



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

# GLOSSARY

For each agent having established ERPG® or OEL values, there is accompanying documentation that summarizes the basis for those values. This glossary was developed to aid in the interpretation of that documentation. The terms contained herein, and their explanations, are in the context of ERPG® and OEL documentation and might be inadequate for other purposes. This glossary is not intended to replace standard reference sources in medicine, toxicology, or industrial hygiene

**Absorbed Dose:** The amount of a substance penetrating across the exchange boundaries of an organism; the amount of substance entering an individual's body after exposure.

**Absorption:** To take in a substance across the exchange boundaries of an organism (skin, lungs, or gastrointestinal tract) and ultimately into body fluids and tissues.

**ACGIH®:** American Conference of Governmental Industrial Hygienists; an organization of professional personnel in governmental agencies or educational institutions engaged in occupational safety and health programs. ACGIH® develops and publishes recommended occupational exposure limits (see TLV®) for chemical substances and physical agents.

**Acrid:** Sharp, bitter, stinging, or irritating to the taste or smell.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Action Level:** In general, the level of a contaminant at which specified actions or countermeasures are to be taken.

**Acute:** Having a sudden onset or short duration.

**Acute Effect:** An adverse effect usually arising from a short exposure (minutes to hours) to a chemical.

**Acute Toxicity:** The adverse effects resulting from a single dose or single exposure to a substance. Ordinarily refers to effects occurring within a short time following administration. Terminology and units used for different descriptive categories of toxicity vary.

**Acute Toxicity Study:** Toxicity study durations of less than 5 days exposure.

**Adenoma:** A benign tumor with glandular structure or of a glandular organ.

**Adjuvant:** A substance that increases the antigenic response of a concomitantly administered substance by modulating the immune system.

**Adsorption:** The attachment of molecules or atoms to the surface of another substance; a process whereby one or more components of an interfacial layer between two bulk phases are either enriched or depleted.

**Aerosol:** A fine suspension, in air, of liquid or solid particles that are sufficiently small in size to remain airborne and, frequently, to be respirable.

**AIHA®:** American Industrial Hygiene Association®

**Allergic Reaction:** Immune response following exposure to a foreign agent or



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

substance in an individual who is hypersensitive to that substance as a result of prior exposures. Examples are some types of skin rashes and asthma.

**Ames Test:** A test for mutagenicity conducted in the bacterium *Salmonella typhimurium*.

**Anemia:** A condition in which the blood is deficient in red blood cells, hemoglobin, or total volume.

**Anesthetic Effect:** The loss of the ability to perceive pain and other sensory stimulation.

**Anoxia:** The lack of oxygen, or a significant reduction in oxygen.

**Apnea:** The temporary cessation of breathing.

**Appearance:** A description of a substance at room temperature and normal atmospheric conditions.

**Asphyxiant:** A chemical that displaces oxygen in the air, potentially resulting in insufficient oxygen to sustain life, especially in poorly ventilated areas. A chemical asphyxiant chemically interferes with the body's ability to take up and transport oxygen; a physical asphyxiant displaces oxygen in the environment.

**Assay:** The quantitative or qualitative evaluation of a hazardous substance; the results of such an evaluation.

**Asthma:** A condition marked by recurrent attacks of labored breathing and wheezing resulting from spasms of the upper airways of the lung.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Asymptomatic:** The lack of identifiable signs or symptoms.

**Ataxia:** A loss of balance with an unsteady gait; a failure of muscular coordination, total or partial.

**Atopy:** A genetic predisposition toward the development of intermediate (Type I) hypersensitivity reactions against common environmental antigens. Hay fever and asthma are two of the most commonly inherited allergies; contact dermatitis and gastrointestinal reactions are inherited less frequently.

**Atrophy:** A wasting away or failure to grow.

**Autoignition Temperature:** In general, the minimum temperature at which a material will ignite without the application of a flame or spark.

**Averaging Time:** The time period over which a function is measured yielding a time-weighted average (e.g., average concentration of an air pollutant).

**BEI<sup>®</sup>:** Biological exposure index (ACGIH<sup>®</sup>); procedures for estimating the amount of a material contained in the human body by measuring it (or its metabolic products) in tissue, body fluids, or exhaled air.

**Benign:** Not malignant or recurrent; often used to describe tumors that might grow in size but do not spread throughout the body.

**Bioaccumulation:** The accumulation or concentration of material in the body over a period of time.

**Biopsy:** The removal and examination of tissue, cells, fluids from a living body for examination.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Biological Half-Life:** The time required for a living tissue, organ, or organism to eliminate one-half of a substance that has been introduced into it.

**Biological Time Constant:** The time required for a portion of an absorbed chemical to undergo metabolic changes in the body.

**Body Burden:** The total amount of a chemical retained in the body.

**Boiling Point:** The temperature at which a liquid changes to a vapor.

**Büehler Test:** Test animals are initially exposed to the test substance by topical application under occlusive patch conditions (induction exposure). Following a rest period of 10–14 days, during which an immune response may develop, the animals are exposed to a “challenge” dose to determine if the test population reacts in a hypersensitive manner. The extent and degree of skin reaction to the challenge exposure in the test population is compared with that of the control population, which did not receive the induction exposure.

**BUN (Blood Urea Nitrogen):** Metabolic byproduct in the liver resulting from the breakdown of blood, muscle and protein. Abnormal levels can indicate kidney or liver disease.

**Burn:** The visible destruction or permanent change in skin, eyes, tissue, etc., at the site of contact.

**C:** Ceiling; the maximum allowable human exposure limit for an airborne substance, not to be exceeded even momentarily.

**CAS Number:** Chemical Abstracts Service number; a concise, unique means of chemical identification.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Cancer:** A cellular tumor that is usually associated with spread throughout the body and can be fatal.

**Carcinogen:** A substance or agent capable of causing or producing cancer.

**Carcinoma:** A malignant tumor of epithelial cell origin (e.g., skin, lung, breast), tending to infiltrate the surrounding tissue and give rise to metastases (tumors at distant sites).

**Case Control Study:** A study that starts with the identification of individuals with a disease or adverse health effect of interest and a suitable control group without the disease. The relationship of an attribute to the adverse health effect is examined by comparing how frequently (and at what levels) the attribute is present in the diseased and nondiseased groups.

**CEGL:** Continuous exposure guidance levels; established by the Committee on Toxicology of the National Research Council for the U.S. Department of Defense. CEGLs are intended for normal, long: lasting military operations. CEGLs are ceiling concentrations designed to avoid adverse health effects, either immediate or delayed, for exposure periods up to 90 days. See EEGl, SPEGL.

**Ceiling:** See C.

**Chemical Asphyxiant:** See asphyxiant.

**Chromosomal Aberrations:** A change in the normal number, size, or shape of chromosomes.

**Chromosomes:** One of several structures in the nucleus of eukaryotic cells. They



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

contain the genes (or hereditary material) in the form of threads of DNA.

**Chronic Effect:** An effect on a human or animal body, with symptoms that develop slowly over a long period of time or that persist.

**Chronic Toxicity:** Adverse health effects that can occur from prolonged, repeated exposure to relatively low levels of a substance; might have a chronic effect from an acute exposure.

**Chronic Toxicity Study:** Refers to toxicity study durations of greater than six months.

**Clinical Chemistry:** Analytical testing of the blood and other body fluids to determine the functioning of various organs and systems.

**CNS:** Central nervous system; brain and spinal cord.

**CNS Depression:** A reversible state of stupor or unconsciousness.

**CNS Effects:** Signs and symptoms include drowsiness, dizziness, loss of coherence, and other signs or symptoms of toxic effects on the CNS.

**Cohort Study:** The method of epidemiologic study in which subsets of a defined population can be identified who are, have been, or in the future might be exposed, not exposed, or exposed in different degrees to a factor or factors hypothesized to influence the probability of occurrence of a given disease or other outcome.

**Coma:** A state of unconsciousness from which the person cannot be aroused by physical stimulation.

**Combustible:** Capable of catching fire or burning; usually a liquid with a flash point at or above 37.8°C (100°F) but below 93.3°C (200°F).



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Concentration:** The quantity of a chemical per unit volume (see ppm, mg/m<sup>3</sup>); 10,000 ppm = 1%.

**Conceptus:** The whole product of conception at any stage of development, from fertilization of the ovum to birth.

**Convulsions:** An abnormal and often violent involuntary contraction, or series of contractions, of the muscles.

**Corrosive:** A chemical that causes necrosis of biological tissues.

**Conjunctiva:** The delicate membrane that lines the eyelids and covers the exposed surface of the eyeballs.

**Conjunctivitis:** Inflammation of the conjunctiva.

**Cornea:** The transparent structure that forms the exposed surface of the eyeball and allows light to enter the eye.

**Corneal Opacity:** A density, spot, or opaque shadow in the cornea.

**Cross-Sectional Study:** A study that examines the relationship between diseases or other health-related characteristics and other variables of interest as they exist in a defined population at one particular time.

**Cutaneous:** Pertaining to the skin.

**CVS:** Cardiovascular system; the heart and blood vessels.

**Cyanosis:** A bluish discoloration of the skin and mucous membranes due to insufficient oxygen in the blood.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Decomposition:** Breakdown of a material or substance (by heat, chemical reaction, electrolysis, decay, or other process) into parts, elements, or simpler compounds.

**Defatting:** The removal of fat or oils; defatting the skin results in dryness, flakiness, and a whitish appearance.

**Density:** The ratio of mass to volume of a material, usually expressed in grams per cubic centimeter (g/cc). At 4°C (39.2°F), 1 cc of water weighs 1 g.

**Depressant:** A substance that diminishes bodily functions, activity, or instinctive desire.

**Dermal:** Pertaining to the skin.

**Dermatitis:** Inflammation of the skin.

**Developmental Toxicity:** A harmful effect on the embryo or fetus; embryotoxicity, fetotoxicity, or teratogenicity.

**DNA:** Deoxyribonucleic acid; the molecules in chromosomes that contain genetic information in most organisms.

**Dominant-Lethal Study:** A mutagenicity study designed to detect an increase in the incidence of embryo lethality related to exposure of a parent to a test agent.

**Dosage:** Mass of substance per mass of body weight (e.g., mg/kg, where mg represents the amount of substance administered and kg is the body weight of the test animal).

**Dose:** The amount of substance entering the body of the test animal, the worker, etc.; expressed in mass of substance.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Dose Rate:** The dose per unit time.

**Dose Response:** In general, the relationship between dose and biological change in organisms; the relationship between administered dose or exposure and the biological change in organisms.

**Draize Test:** Animal testing to assess the potential irritation or corrosion of a material to skin or eyes.

**DSEN:** Chemical may cause skin sensitization, a delayed contact hypersensitivity reaction following skin absorption and interaction with the immune system that is cell mediated (Type IV) and generally not life-threatening.

**Dust:** Fine, solid particles sometimes defined as having diameters greater than 1 mm; small dust particles may be respirable.

**Dyspnea:** Labored or difficult breathing; a symptom.

**ECX:** Effective concentration "X"; the concentration of a material that has caused a biological effect to X percent of the test animals.

**Eczema:** A disease of the skin characterized by inflammation, itching, and formation of scales.

**Edema:** Accumulation of fluid in the tissues.

**EEGL:** Emergency exposure guidance level; established by the Committee on Toxicology of the National Research Council for the U.S. Department of Defense. EEGLs provide guidelines for military personnel operating under emergency conditions



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

whose circumstances are peculiar to military operations. The EEGL is a ceiling guidance level for single emergency exposures usually lasting 1 hr to 24 hr, an occurrence expected to be infrequent in the lifetime of an individual. See CEGL, SPEGL.

**EHS:** Extremely hazardous substance as defined by the U.S. Environmental Protection Agency (EPA) in 57 the Superfund Amendment and Reauthorization Act (SARA) Title III.

**Embryo:** The early or developing stage of any organism. In animals, the period of development beginning when the long axis is established and continuing until all major structures are represented.

**Embryotoxin:** A material harmful to the developing embryo.

**Epidemiology:** The science dealing with the study of factors determining the frequency and distribution of disease in a human population or work force.

**ERPG(s)®:** Emergency Response Planning Guideline(s)®; values intended to provide estimates of concentration ranges above which one could reasonably anticipate observing adverse health effects; the documentation that summarizes the basis for those values.

**ERPG–1:** The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing more than mild, transient adverse health effects or without perceiving a clearly defined objectionable odor.

**ERPG–2:** The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**ERPG–3:** The maximum airborne concentration below which nearly all individuals could be exposed for up to one hour without experiencing or developing life-threatening health effects.

**Erythema:** Redness of the skin.

**Eschar:** A dry scab that forms as a result of a burn or other corrosive action.

**Evaporation Rate:** The rate at which a material is converted from the liquid or solid state to the vapor state; may be expressed relative to the evaporation rate of a known material, usually n-butyl acetate, with an evaporation rate of 1.0 by definition. Faster evaporation rates are  $>1$ , and slower evaporation rates are  $<1$ .

**Exfoliation:** Peeling or flaking of skin.

**Exposure:** The amount of an environmental agent that has reached the individual (external dose) or has been absorbed into the individual (internal dose or absorbed dose).

**Exposure route:** The manner by which a chemical agent enters the body (inhalation, ingestion, or dermal absorption).

**Fetotoxin:** A material harmful to the fetus.

**Fetus:** The unborn offspring of an animal in the postembryonic period, after all major structures are represented.

**Fibrillation:** Rapid uncoordinated contractions of the heart that are ineffective in pumping blood.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Fibrosis:** An abnormal accumulation or proliferation of fibrous connective tissue, usually in the lungs.

**Flammable Limits:** The minimum and maximum concentrations in air of a flammable gas or vapor at which ignition can occur. Concentrations below the lower flammable limit (LFL), also referred to as the lower explosive limit (LEL), are too lean to burn; concentrations above the upper flammable limit (UFL), also referred to as the upper explosive limit (UEL), are too rich to burn.

**Flammable Liquid:** Any liquid having a flash point below 37.8°C (100°F).

**Flash Point:** The lowest temperature at which a liquid or solid produces enough vapor to ignite, if an ignition source is present, when tested under defined conditions.

**Freund's Adjuvant:** A mixture of killed microorganisms, usually mycobacteria, in an oil and water emulsion that induces antibody formation. Because oil retards absorption of the mixture, the antibody response is much greater than if the killed microorganisms were administered alone. Freund's adjuvant is widely used in predictive animal studies for dermal sensitization.

**Fume:** The particulate formed by the condensation in air of molten metal or plastic vapor; made up of tiny particulates, generally <0.1 µm diameter, suspended in air. Some of the particulates may be oxides.

**g:** Also gm; gram; a unit of mass; defined as the mass of 1 cc of water at 4°C (39.2°F).

**g/kg:** Grams per kilogram body weight; an expression of dosage.

**Gastrointestinal Tract:** The mouth, esophagus, stomach, intestines, and related organs.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Gavage:** Introduction of a test agent through a tube passed into the stomach.

**Genotoxin:** A material harmful to the genetic material.

**Guinea Pig Maximization Test:** Similar to the Buehler test, with the exception that the animals are initially exposed to the test substance in addition to Freund's adjuvant by intradermal injection. Topical application is used for the "challenge" dose.

**Haber's Law:** The Haber relationship expresses the constancy of the product of exposure concentration and exposure duration ( $Ct = k$ , where  $C$  represents exposure concentration,  $t$  is time, and  $k$  is constant). The Haber relationship does not hold over more than small differences in exposure time.

**Healthy Worker Effect:** A phenomenon observed initially in studies of occupational diseases; workers usually exhibit lower overall death rates than the general population because the severely ill and disabled are ordinarily excluded from employment.

**Hedonic Tone:** A category judgment of the relative pleasantness or unpleasantness of an odor. Perception of hedonic tone is influenced by subjective experience, frequency of occurrence, odor character, odor intensity, and duration. See odor threshold.

**Hematopoietic:** Pertaining to or affecting the formation of blood cells.

**Hematuria:** The presence of blood or blood cells in the urine.

**Hepatic:** Pertaining to the liver.

**Hepatotoxicant:** A material harmful to the liver.

**Hygroscopic:** Readily absorbing and retaining moisture.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Hyperemia:** An increased blood flow or congestion of blood anywhere in the body.

**Hyperplasia:** An abnormal increase in the number of normal cells composing a tissue or organ.

**Hypersensitivity:** A state of heightened responsiveness in which the body reacts to a foreign agent or substance more strongly than normal; generally results from prior exposures to the agent or substance.

**IARC:** International Agency for Research on Cancer, World Health Organization, Geneva, Switzerland. IARC publications deal with comprehensive summaries of information on possible carcinogens.

**ID:** Insufficient data.

**IDLH:** Immediately dangerous to life or health; a National Institute for Occupational Safety and Health (NIOSH) value defined for certain chemicals and intended only for respirator selection.

**Inflammation:** A form of tissue reaction to injury that is often marked by pain, heat, redness, and swelling.

**Inhalation:** The breathing in of a substance in the air (e.g., gas, vapor, particulate, dust, fume, mist).

**Interstitial:** Situated between the cellular components of an organ or structure.

**In Vitro:** In glass; experimental work done on cell cultures.

**In Vivo:** In life; an experiment conducted in the living organism.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Irreversible Injury:** An injury or effect that is not reversible once the exposure has been terminated.

**Irritation:** An inflammatory response or reaction of tissues resulting from contact with a material.

**Jaundice:** A yellow discoloration of the skin, mucous membranes, and eyes most often due to abnormalities of the liver or rapid destruction of blood cells.

**kg:** Kilogram; one thousand grams.

**Lacrimation:** The excessive secretion and discharge of tears.

**Latency Period:** The time that elapses between exposure and the manifestations of disease or illness.

**LCX:** Lethal concentration “X”; the concentration that was lethal to X percent of test animals; may be expressed, for example, as LC50, LC10, etc.; these would represent the concentrations producing deaths in 50%, 10%, etc., of the exposed animals, respectively.

**LC<sub>10</sub>:** Lowest lethal concentration; the lowest concentration of a substance in air that has been reported to have caused death in test animals.

**LDX:** Lethal dose “X”; the dose that was lethal to X percent of test animals. The amount of a chemical per unit of body weight that will cause death in X percent of test animals. Most commonly used as LD50, the dose producing deaths in 50% of the dosed animals.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**LD<sub>50</sub>:** Lowest lethal dose; the lowest dose of a substance reported to have caused death in test animals.

**LEL:** See flammable limits.

**Leukopenia:** A decrease below normal in the amount of leukocytes in the blood.

**LFL:** See flammable limits.

**Local Lymph Node Assay:** A test based on the fact that topical exposure to contact allergens causes lymphocyte activation in the lymph nodes draining the site of application. A chemical is regarded as a sensitizer in the LLNA if at least one concentration results in a three-fold increase in lymphocyte proliferation (EC3) in the auricular lymph nodes compared to controls following topical application to ears.

**m<sup>3</sup>:** Cubic meter; one cubic meter of air is equal to 1000 liters of air.

**Malformation:** Defective or abnormal formation.

**Malignant:** Tending to become progressively worse and to lead to death; often used to describe tumors that grow in size and also spread throughout the body.

**mg:** Milligram; 1000 mg = 1 gram.

**mg/kg:** Milligrams per kilogram body weight; an expression of dosage.

**mg/m<sup>3</sup>:** Milligrams per cubic meter of air; an expression of concentration. The conversion factor for mg/m<sup>3</sup> will use the following formula:  $\text{mg/m}^3 = (\text{Molecular Weight} \times \text{ppm}) / 24.45$



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Micron:** Greek mu ( $\mu$ ); micrometer; 1,000,000 micrometers = 1 meter.

**Micronucleus:** A small nucleus; in eukaryotic organisms, micronuclei are produced when chromosomes are broken and the fragments are left in the cytoplasm following cell division.

**Miscible:** Susceptible of being mixed; soluble in all proportions.

**Mist:** Small droplets of liquid suspended in air. Droplet size can cover a very large range, usually from about 2  $\mu\text{m}$  to greater than 50  $\mu\text{m}$ .

**Mottling:** Colored spots or blotches.

**Mouse Ear Swelling Test:** Animals are initially exposed to the test material by topical application to abdominal skin under an occlusive patch. Following the induction period, a challenge dose is applied to one ear of the test animal while vehicle alone is applied to the contralateral ear. Mice are considered positive responders if the challenged ear thickness is >120% that of the contralateral control ear thickness. Results can also be reported as a group mean relative thickness of challenged ears.

**Mucous Membrane:** The mucous-secreting membranes lining the hollow organs of the body (i.e., eyes, nose, mouth, etc.)

**Mutagen:** A substance or agent capable of altering the genetic material in a living cell.

**NA:** Not appropriate.

**National Research Council:** Abbreviated NRC; develops and publishes emergency exposure limits such as CEGs, EEGs, and SPEGLs.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Necrosis:** Tissue death.

**Neoplasm:** Any new and abnormal growth, such as a tumor.

**Nephrotoxicant:** A substance harmful to the kidney.

**Neural:** Relating to the nervous system.

**Neuropathy:** Functional disturbance or pathology of the nervous system; may be central (affecting the brain or spinal cord) or peripheral (affecting nerves outside the brain and spinal cord).

**Neurotoxicant:** A substance harmful to nerves or the brain.

**NOAEL:** No observable adverse effect level.

**NOEL:** No observable effect level.

**NIOSH:** National Institute for Occupational Safety and Health (United States).

**NRC:** See National Research Council.

**NTP:** National Toxicology Program; overseen by the U.S. Department of Health and Human Services.

**Occluded:** Closed, shut, or blocked.

**Odor Character:** Used to describe a substance's odor (e.g., "fishy," "rancid," "bananas").

**Odor Threshold:** In general, the lowest concentration of gas or a material's vapor that can be detected by odor. The detection threshold is the lowest concentration of



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

odorant that will elicit a sensory response in the olfactory receptors of a specified percentage of a given population. The recognition threshold is the minimum concentration that is recognized as having a characteristic odor quality by a specified percentage of a given population. See odor character, hedonic tone.

**Olfactory:** Relating to the sense of smell.

**OSHA:** Occupational Safety and Health Administration; part of the U.S. Department of Labor; the regulatory and enforcement agency for safety and health for most U.S. business and industrial sectors.

**Oxidizing Agent:** A chemical that produces oxygen readily and gains electrons during the reaction; may start or assist the combustion of other materials.

**PEL:** Permissible exposure limit; enforceable occupational exposure limits established by OSHA in 29 CFR 1910.1000, Subpart Z.

**PEL–C:** An acceptable ceiling concentration. An employee's exposure to any material in 29 CFR 1910.1000, Table Z-1, the name of which is preceded by a C, shall at no time exceed the ceiling value given for that material in the table.

**PEL–STEL:** Short-term exposure limit is the employee's 15-min. time-weighted average (TWA) exposure that shall not be exceeded at any time during a workday unless another time limit is specified in a parenthetical notation below the limit.

**PEL–TWA:** An 8-hr time-weighted average. An employee's exposure to any material listed in 29 CFR 1910.1000, Table Z-2, in any 8-hr work shift of a 40-hr workweek shall not exceed the 8-hr timeweighted average limit given for that material in the table.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Photoallergy:** A Type IV delayed hypersensitivity reaction in which absorption of ultraviolet energy by a potential photosensitizing chemical in the skin is required to produce a hapten that elicits an allergic response. Photoallergens are indicated by a DSENP notation.

**Physical Asphyxiant:** See asphyxiant.

**Pneumoconiosis:** A disease characterized by permanent deposits of substantial amounts of particulate matter in the lungs; generally of occupational or environmental origin. It may produce a fibrosis of the lung.

**ppb:** Parts per billion by volume; sometimes written as ppbv or ppb v/v. An expression of concentration as a volume ratio, usually parts of contaminant per billion parts of air, may also be used to express dietary exposure concentration as a weight ratio.

**ppm:** Parts per million by volume; sometimes written as ppmv or ppm v/v. An expression of concentration as a volume ratio, usually parts of contaminant per million parts of air; may also be used to express dietary exposure concentration as a weight ratio.

**Pulmonary:** Relating to or associated with the lungs.

**RD50:** The concentration of an airborne chemical that produces a 50% decrease in the respiratory rate in mice.

**Reducing Agent:** A substance that combines with oxygen or loses electrons to the reaction.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**REL:** Recommended exposure limit; an occupational exposure limit recommended by NIOSH as being protective of worker health and safety over a working lifetime. The REL is used in combination with engineering and work practice controls, exposure and medical monitoring, labeling, posting, worker training, and personal protective equipment. It is frequently expressed as a TWA exposure for up to 10 hr/day during a 40-hr work week; may also be expressed as a short-term exposure limit (STEL) that should never be exceeded and is to be determined in a specified sampling time usually 15 min, or a ceiling (C) limit that should never be exceeded even instantaneously unless specified over a given time period.

**Renal:** Relating to or associated with the kidney.

**Reproductive Toxicity:** A harmful effect on the adult reproductive system.

**Resorption:** In mammalian species that give birth to litters, the intrauterine tissue remaining at the site of death of an embryo or fetus.

**Respiratory Hypersensitivity:** An allergic lung condition following inhalation exposure, characterized by bronchi constriction and rhinitis (occupational asthma), resulting from the IgE-induced release of histamine from mast cells. Immediate (Type I) allergic reactions can be life-threatening. Agents causing respiratory allergy are indicated by an RSEN notation.

**Respiratory System:** The breathing system, including mouth, nose, larynx, trachea, lungs, etc., and associated nerves and blood supply.

**Routes of Entry:** Inhalation, ingestion, and contact with skin or eyes.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**RSEN:** Agent may cause respiratory hypersensitivity, an allergic lung condition following inhalation exposure, characterized by bronchoconstriction and rhinitis (occupational asthma), resulting from the IgE-induced release of histamine from mast cells. Immediate (Type I) allergic reactions can be life threatening.

**Sarcoma:** A malignant tumor that develops from connective tissue cells.

**SCE(s):** Sister-chromatid exchange(s); an exchange of genetic material between the chromatid pairs of a chromosome during cell division.

**Sensitization:** A condition that develops when earlier exposure to an agent results in a change in the immune system (induction), which causes symptoms upon subsequent exposure to lower concentrations (elicitation). These hypersensitivity reactions can be manifested as dermatitis and/or asthma with the length of the delay period relating to the potency of the sensitizer. Some agents can cause dermal or respiratory sensitization or both. A condition that can arise with exposure to certain materials in which the heart becomes hypersusceptible to serious, potentially life-threatening, arrhythmia, especially when exposure is coupled with stress.

**Sensitizer:** A substance that is capable of causing a sensitization in an individual. See Sensitization.

**Sister-chromatid Exchange(s):** See SCE(s).

**Skeletal Variant:** A minor alteration of the skeletal structure that will not adversely affect function or length of life of the organism and that occurs normally in a small proportion of animals.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Skin:** When used with an exposure guideline such as a PEL or TLV®, it indicates that the substance may be absorbed in toxic amounts through the skin or mucous membranes.

**Skin Sensitization:** A delayed contact hypersensitivity reaction following skin absorption and interaction with the immune system that is cell-mediated (Type IV) and generally not lifethreatening. There are two phases: induction and elicitation. Agents causing skin sensitization are indicated by a DSEN notation.

**Smoke:** A mixture of dry and liquid particles generated by incomplete combustion of an organic material, combined with, and suspended in, the gases from combustion.

**Solubility in Water:** Susceptible of being dissolved; may be expressed as the percentage of a material by weight that will dissolve in a solvent. The following terms are used to express solubility: negligible = <0.1%; slight = 0.1%–1.0%; moderate = 1.0%–10.0%, appreciable = 10.0%– 99.0%; complete = soluble in all proportions

**Specific Gravity:** The ratio of the mass of a material to the mass of an equal volume of water at 4°C (39.2°F) (or other specified temperature).

**SPEGL:** Short: term public emergency guidance level; established by the Committee on Toxicology of the National Research Council for the U.S. Department of Defense. The SPEGL is a suitable concentration for unpredicted, single, short-term, emergency exposure of the general public. In contrast to the EEGL, the SPEGL takes into account the wide range of susceptibility of the general public. See EEGL, CEGL.

**Squamous:** Scaly or plate-like.

**Squamous Cell Carcinoma:** A carcinoma of epithelial origin.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**STEL:** Short-term exposure limit; used in reference to OSHA PEL–STEL and ACGIHs® TLV®–STEL. The STEL represents a time-weighted average exposure that should not be exceeded for any 15: min period.

**Stochastic Effect:** The effect for which the probability of occurrence depends on the absorbed dose. Heredity effects and cancer induced by radiation are considered to be stochastic effects. This means that, even for an individual, there is no threshold of dose below which the effect will not appear, but the chance of experiencing the effect increases with increasing dose.

**STP:** Standard temperature and pressure; 298°K (25°C) and 760 mmHg (1 atm).

**Subacute Toxicity Study:** Toxicity study durations of 5 days to 14 days.

**Subchronic Toxicity Study:** Toxicity study durations of 15 days to 6 months.

**Subcutaneous:** Beneath the skin.

**Symptom:** Any condition accompanying or resulting from an exposure, a disease, or a disorder.

**Systemic Effects:** Adverse effects other than at the site of contact.

**Target Organ:** The site where an adverse effect occurs following exposure to an agent. Examples of target organs are liver, kidney, skin, eyes, and central nervous system.

**TC<sub>Lo</sub>:** Lowest toxic concentration; the lowest concentration of a substance shown to have produced an adverse health effect in humans or test animals.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**TD<sub>LO</sub>**: Lowest toxic dose; the lowest dose reported to cause toxic effects in humans or test animals.

**Teratogen**: A substance that causes birth defects in the offspring.

**TLV®**: Threshold limit value; occupational exposure limits recommended by ACGIH®. See ACGIH®, TLV-C, TLV-STEL, TLV-TWA.

**TLV-C**: A ceiling exposure limit that should not be exceeded for even an instant.

**TLV-STEL**: A short-term exposure limit; a 15-min time-weighted average exposure that should not be exceeded.

**TLV-TWA**: An 8-hr time-weighted average exposure limit.

**Tolerance**: An adaptive state characterized by diminished responses to the same dose of a chemical.

**Tracheitis**: Inflammation of the trachea.

**Transient**: Something lasting only a very short period of time.

**Tumor**: Abnormal mass of tissue that might be or might not be malignant.

**TWA**: Time-weighted average; the most frequently used exposure guideline term; the average concentration over a workday (8 hr for OSHA PELs and ACGIH® TLVs®, up to 10 hr in a 40-hr workweek for NIOSH RELs).

**UEL**: See flammable limits.

**UFL**: See flammable limits.



# Occupational Exposure Limits

from the AIHA® Guideline Foundation

**Uncertainty factor:** In toxicology, value used in extrapolation from experimental animals to man (assuming that man may be more sensitive) or from selected individuals to the general population. The value depends on the nature of the toxic effect, the size and type of population to be protected, and the quality of the toxicological information available.

**Upper Respiratory Tract:** The mouth, nose, sinuses, and pharynx.

**Vapor:** The gaseous phase of a chemical that is a solid or liquid chemical at room temperature.

**Vapor Density:** The ratio of the mass of a vapor or gas to the mass of an equal volume of air at the same temperature; an expression of the density of the vapor or gas.

**Vapor Pressure:** A measure of the tendency of a liquid to form a gas (usually a function of temperature); the pressure exerted when a solid or liquid is at equilibrium with its own vapor; normally reported in mm of mercury (mmHg). The higher the vapor pressure, the more volatile the chemical.

**WEEL:** Workplace Environmental Exposure Limit