

Hazard Banding

Susan Ripple, MS, CIH

Qualitative Criteria and GHS Information

Band	A	B	C (default)	D	E
GHS Signal Word	Warning	Warning	Danger	Danger	Danger
OEL (Control) Ranges	> 1,000 µg/m ³	> 100 and < 1,000 µg/m ³	> 10 and < 100 µg/m ³	> 1 and < 10 µg/m ³	< 1 µg/m ³
	> 1000 ppm	> 100 - < 1000 ppm	> 10 - < 100 ppm	> 1 - < 10 ppm	< 1 ppm
Examples of Health Outcomes and Potency Considerations	Minor, reversible health effects occurring at high doses. Skin and eye irritation.	Reversible organ toxicity, skin and eye corrosion (reversible), possible dermal sensitizer at high doses.	Irreversible organ toxicity at high doses, irreversible skin and eye corrosion, dermal sensitizer at moderate doses.	Irreversible organ toxicity at low doses, <i>in vivo</i> genotoxicity, dermal sensitizer at low doses, evidence of mutagenicity, potential developmental and reproductive toxicants.	Human carcinogens at low doses, respiratory sensitization
Examples of GHS Hazard Statements and Hazard Categories	May cause drowsiness or dizziness	Harmful if inhaled (4). Harmful in contact with skin (4).	Toxic if inhaled (3). Toxic in contact with skin (3). Suspected of causing cancer (2). May cause damage to organs (2)	Fatal if inhaled (2). Fatal in contact with skin (1). Causes damage to organs (1). May cause cancer (by route of exposure)—1A or B. Presumed or known human reproductive toxicant (1A or 1B). Causes damage to organs through prolonged or repeated exposure (1)	Fatal if inhaled (1). Fatal in contact with skin (1). May cause cancer (by route of exposure)—1A. May cause allergy or asthma symptoms or breathing difficulties if inhaled (1A resp.). Known human reproductive toxicant (1A). Causes damage to organs through prolonged or repeated exposure (1)

Qualitative Tier 1 Hazards

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Irritant, Teratogen, Reproductive hazard

GHS Classification

Flammable liquids (Category 2)

Skin irritation (Category 2)

Eye irritation (Category 2A)

Reproductive toxicity (Category 1B)

Specific target organ toxicity - single exposure (Category 2)

Specific target organ toxicity - single exposure (Category 3)

Acute aquatic toxicity (Category 3)

Chronic aquatic toxicity (Category 3)

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Acute Toxicity

Band	A	B	C	D	E
GHS Signal Word	Precautionary	Warning	Danger	Danger	Danger
GHS Hazard Category	--	4	3	2	1
GHS Hazard Statements		Harmful if swallowed. Harmful if inhaled. Harmful in contact with skin	Toxic if swallowed. Toxic if inhaled. Toxic in contact with skin.	Fatal if swallowed. Fatal if inhaled. Fatal in contact with skin.	Fatal if swallowed. Fatal if inhaled. Fatal in contact with skin.
"H" Codes		H302, H332, H312	H301, H331, H311	H300, H330, H310	H300, H330, H310
Oral Toxicity LD ₅₀ Technical Criteria (mg/kg bodyweight)	>2000	>300 and ≤ 2000	>50 and ≤ 300	>5 and ≤ 50	≤ 5
Inhalation Vapors (mg/l) LC ₅₀ Technical Criteria (mg/kg bodyweight)		>10.0 and ≤ 20.0	>2.0 and ≤ 10.0	>0.5 and ≤ 2.0	≤ 0.5

Example: Acetylene tetrabromide

H330 (fatal if inhaled) category 2 (LC50 inhalation rat: 0.549 mg/l/4 h)

H319 (causes serious eye irritation) category 2

Band _____

Sensitization Respiratory and Skin

Band	A	B	C	D	E Consider "Ceiling" for respiratory sensitizers
GHS Signal Word		Warning	Warning	Danger	Danger
GHS Hazard Category		1B (skin)	1A (skin)	1B (resp.)	1A (resp.)
GHS Respiratory and Skin Sensitization Hazard Statements		May cause an allergic skin reaction	May cause an allergic skin reaction	May cause allergy or asthma symptoms or breathing difficulties if inhaled	May cause allergy or asthma symptoms or breathing difficulties if inhaled
Respiratory and Skin Sensitization "H" Codes		H317	H317	H334	H334

Example: Isopropyl Glycidyl Ether

H332 (harmful if inhaled) category 4

H341 (suspected of causing genetic defects) category 2

H317 (may cause allergic skin reaction) category 1

H334 (may cause allergy or asthma symptoms...) category 1

Band _____

Carcinogenicity

Band	A	B	C	D	E
GHS Signal Word		Warning	Warning	Danger	Danger
GHS Hazard Category		2	2	1B	1A
GHS Carcinogenicity Hazard statement		Suspected of causing cancer	Suspected of causing cancer	May cause cancer	May cause cancer
Carcinogenicity "H" Codes		H351	H351	H350	H350

Example: 4-Aminobiphenyl

H350 (may cause cancer) category 1A

H302 (harmful if swallowed) category 4 (oral)

Band _____

Additional Tier 1 Examples

1-bromopropane

- TIER 1a
 - Signal word: danger
 - H360FD: May damage fertility or the unborn child
 - H373: May cause damage to organs through prolonged or repeated exposure (STOT-RE-2)
 - H319: Causes serious eye irritation
 - H335: May cause respiratory irritation
 - H315: Causes skin irritation
 - H336: May cause drowsiness or dizziness

TIER 1a outcome: Band _____

- TIER 1b
 - Hazard Category Repro 1B

TIER 1b outcome: Band ____: (_____ ppm)

- TLV: _____
- OSHA-GHS: Presumed human reproductive toxicant

Cobalt Sulfate

- TIER 1a
 - Signal word: danger
 - H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled
 - STOT-RE 1
 - H350i: May cause cancer
 - H360F: May damage fertility
 - H341: Suspected of causing genetic defects
 - H302: Harmful if swallowed
 - H317: May cause allergic skin reaction

TIER 1a outcome: Band _____

- TIER 1b
 - Germ cell mutagen category 2
 - Resp. Sens: 1
 - Carcinogen category 1B
 - Repro 1B

**TIER 1b outcome: Band ____: (_____ µg/m³)
or Band ____: (_____ µg/m³)**

TLV: _____ ug/m³