Hazard Communications (HAZCOM)

Title 29 CFR 1910.1200, Hazard Communications (HAZCOM) Standard, specifically addresses proper labeling of hazards in the workplace. All biocide products must bear the appropriate label. Labels convey information required by various local, state and federal laws. To the manufacturer, the label is a license to sell the product. To the government, the label is a means to control the distribution, storage, sale, use and disposal of the product. To the user, the label provides facts on how to use the product correctly and legally. To health and safety officials, the label provides information to prevent worker exposures, personal protective equipment to be used and actions to be taken if personnel are exposed. Biocide labels use "signal words" and symbols to provide immediate clues regarding danger of the product to humans. Understanding this labeling system helps the user take proper precautions and protect co-workers or other persons who could be exposed. Labels will appear on biocide containers as:

**DANGER** Highly toxic orally, dermally or through inhalation (LD50 of 50 ppm or below); causes severe eye and/or skin burning. Any biocides which are toxic orally, dermally or by inhalation will also carry a **POISON** signal worked in red and crossbones and skull symbol. A teaspoonful taken by mouth could kill and averaged-sized adult.

**WARNING** Moderately toxic orally, dermally or through inhalation (LD50 of 50 – 500 ppm); causes moderate eye and/or skin irritation. As little as a teaspoonful to a tablespoonful taken by mouth could kill and average-sized adult.

**CAUTION** Slightly toxic orally, dermally or through inhalation (LD50 of 500 ppm or more); causes slight eye and/or skin irritation. An ounce to more than a pint taken by mouth could kill an average-sized adult.
<table>
<thead>
<tr>
<th>LD50 in Rats for Several Common Substances</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
</tr>
<tr>
<td>Nicotine</td>
</tr>
<tr>
<td>Salt</td>
</tr>
</tbody>
</table>

## Toxicity Classification

### LD50 Equivalent Class

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
<th>LD50</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Toxic</td>
<td>&lt; 0.05 mg/kg</td>
</tr>
<tr>
<td>II</td>
<td>Moderately Toxic</td>
<td>0.05 - 0.5 mg/kg</td>
</tr>
<tr>
<td>III</td>
<td>Very Toxic</td>
<td>0.5 - 5.0 mg/kg</td>
</tr>
<tr>
<td>IV</td>
<td>Extremely Toxic</td>
<td>&gt; 5.0 mg/kg</td>
</tr>
</tbody>
</table>

### Toxicity Ranks

- LD50: Less than 0.05 mg/kg
- LD30: Between 0.05 and 0.5 mg/kg
- LD15: Between 0.5 and 5.0 mg/kg
- LD5: Between 5.0 and 15.0 mg/kg
- LD1: Between 15.0 and 30.0 mg/kg
- LD0.5: Between 30.0 and 50.0 mg/kg
- LD0.25: Between 50.0 and 100.0 mg/kg
- LD0.1: Between 100.0 and 200.0 mg/kg
- LD0.05: Between 200.0 and 400.0 mg/kg
- LD0.025: Between 400.0 and 800.0 mg/kg
- LD0.01: Between 800.0 and 1600.0 mg/kg
- LD0.005: Between 1600.0 and 3200.0 mg/kg
- LD0.0025: Between 3200.0 and 6400.0 mg/kg
- LD0.001: Between 6400.0 and 12800.0 mg/kg
- LD0.0005: Between 12800.0 and 25600.0 mg/kg
- LD0.00025: Between 25600.0 and 51200.0 mg/kg
- LD0.0001: Between 51200.0 and 102400.0 mg/kg
- LD0.00005: Between 102400.0 and 204800.0 mg/kg
- LD0.000025: Between 204800.0 and 409600.0 mg/kg
- LD0.00001: Between 409600.0 and 819200.0 mg/kg
- LD0.000005: Between 819200.0 and 1638400.0 mg/kg
- LD0.0000025: Between 1638400.0 and 3276800.0 mg/kg
- LD0.000001: Between 3276800.0 and 6553600.0 mg/kg
- LD0.0000005: Between 6553600.0 and 13107200.0 mg/kg
- LD0.00000025: Between 13107200.0 and 26214400.0 mg/kg
- LD0.0000001: Between 26214400.0 and 52428800.0 mg/kg
- LD0.00000005: Between 52428800.0 and 104857600.0 mg/kg
- LD0.000000025: Between 104857600.0 and 209715200.0 mg/kg
- LD0.00000001: Between 209715200.0 and 419430400.0 mg/kg
- LD0.000000005: Between 419430400.0 and 838860800.0 mg/kg
- LD0.0000000025: Between 838860800.0 and 1677721600.0 mg/kg
- LD0.000000001: Between 1677721600.0 and 3355443200.0 mg/kg
- LD0.0000000005: Between 3355443200.0 and 6710886400.0 mg/kg
- LD0.00000000025: Between 6710886400.0 and 13421772800.0 mg/kg
- LD0.0000000001: Between 13421772800.0 and 26843545600.0 mg/kg
- LD0.00000000005: Between 26843545600.0 and 53687091200.0 mg/kg
- LD0.000000000025: Between 53687091200.0 and 107374182400.0 mg/kg
- LD0.00000000001: Between 107374182400.0 and 214748364800.0 mg/kg

### Toxicity Categories

- **Acute:** Immediate effects observed within 24 hours.
- **Chronic:** Effects observed over a prolonged period.
- **Reversible:** Effects that can be reversed with treatment.
- **Irreversible:** Effects that persist even with treatment.
- **Fatal:** Causes death.
- **Sublethal:** Effects do not cause death.

### Skin Effects

- **Dermatitis:** Reddening, irritation, and scaling.
- **Allergic contact dermatitis:** Irritation that occurs upon repeated contact.
- **Contact dermatitis:** Irritation caused by direct contact.
- **Chemical burns:** Severe irritation and damage to the skin.

### Eye Effects

- **Iritis:** Inflammation of the iris.
- **Corneal abrasion:** Scratches or cuts on the cornea.
- **Conjunctivitis:** Inflammation of the conjunctiva.
- **Cataracts:** Clouding of the lens of the eye.
- **Glaucoma:** Increased intraocular pressure.

### Initial Route of Exposure

- **Inhalation:** Exposure to airborne substances.
- **Ingestion:** Exposure through ingestion.
- **Skin:** Exposure through skin contact.
- **Eye:** Exposure through eye contact.

### Initial Concentration

- **LD50:** Lethal dose for 50% of the test population.
- **LC50:** Lethal concentration for 50% of the test population.
- **LD10:** Lethal dose for 10% of the test population.
- **LC10:** Lethal concentration for 10% of the test population.

### Delayed Effects

- **Chronic effects:** Symptoms that may develop after a period of exposure.
- **Reversible effects:** Symptoms that can be reversed with treatment.
- **Irreversible effects:** Symptoms that persist even with treatment.
- **Fatal effects:** Symptoms that lead to death.

### Reference Sources

- [National Institute for Occupational Safety and Health (NIOSH)](https://www.cdc.gov/niosh/)
- [World Health Organization (WHO)](https://www.who.int/)
- [American Conference of Governmental Industrial Hygienists (ACGIH)](https://www.acgih.org/)
- [Occupational Safety and Health Administration (OSHA)](https://www.osha.gov/)

### Additional Information

- The information provided is subject to change and should be verified with the latest sources.
- Always seek medical advice for any exposure or suspected exposure.
- Personal protective equipment (PPE) should be worn when handling hazardous substances.
- Regular health check-ups are recommended for workers exposed to hazardous substances.

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**Note:** The table is a simplified representation of the toxicity classification and LD50 values. For accurate and comprehensive information, please consult the relevant references and resources.