



# ZINC Metal HG & SHG

## Safety Data Sheet (SDS)

### Section 1 – Identification

**1(a) Product Identifier Used on Label:** Zinc Metal - HG & SHG

**1(b) Other Means of Identification:** High Grade (HG) and Special High Grade (SHG) Zinc

**1(c) Recommended Use of the Chemical and Restrictions on Use:** None

**1(d) Name, Address, and Telephone Number:**

WIRE-BOND Phone number : 800-849-6722  
400 Rountree Road  
Charlotte, NC 28217

**1(e) Emergency Phone Number:** Chemtrec 1-800-424-9300 (Within Continental U.S.); Chemtrec 703-527-3887 (Outside U.S.).

### Section 2 – Hazard(s) Identification

**2(a) Classification of the Chemical:** Zinc Metal is NOT considered a hazardous material according to the criteria specified in REACH [REGULATION (EC) No 1907/2006] and CLP [REGULATION (EC) No 1272/2008] and OSHA 29 CFR 1910.1200 Hazard Communication Standard. The categories of Health Hazards as defined in “GLOBALLY HARMONIZED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS (GHS), Third revised edition ST/SG/AC.10/30/Rev. 3” United Nations, New York and Geneva, 2009 have been evaluated. Refer to Section 3, 8 and 11 for additional information.

**2(b) Signal Word, Hazard Statement(s), Symbols and Precautionary Statement(s):** Not Applicable

**2(c) Hazards not Otherwise Classified:** None Known

**2(d) Unknown Acute Toxicity Statement (Mixture):** None Known

### Section 3 – Composition/Information on Ingredients

**3(a-c) Chemical Name, Common Name (Synonyms), CAS Number and Other Identifiers, and Concentration:**

Chemical Name	CAS Number	EC Number	% weight
Zinc	7440-66-6	231-175-3	99.95% (HG) - 99.99% (SHG) min.

EC- European Community

CAS- Chemical Abstract Service

Note: High Grade (.03% max lead), Special High Grade (.003% max lead)

### Section 4 – First-aid Measures

**4(a) Description of Necessary Measures:**

**Inhalation:** If inhaled: Remove person to fresh air and keep comfortable for breathing.

**Eye Contact:** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

**Skin Contact:** If on skin: Rinse skin with water/shower.

**Ingestion:** If swallowed: Rinse mouth. Do NOT induce vomiting.

**4(b) Most Important Symptoms/Effects, Acute and Delayed (Chronic):**

**Acute effects:**

**Inhalation:** Excessive exposure to high concentrations of dust may cause irritation to the eyes, skin and mucous membranes of the upper respiratory tract.

**Eye:** Excessive exposure to high concentrations of dust may cause irritation to the eyes.

**Skin:** Skin contact with dusts may cause irritation or sensitization, possibly leading to dermatitis. Skin contact with metallic dusts may cause physical abrasion.

**Ingestion:** Ingestion of dust may cause nausea and/or vomiting.

**Chronic Effects:**

Individuals with chronic respiratory disorders (i.e., asthma, chronic bronchitis, emphysema, etc.) may be adversely affected by any airborne particulate matter exposure. Persons with pre-existing skin disorders may be more susceptible to dermatitis.

**4(c) Immediate Medical Attention and Special Treatment:** Treat symptomatically.

### Section 5 – Fire-fighting Measures

**5(a) Suitable (and Unsuitable) Extinguishing Media:** Smother and cool with a suitable dry extinguishing agent (class D fires) such as dry powder (Ansul Met-L-X), zinc oxide or dry sand. Do not use water if possible. Use water only when necessary, such as to cool containers exposed to fire. Extreme caution should be taken to prevent contact with molten zinc or burning zinc products.



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### Section 5 – Fire-fighting Measures (continued)

**5(b) Specific Hazards Arising from the Chemical:** The pressure in sealed containers can increase under the influence of heat.

**5(c) Special Protective Equipment and Precautions for Fire-fighters:** Self-contained NIOSH approved respiratory protection and full protective clothing should be worn when fumes and/or smoke from fire are present. Heat and flames cause emittance of acrid smoke and fumes. Do not release runoff from fire control methods to sewers or waterways. Firefighters should wear full face-piece self-contained breathing apparatus and chemical protective clothing with thermal protection. Direct water stream will scatter and spread flames and, therefore, should not be used.

### Section 6 - Accidental Release Measures

**6(a) Personal Precautions, Protective Equipment and Emergency Procedures:** For spills involving finely divided particles, clean-up personnel should be protected against contact with eyes and skin. If material is in a dry state, avoid inhalation of dust. Personnel should be protected against contact with eyes and skin. Fine, dry material should be removed by vacuuming or wet sweeping methods to prevent spreading of dust. Avoid using compressed air. Do not release into sewers or waterways.

**6(b) Methods and Materials for Containment and Clean Up:** Collect material in appropriate, labeled containers for recovery or disposal in accordance with federal, state, and local regulations. Follow applicable OSHA regulations (29 CFR 1910.120) and all other pertinent state and federal requirements.

### Section 7 - Handling and Storage

**7(a) Precautions for Safe Handling:** Use personal protective equipment as required. Avoid and control operations which create high dust concentrations.

**7(b) Conditions for Safe Storage, Including any Incompatibilities:** Store in a cool, well-ventilated area. Keep away from heat. Inspect periodically for damage or leaks. Store away from incompatible materials.

### Section 8 - Exposure Controls / Personal Protection

**8(a) Occupational Exposure Limits (OELs):** The following exposure limits are offered as reference, for an experienced industrial hygienist to review.

Ingredients	OSHA PEL 1	ACGIH TLV 2	NIOSH REL 3	IDLH 4
Zinc Compounds	5.0 mg/m <sup>3</sup> (as zinc oxide fume) 15 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable fraction)	2.0 mg/m <sup>3</sup> (as zinc oxide)	10 mg/m <sup>3</sup> (as total dust) 5.0 mg/m <sup>3</sup> (as respirable dust)	NE

NE - None Established

- OSHA PELs (Permissible Exposure Limits) are 8-hour TWA (time-weighted average) concentrations unless otherwise noted. A ("C") designation denotes a ceiling limit, which should not be exceeded during any part of the working exposure unless otherwise noted. An Action level (AL) is used by OSHA and NIOSH to express a health or physical hazard. They indicate the level of a harmful or toxic substance/activity, which requires medical surveillance, increased industrial hygiene monitoring, or biological monitoring. Action Levels are generally set at one half of the PEL but the actual level may vary from standard to standard. The intent is to identify a level at which the vast majority of randomly sampled exposures will be below the PEL.
- Threshold Limit Values (TLV) established by the American Conference of Governmental Industrial Hygienists (ACGIH) are 8-hour TWA concentrations unless otherwise noted. ACGIH TLVs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes. A Short Term Exposure Limit (STEL) is defined as the maximum concentration to which workers can be exposed for a short period of time (15 minutes) for only four times throughout the day with at least one hour between exposures.
- The National Institute for Occupational Safety and Health Recommended Exposure Limits (NIOSH-REL) - Compendium of Policy and Statements. NIOSH, Cincinnati, OH (1992). NIOSH is the federal agency designated to conduct research relative to occupational safety and health. As is the case with ACGIH TLVs, NIOSH RELs are for guideline purposes only and as such are not legal, regulatory limits for compliance purposes.
- The "immediately dangerous to life or health air concentration values (IDLHs)" are used by NIOSH as part of the respirator selection criteria and were first developed in the mid-1970's by NIOSH. The Documentation for Immediately Dangerous to Life or Health Concentrations (IDLHs) is a compilation of the rationale and sources of information used by NIOSH during the original determination of 387 IDLHs and their subsequent review and revision in 1994.

**8(b) Appropriate Engineering Controls:** Local exhaust ventilation should be used to control the emission of air contaminants. General dilution ventilation may assist with the reduction of air contaminant concentrations. Emergency eye wash stations and deluge safety showers should be available in the work area.

**8(c) Individual Protection Measures:**

**Respiratory Protection:** Seek professional advice prior to respirator selection and use. Follow OSHA respirator regulations (29 CFR 1910.134) and, if necessary, use only a NIOSH-approved respirator. Select respirator based on its suitability to provide adequate worker protection for given working conditions, level of airborne contamination, and presence of sufficient oxygen. Concentration in air of the various contaminants determines the extent of respiratory protection needed. Half-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 10 times the exposure limit. Full-face, negative-pressure, air-purifying respirator equipped with P100 filter is acceptable for concentrations up to 50 times the exposure limit. Protection by air-purifying negative-pressure and powered air respirators is limited. Use a positive-pressure-demand, full-face, supplied air respirator or self contained breathing apparatus (SCBA) for concentrations above 50 times the exposure limit. If exposure is above the IDLH (immediately dangerous to life or health) for any of the constituents, or there is a possibility of an uncontrolled release or exposure levels are unknown, then use a positive-demand, full-face, supplied air respirator with escape bottle or SCBA.

**Warning!** Air-purifying respirators both negative-pressure, and powered-air do not protect workers in oxygen-deficient atmospheres.



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#### Section 8 - Exposure Controls / Personal Protection (continued)

##### 8(c) Individual Protection Measures (continued):

**Eyes:** Wear eye protection/face protection. A face shield should be used when appropriate to prevent contact with splashed materials. Chemical goggles, face shields or glasses should be worn to prevent eye contact. Contact lenses should not be worn where industrial exposure to this material is likely.

**Skin:** Persons handling this product should wear appropriate clothing.

**Other protective equipment:** An eyewash fountain and deluge shower should be readily available in the work area.

#### Section 9 - Physical and Chemical Properties

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| <b>9(a) Appearance (physical state, color, etc.):</b> Silver gray, metallic solid. | <b>9(j) Upper/Lower Flammability or Explosive Limits:</b> NA |
| <b>9(b) Odor:</b> Odorless   | <b>9(k) Vapor Pressure:</b> NA                               |
| <b>9(c) Odor Threshold:</b> NA   | <b>9(l) Vapor Density (Air = 1):</b> NA                      |
| <b>9(d) pH:</b> NA   | <b>9(m) Relative Density:</b> 7.14 SG                        |
| <b>9(e) Melting Point/Freezing Point:</b> 420°C                                    | <b>9(n) Solubility(ies):</b> slightly soluble (<2 mg/L)      |
| <b>9(f) Initial Boiling Point and Boiling Range:</b> 907oC                         | <b>9(o) Partition Coefficient n-octanol/water:</b> NA        |
| <b>9(g) Flash Point:</b> NA  | <b>9(p) Auto-ignition Temperature:</b> ND                    |
| <b>9(h) Evaporation Rate:</b> NA   | <b>9(q) Decomposition Temperature:</b> ND                    |
| <b>9(i) Flammability (solid, gas):</b>   | <b>9(r) Viscosity:</b> ND                                    |

NA - Not Applicable

ND - Not Determined for product as a whole

#### Section 10 - Stability and Reactivity

- 10(a) Reactivity:** Not Determined (ND)
- 10(b) Chemical Stability:** Zinc Metal is stable under normal storage and handling conditions.
- 10(c) Possibility of Hazardous Reaction:** None Known
- 10(d) Conditions to Avoid:** Direct sources of heat.
- 10(e) Incompatible Materials:** Acids; Alkalis; Halogenated compounds; Oxidizing agents; Nitrogen compounds.
- 10(f) Hazardous Decomposition Products:** Oxides of carbon, metal oxides and toxic vapors may be releases at elevated temperatures.

#### Section 11 - Toxicological Information

**11 Information on Toxicological Effects:** The following toxicity data has been determined for **Zinc Metal** by using the information available for its components applied to the guidance on the preparation of an SDS under the GHS requirements of OSHA and the EU CPL:

NR Not Rated - Available data does not meet criteria for classification.

The Toxicological data listed below are presented regardless to classification criteria. Individual hazard classification categories where the toxicological information has met or exceeded a classification criteria threshold are listed above.

- No LC50 or LD50 has been established for **Zinc Metal**.
- No Skin (Dermal) Irritation data available for **Zinc Metal**.
- No Eye Irritation data available for **Zinc Metal**.
- No Skin (Dermal)/Respiratory Sensitization data available for **Zinc Metal**.
- No Aspiration Hazard data available for **Zinc Metal**.
- No Germ Cell Mutagenicity data available for **Zinc Metal**.
- Carcinogenicity: IARC, NTP, and OSHA do not list **Zinc Metal** as a carcinogen.
- No Toxic Reproduction data available for **Zinc Metal**.
- No Specific Target Organ Toxicity (STOT) following a Single Exposure data available for **Zinc Metal**.
- No Specific Target Organ Toxicity (STOT) following Repeated Exposure data was available for **Zinc Metal**.

The above toxicity information was determined from available scientific sources to illustrate the prevailing posture of the scientific community. The scientific resources includes: The American Conference of Governmental Industrial Hygienist (ACGIH) Documentation of the Threshold Limit Values (TLVs) and Biological Exposure indices (BEIs) with Other Worldwide Occupational Exposure Values 2009, The International Agency for Research on Cancer (IARC), The National Toxicology Program (NTP) updated documentation, the World Health Organization (WHO) and other available resources, the International Uniform Chemical Information Database (IUCLID), European Union Risk Assessment Report (EU-RAR), Concise International Chemical Assessment Documents (CICAD), European Union Scientific Committee for Occupational Exposure Limits (EU-SCOEL), Agency for Toxic Substances and Disease Registry (ATSDR), Hazardous Substance Data Bank (HSDB), and International Programme on Chemical Safety (IPCS), European Union Classification, Labeling and Packaging. (EU CPL), Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH), International Uniform Chemical Information Database (IUCLID), TOXicology Data NETwork (TOXNET), European Risk Assessment Reports (EU RAR).



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### Section 11 - Toxicological Information (continued)

The following health hazard information is provided regardless to classification criteria and is based on the individual component(s):

**Acute Effects by Component:**

**ZINC:** Not Reported/ Not Classified

**Delayed (chronic) Effects by Component:**

**ZINC:** Zinc Residue CGLs are a low health risk by inhalation and should be treated as a nuisance dust. Inhalation of zinc oxide fumes may cause metal fume fever, which is characterized by flu-like symptoms with metallic taste, fever, chills, cough, weakness, chest pain, muscle pain and increased white blood cell count.

### Section 12 - Ecological Information

**12(a) Ecotoxicity (aquatic & terrestrial):** Not Applicable (NA) as shipped or sold. Zinc metal is not an environmental hazard, however processing may lead to the release of zinc compounds in bioavailable forms generated from downstream processing activities.

**12(b) Persistence & Degradability:** Not Applicable (NA) as shipped or sold

**12(c) Bioaccumulative Potential:** Not Applicable (NA) as shipped or sold

**12(d) Mobility (in soil):** Not Applicable (NA) as shipped or sold

**Additional Information:**

**Hazard Category:** Not Applicable (NA) as shipped or sold

**Signal Word:** Not Applicable (NA) as shipped or sold

**Hazard Symbol:** Not Applicable (NA) as shipped or sold

**Hazard Statement:** Not Applicable (NA) as shipped or sold

### Section 13 - Disposal Considerations

**Disposal:** Dispose of in accordance with Local, State, Federal and International regulations. Observe safe handling precautions.

**Container Cleaning and Disposal:** Follow Local, State, Federal and international regulations. Observe safe handling precautions.

Please note this information is for Zinc Metal in its original form. Any alterations can void this information.

### Section 14 - Transport Information

**14 (a-g) Transportation Information:**

**US Department of Transportation (DOT)** under 49 CFR 172.101 does not regulate **Zinc Metal** as a hazardous material. All federal, state, and local laws and regulations that apply to the transport of this type of material must be adhered to.

<b>Shipping Name:</b> NOT DOT Regulated <b>Shipping Symbols:</b> NA <b>Hazard Class:</b> NA <b>UN No.:</b> NA <b>Packing Group:</b> NA <b>DOT/IMO Label:</b> NA <b>Special Provisions (172.102):</b> NA	<b>Packaging Authorizations</b> <b>a) Exceptions:</b> NA <b>b) Non-bulk:</b> NA <b>c) Bulk:</b> NA	<b>Quantity Limitations</b> <b>a) Passenger Aircraft or Rail:</b> NA <b>b) Cargo Aircraft Only:</b> NA  <b>Vessel Stowage Location:</b> NA  <b>DOT reportable quantities:</b> NA
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**International Maritime Dangerous Goods (IMDG) and the Regulations Concerning the International Carriage of Dangerous Goods by Rail (RID)** classification, packaging and shipping requirements follow the US DOT Hazardous Materials Regulation.

**Regulations Concerning the International Carriage of Dangerous Goods by Road (ADR)** does not regulate **Zinc Metal** as a hazardous material.

<b>Shipping Name:</b> NOT DOT Regulated <b>Classification Code:</b> NA <b>UN No.:</b> NA <b>Packing Group:</b> NA <b>ADR Label:</b> NA <b>Special Provisions:</b> NA <b>Limited Quantities:</b> NA	<b>Packaging</b> <b>a) Packing Instructions:</b> NA <b>b) Special Packing Provisions:</b> NA <b>c) Mixed Packing Provisions:</b> NA	<b>Portable Tanks &amp; Bulk Containers</b> <b>a) Instructions:</b> NA <b>b) Special Provisions:</b> NA
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**International Air Transport Association (IATA)** does not regulate **Zinc Metal** as a hazardous material.

<b>Shipping Name:</b> NOT DOT Regulated <b>Class/Division:</b> NA <b>Hazard Label (s):</b> NA <b>UN No.:</b> NA <b>Packing Group:</b> NA <b>Excepted Quantities (EQ):</b> NA	<b>Passenger &amp; Cargo Aircraft Limited Quantity (EQ)</b> <b>Pkg Inst:</b> NA <b>Pkg Inst:</b> NA		<b>Cargo Aircraft Only</b> <b>Pkg Inst:</b> NA  <b>Max Net Qty/Pkg:</b> NA	<b>Special Provisions:</b> NA  <b>ERG Code:</b> NA
	<b>Max Net Qty/Pkg:</b> NA	<b>Max Net Qty/Pkg:</b> NA		

Pkg Inst – Packing Instructions

Max Net Qty/Pkg – Maximum Net Quantity per Package

ERG – Emergency Response Drill Code



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### Section 14 - Transport Information (continued)

Zinc Metal does not have a Transport Dangerous Goods (TDG) classification.

### Section 15 - Regulatory Information

**Regulatory Information:** The following listing of regulations relating to a Horsehead product may not be complete and should not be solely relied upon for all regulatory compliance responsibilities.

This product and/or its constituents are subject to the following regulations:

**OSHA Regulations:** Air Contaminant (29 CFR 1910.1000, Table Z-1, Z-2, Z-3): The product, **Zinc Metal** as a whole is listed. Refer to Section 8, Exposure Controls and Personal Protection

**EPA Regulations:** The product, **Zinc Metal** is not listed as a whole in the following regulatory listings. However, individual components of the product are listed:

Components	Regulations
Zinc (Zn Compounds)	CWA, SARA 313

**SARA Potential Hazard Categories:** Immediate Acute Health Hazard, Delayed Chronic Health Hazard.

**Regulations Key:**

- CAA Clean Air Act (42 USC Sec. 7412; 40 CFR Part 61 [As of: 8/18/06])
- CERCLA Comprehensive Environmental Response, Compensation and Liability Act (42 USC Secs. 9601(14), 9603(a); 40 CFR Sec. 302.4, Table 302.4 and App. A)
- CWA Clean Water Act (33 USC Secs. 1311; 1314(b), (c), (e), (g); 136(b), (c); 137(b), (c) [as of 8/2/06])
- RCRA Resource Conservation Recovery Act (42 USC Sec. 6921; 40 CFR Part 261 App VIII)
- SARA Superfund Amendments and Reauthorization Act of 1986 Title III Section 302 Extremely Hazardous Substances (42 USC Secs. 11023, 13106; 40 CFR sec. 372.65) and Section 313 Toxic Chemicals (42 USC Secs. 11023, 13106; 40 CFR Sec. 372.65 [as of 6/30/05])
- TSCA Toxic Substance Control Act (15 U.S.C. s/s 2601 et seq. [1976])
- SDWA Safe Drinking Water Act (42 U.S.C. s/s 300f et seq. [1974])

**Section 313 Supplier Notification:** The product, **Zinc Metal** contains the following toxic chemicals subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR part 372:

CAS #	Chemical Name	Percent by Weight
7440-66-6	Zinc	100

**State Regulations:** The product, **Zinc Metal** as a whole is not listed in any state regulations. However, individual components of the product are listed in various state regulations:

- Pennsylvania Right to Know (RTK): Contains regulated material in the following categories:  
Hazardous Substances: Zinc  
Environmental Hazards: Zinc
- California Prop. 65: Does not contains elements known to the State of California to cause cancer or reproductive toxicity.
- New Jersey: Contains regulated material in the following categories:  
Hazardous Substance: Zinc  
Environmental Hazards: Zinc
- Minnesota: Zinc
- Massachusetts: Zinc

**Other Regulations:**

**WHMIS Classification (Canadian):** The product, **Zinc Metal** is not listed

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the SDS contains all the information required by the Controlled Products Regulations.

### Section 16 - Other Information

**Prepared By:** Horsehead Corporation

**Revision History:**

05/19/2015 - Original

**Additional Information:**

**Hazardous Material Identification System (HMIS) Classification**

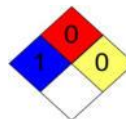
Health Hazard	1
Fire Hazard	0
Physical Hazard	0

HEALTH= 1, \* Denotes possible chronic hazard if airborne dusts or fumes are generated  
Irritation or minor reversible injury possible.

FIRE= 0, Materials that will not burn.

PHYSICAL HAZARDS = 0, Materials that are normally stable, even under fire conditions, and will not react with water, polymerize, decompose, condense, or self-react. Non-explosives.

**National Fire Protection Association (NFPA)**



HEALTH = 1, Exposure could cause irritation but only minor residual injury even if no treatment is given.

FIRE = 0, Materials that will not burn.

INSTABILITY = 0, Normally stable, even under fire exposure conditions, and are not reactive with water.



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### Section 16 - Other Information (continued)

**ABBREVIATIONS/ACRONYMS:**

<b>ACGIH</b>	American Conference of Governmental Industrial Hygienists	<b>NIF</b>	No Information Found
<b>BEIs</b>	Biological Exposure Indices	<b>NIOSH</b>	National Institute for Occupational Safety and Health
<b>CAS</b>	Chemical Abstracts Service	<b>NTP</b>	National Toxicology Program
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act	<b>ORC</b>	Organization Resources Counselors
<b>CLP</b>	Classification, Labelling and Packaging	<b>OSHA</b>	Occupational Safety and Health Administration
<b>CFR</b>	Code of Federal Regulations	<b>PEL</b>	Permissible Exposure Limit
<b>CNS</b>	Central Nervous System	<b>PNOR</b>	Particulate Not Otherwise Regulated
<b>GI, GIT</b>	Gastro-Intestinal, Gastro-Intestinal Tract	<b>PNOC</b>	Particulate Not Otherwise Classified
<b>HMIS</b>	Hazardous Materials Identification System	<b>PPE</b>	Personal Protective Equipment
<b>IARC</b>	International Agency for Research on Cancer	<b>ppm</b>	parts per million
<b>LC50</b>	Median Lethal Concentration	<b>RCRA</b>	Resource Conservation and Recovery Act
<b>LD50</b>	Median Lethal Dose	<b>REACH</b>	Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals
<b>LD Lo</b>	Lowest Dose to have killed animals or humans	<b>RTECS</b>	Registry of Toxic Effects of Chemical Substances
<b>LEL</b>	Lower Explosive Limit	<b>SARA</b>	Superfund Amendment and Reauthorization Act
<b>LOEL</b>	Lowest Observed Effect Level	<b>SCBA</b>	Self-contained Breathing Apparatus
<b>LOAEC</b>	Lowest Observable Adverse Effect Concentration	<b>SDS</b>	Safety Data Sheet
<b>µg/m3</b>	microgram per cubic meter of air	<b>STEL</b>	Short-term Exposure Limit
<b>mg/m3</b>	milligram per cubic meter of air	<b>TLV</b>	Threshold Limit Value
<b>mppcf</b>	million particles per cubic foot	<b>TWA</b>	Time-weighted Average
<b>MSHA</b>	Mine Safety and Health Administration	<b>UEL</b>	Upper Explosive Limit
<b>NFPA</b>	National Fire Protection Association		

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