	-	0.1	0.4	-
o-Dichlorobenzene	95-50-1	-	-	-	-	50	300	-
p-Dichlorobenzene	106-46-7	75	450	110	675	-	-	-
3,3'-Dichlorobenzidine	91-94-1	See §1910.1003						
Dichlorodifluoromethane	75-71-8	1,000	4,950	1,250	6,200	-	-	-
1,3-Dichloro-5,5- dimethyl hydantoin	118-52-5	-	0.2	-	0.4	-	-	-
1,1-Dichloroethane	75-34-3	100	400	250	1,010	-	-	-
1,2-Dichloroethylene	540-59-0	200	790	250	1,000	-	-	-
Dichloroethyl ether	111-44-4	5	30	10	60	-	-	X
Dichloromethane		See Methylene chloride						
Dichloromonofluoro- methane	75-43-4	10	40	-	-	-	-	-
1,1-Dichloro-1-nitro- ethane	594-72-9	2	10	10	60	-	-	-
1,2-Dichloropropane		See Propylene dichloride						
1,3-Dichloropropene	542-75-6	1	5	-	-	-	-	X
2,2-Dichloropropionic acid	75-99-0	1	6	-	-	-	-	-

Limits for Air Contaminants¹ (Continued)

Substance	CAS No. ^b	Air Contaminant Limits**						Skin Designation
		PEL-TWA*		PEL-STEL ^a		PEL-CEILING		
		ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	ppm ^c	mg/m ^{3d}	
Dichlorotetrafluoroethane	76-14-2	1,000	7,000	1,250	8,750	-	-	-
Dichlorvos (DDVP)	62-73-7	0.1	1	0.3	3	-	-	X
Dicrotophos	141-66-2	-	0.25	-	-	-	-	X
Dicyclopentadiene	77-73-6	5	30	-	-	-	-	-
Dicyclopentadienyl iron	102-54-5							
Total dust		-	10	-	20	-	-	-
Respirable fraction		-	5	-	-	-	-	-
Dieldrin	60-57-1	-	0.25	-	0.75	-	-	X
Diethanolamine	111-42-2	3	15	-	-	-	-	-
Diethylamine	109-89-7	10	30	25	75	-	-	-
2-Diethylaminoethanol	100-37-8	10	50	-	-	-	-	X
Diethylene triamine	111-40-0	1	4	-	-	-	-	-
Diethyl ether		See Ethyl ether						
Diethyl ketone	96-22-0	200	705	-	-	-	-	-
Diethyl phthalate	84-66-2	-	5	-	10	-	-	-
Difluorodibromomethane	75-61-6	100	860	150	1,290	-	-	-
Diglycidyl ether (DGE)	2238-07-5	0.1	0.5	-	-	-	-	-
Dihydroxybenzene		See Hydroquinone						
Diisobutyl ketone	108-83-8	25	150	-	-	-	-	-
Diisopropylamine	108-18-9	5	20	-	-	-	-	X
4-Dimethylaminoazobenzene	60-11-7	See §1910.1003						
Dimethoxymethane	109-87-5							
Dimethyl acetamide	127-19-5	10	35	15	50	-	-	X
Dimethylamine	124-40-3	10	18	10	50	-	-	-
Dimethylaminobenzene		See Xylidine						
Dimethylaniline (N-Dimethylaniline)	121-69-7	5	25	10	50	-	-	X
Dimethylbenzene		See Xylene						
Dimethyl-1, 2-dibromo-2,2-dichloroethyl phosphate	300-76-5	-	3	-	-	-	-	X
Dimethylformamide	68-12-2	10	30	20	60	-	-	X
2,6-Dimethyl-4-heptanone		See Diisobutyl ketone						
1,1-Dimethylhydrazine	57-14-7	0.5	1	1	2	-	-	X
Dimethylphthalate	131-11-3	-	5	-	10	-	-	-
Dimethyl sulfate	77-78-1	0.1	0.5	-	-	-	-	X
Dinitolmide (3,5-Dinitro-o-toluamide)	148-01-6	-	5	-	10	-	-	-

