



# Material Safety Data Sheet

## PART I: What is the material and what do I need to know in an emergency?

### 1. PRODUCT IDENTIFICATION

**Revision Date:** 05/05/06  
**Manufacturer:** BIO HUMA NETICS, INC.  
201 South Roosevelt  
Chandler, AZ 85226

**BUSINESS PHONE:** 480-961-1220  
**FAX:** 480-961-3501  
**EMERGENCY PHONE:** 800-961-1220

### TRADE NAME: HUMA GRO® MOLYBDENUM

**COMPOSITION:** Proprietary Polymerous Hydrosol leachate with Inorganic Molybdate Salts.

### 2. COMPOSITION AND INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS NO.	% W/W	ACGIH TLV/STEL	OSHA PEL/STEL
Molybdenum (Mo)	7439-98-7	5.00%	NE	NE
Proprietary Polymerous Hydrosol Leachate and Chelated Nutrients.		80.0%	This component does not have an established exposure limit and does not contribute significant additional hazards at the concentrations present in this product.	
Water and other components. Each of the other components is present in less than 1% concentration (or 0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		BALANCE	None of the other components contribute significant health hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of OSHA Standard 29 CFR 1910.200, U.S. State Equivalent Standards and Canadian Workplace Hazardous Materials Identification System Standards (CPR4).	

**NOTE:** NA = Not Applicable

NE = Not Established

ND = Not Determined

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### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This is a slightly alkaline, light amber liquid. This product presents a slight health hazard (in terms of irritation on contaminated skin, eyes, or mucous membranes). This product presents no significant flammability or reactivity hazards. Emergency Responders must wear the personal protective equipment suitable for the situation to which they are responding.

#### SIGNS AND SYMPTOMS OF EXPOSURE BY ROUTE OF EXPOSURE

**Inhalation:** Inhalation of sprays, aerosols, or mists of this solution may be irritating to the nose, throat and exposed mucous membranes. Symptoms of exposure may include coughing, sneezing, and sore throat. Symptoms generally subside when overexposure ends.

**Contact With Skin Or Eyes:** Contact with skin may cause irritation and reddening of exposed tissue. Contact with eyes may cause tearing, pain, reddening, and general irritation. Prolonged or repeated contact may lead to the development of chapped skin or dermatitis.

**Skin Absorption:** Skin absorption is anticipated to be a significant route of overexposure to this product.

**Ingestion:** Though not a likely route of occupational exposure, ingestion will lead to irritation to the throat, esophagus, and other tissues of the digestive systems. Symptoms of such exposure would include coughing, nausea, vomiting, and diarrhea.











**Injection:** Injection of this product, via puncture with a contaminated object, or pressurized spraying system will lead to a burning sensation, reddening, and swelling around the site of injection.

#### HEALTH EFFECTS OR RISKS FROM EXPOSURE

**Acute:** Pain, reddening, and irritation of exposed tissue. Severe inhalation or ingestion overexposure may be harmful.

**Chronic:** Prolong or repeated skin contact to this product may lead to chapped skin or dermatitis (dry, inflamed skin)

**Target Organs:** Skin and Eyes

CODE:	NAME:			
<input type="checkbox"/> FIRE	<input type="checkbox"/> EYE IRRITANT	<input type="checkbox"/> TOXIC		
<input type="checkbox"/> REACTIVE	<input type="checkbox"/> SKIN IRRITANT	<input type="checkbox"/> SENSITIZER		
<input type="checkbox"/> OXIDIZER	<input type="checkbox"/> CORROSIVE	<input type="checkbox"/> CHRONIC HAZARD		
SEVERITY RATINGS:		<div style="display: flex; justify-content: space-between; align-items: center;"> <div style="text-align: center;"> <input checked="" type="radio"/> FIRE         </div> <div style="writing-mode: vertical-rl; text-orientation: mixed; font-size: 2em; font-weight: bold;">HAZARD</div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input checked="" type="radio"/> HEALTH         </div> </div> <div style="display: flex; justify-content: space-between; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <input checked="" type="radio"/> REACTIVE         </div> </div>		
4 EXTREME				
3 SERIOUS				
2 SIGNIFICANT				
1 SLIGHT				
0 MINIMUM				
<input type="checkbox"/> (S)				
REQUIRED PERSONAL PROTECTION EQUIPMENT				
<input type="checkbox"/> MG	<input type="checkbox"/> DR	<input type="checkbox"/> CR	<input type="checkbox"/> RG	<input type="checkbox"/> RB
				
<input type="checkbox"/> FS	<input type="checkbox"/> VR	<input type="checkbox"/> AR	<input type="checkbox"/> RA	<input type="checkbox"/> FU
				
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## PART II: What should I do if a hazardous situation occurs?

### 4. FIRST-AID MEASURES

**Skin Exposure:** In case of contact, rinse exposed area immediately and thoroughly with clear water for up to 15 minutes. Pat dry without rubbing. If irritation continues, seek medical help. If necessary, remove exposed or contaminated clothing, taking care not to contaminate eyes.

**Eyes Exposure:** In case of contact: flush eyes with large amounts of water for up to 15 minutes. Eyelids should be held apart intermittently for about 10 to 15 seconds during flushing to insure contact with the water with all accessible tissue of eyes and lids.

**Inhalation:** Avoid breathing mists or sprays. If inhaled, move contaminated individual to fresh air. If necessary use artificial respiration to support vital functions. Remove, rinse, flush, or cover contamination to avoid exposure to rescue personnel.

**Ingestion:** Avoid swallowing this product. In case of accidental ingestion, **CALL A PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. Do not induce vomiting.** Drink large amounts of clean water or milk. *Never induce vomiting or give liquids to someone who is unconscious, having convulsions, or unable to swallow.* Seek prompt medical attention and advise of acidic nature of product.

CONTAMINATED INDIVIDUALS MUST BE TAKEN FOR MEDICAL ATTENTION IF ANY ADVERSE REACTION OCCURS. RESCUERS SHOULD BE TAKEN FOR MEDICAL ATTENTION, IF NECESSARY. TAKE A COPY OF THE LABEL AND THIS MSDS TO THE PHYSICIAN OR HEALTH PROFESSIONAL WITH VICTIM.

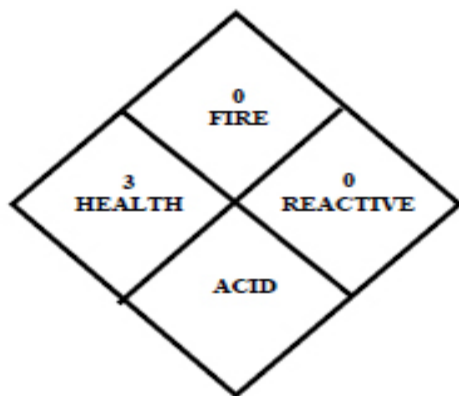
### 5. FIRE-FIGHTING MEASURES

**Flash Point:** N/A    **Method Used:**    **Auto ignition Temperature:** N/A

**Flammable Limits in Air % by Volume:** N/A    **UEL:** N/A    **LEL:** N/A

**Fire Extinguishing Materials:**

Water Spray:	YES	Carbon Dioxide:	NA
Foam:	YES	Dry Chemical:	NA
Halon:	NA	Other:	Any "ABC" Class



**Unusual Fire/Explosion Hazards:** Extreme temperatures may produce toxic oxide

**Explosion Sensitivity to Mechanical Impact:** N/A

**Explosion Sensitivity to Static Discharge:** N/A

**Special Fire-Fighting Procedures** - Incipient stage fire responders should wear eye protection. Firefighters should wear NIOSH approved full Face piece, self-contained breathing apparatus (SCBA) operated in positive pressure mode and wear full protective equipment. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.



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### 6. ACCIDENTAL RELEASE MEASURES

**Release Response:** In case of a release, if uncontaminated, recover and reuse. Absorb liquid spill or release with dry absorbent and containerize unusable material for disposal in an approved waste facility. Do not release this or any chemical product into service or sewer system(s).

For small spills (e.g. 1 gallon from a leaking container), the minimum personal protective equipment (PPE) should be as follows: gloves, goggles, and appropriate body protection (e.g., boots, Tyvek suit). For large releases (e.g., 55 gallon drum), the minimum PPE should be level C: triple gloves (rubber & nitrile gloves, over latex gloves) chemical resistant suit and boots, hard-hat and an air purifying with a high efficiency particulate filter. If necessary, dike the spill to prevent contamination to environmentally sensitive areas. Absorb spilled liquid with Polypads or other suitable absorbent materials. Rinse area thoroughly with water. Decontaminate the area thoroughly. Place all spill residues in an approved container and seal. Reuse this product, or dispose of in accordance with U.S. Federal, State, or local procedures and appropriate Canadian standards (see section 13, Disposal Considerations).

### PART III: How can I prevent *hazardous* situations from occurring?

### 7. HANDLING AND STORAGE

**Work and Hygiene Practices:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing vapors or mists generated by this product. Use in a well ventilated area. Remove and wash contaminated clothing immediately.

**Storage and Handling Practices - Non-Bulk Containers:** All employees should be properly trained prior to handling this product. Open containers and drums slowly, on a stable surface. Open drum bungs carefully, to relieve any pressure build-up, which may have developed during storage. All containers of this product must be properly labeled. Empty containers may contain product residue; empty containers should be handled with care. Store containers in a cool, dry, location; away from direct sunlight, sources of intense heat, or where freezing is possible. Store away from incompatible materials (see Section 10, Stability and Reactivity). Material should be stored in secondary containers or in a diked area, if possible. Keep container tightly closed when not in use. Inspect all incoming containers before storage to ensure that containers are properly labeled and are not damaged.

**Intermediate Bulk Containers and Equipment:** Ensure materials in bulk containers and process lines are properly labeled. Close all valves tightly when product is not being used. Determine that lines are not contaminated with incompatible materials before use in operations involving this material. Secondary containment (dikes and berms) should be used. Periodic inspection of bulk containers and process equipment must be conducted.

**Tank Car Shipments:** Tank cars carrying this product should be loaded and unloaded in strict accordance with tank car manufacturer's recommendation and all established on-site safety procedures. Appropriate PPE must be used (see Section 8, Exposure Controls - Personal Protection). All loading and unloading equipment must be inspected prior to each use. Loading and unloading operations must be attended at all times. Tank car must be level and wheels locked or blocked prior to loading or unloading. Tank cars or storage tanks must be verified to be correct for receiving this product and be properly prepared prior to starting transfer operations. Hoses must be verified to be clean and free of incompatible chemicals prior to connection to the tank car or vessel. Valves and hoses must be verified to be in the correct positions before starting transfer operations. A sample (if required) must be taken and verified (if required) prior to starting transfer operations. All lines must be blowdown and purged before disconnecting them from the tank car or vessel.

**Protective Practices During Maintenance of Contaminated Equipment:** Follow practices indicated in Section 6 (Accidental Measures). Make certain that application equipment is locked and tagged out in accordance with U.S. Federal, State, or local procedures and appropriate Canadian standards (see Section 13, Disposal Consideration).



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### **8. EXPOSURE CONTROLS - PERSONAL PROTECTION**

**Ventilation and Engineering Controls:** Use with adequate ventilation to prevent inhalation of sprays or mists. All operations should be directed at minimizing the generation of aerosols, sprays, or mists. Eyewash stations/safety showers should be near areas where this product is used or sprayed.

**Respirator Protection:** None required under normal circumstances of use. If operations generate aerosols, mists, or sprays that cause exposure in excess of the guidelines listed in Section 2 (Composition and Information on Ingredients), respirator protection may be needed (e.g., air-purifying respirator with a high efficiency particulate filter) and must comply with the U.S. Federal OSHA Standard (29 CFR 1910.134), and applicable U.S. State regulations, or the appropriate standards of Canada and its Provinces.

**Eye Protection:** Splash goggles or safety glasses. Wear face shield for operations involving this solution in which splashes or sprays can be generated.

**Hand Protection:** Wear Neoprene gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 (Accidental Release Measures) of this MSDS.

**Body Protection:** Use waterproof body protection such as rubber aprons or coveralls.

### **9. PHYSICAL & CHEMICAL PROPERTIES**

**Vapor Density:** (air =1)

**Sp. Gravity:** 1.1798 @ 68° F (H<sub>2</sub>O=1)

**Solubility in Water:** Soluble in water

**Vapor Pressure:** NE

**Odor Threshold:** NE

**Coefficient of Oil/Water Distribution (Partition Coefficient):** N/A

**Appearance and Color:** Light amber liquid.

**How to Detect This Substance (warning properties):** The appearance of this product may act as a distinguishing characteristic of this product.

**Evaporation Rate:** ND

**Melting/Freezing Point:** NA

**Boiling Point:** ND

**PH:** 2.0 @ 68° F

### **10. STABILITY AND REACTIVITY**

**Stability:** Stable

**Hazardous Decomposition Products:** Irritating fumes possible.

**Materials with Which This Substance Is Incompatible:** Alkaline solutions, metals, strong oxidizers, reducing or combustible materials or chemicals. Contact with non-ferrous metals such as zinc and aluminum should be avoided.

**Hazardous Polymerization:** May Occur  Will not Occur

**Conditions to Avoid:** If this product is mixed with incompatible materials or chemicals, a chemical change may occur in which there is a product of or in which insoluble particles are formed. The use of common sense and good judgment should prevail when using this or any other chemical, agricultural, garden or turf product.



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### **PART IV: Is there any other useful information about this material?**

#### **11. TOXICOLOGICAL INFORMATION**

**Toxicity Data:** The specific toxicology data available for components greater than 1% in concentration is as follows.

**Suspected Cancer Agent:** This products components are not found on the following lists: U.S. FEDERAL OSHA Z LIST, NTP, IARC, and CAL/OSHA and therefore are neither considered to be or suspected to be cancer-causing agents by these agencies.

**Irritancy Of Product:** This product can be irritating to contaminated tissues upon prolonged or repeated exposure.

**Sensitization to product:** No component of this product is known to be a Sensitizer after prolonged or repeated exposure.

**Reproductive Toxicity Information:** This product and its components do not have any known reproductive toxicity effects.

**ACGIH Biological Exposure Indices:** Currently there are no ACGIH Biological Exposure Indices (BEIs) associated with the components of this product.

**Medical Conditions Aggravated by Exposure:** Preexisting respiratory problems, dermatitis, and other skin disorders can be aggravated by exposure to this product.

**Recommendations to Physicians:** Treat symptoms and eliminate overexposure.

#### **12. ECOLOGICAL INFORMATION**

WORK PRACTICES MUST PREVENT UNINTENTIONAL ENVIRONMENTAL RELEASES.

**Environmental Stability:** The components of this solution are relatively stable, but will decompose over extended time to generate other inorganic compounds. The following environmental data are available for the components of this product:

**Effect of Material On Plants or Animals:** This solution is irritating to contaminated animals. Refer to Section I I (Toxicology Information) for information on this product's components and their effects on test animals. This product is a mineral or fertilizer solution. Releases of large quantities into a confined area can substantially alter the nutrient composition affect on terrestrial plant life.

**Effect of Chemical on Aquatic Life:** This product is a mineral or fertilizer solution. Releases of large quantities into a body of water can substantially alter the nutrient composition affect on aquatic plant, fish and animal life.

#### **13. DISPOSAL CONSIDERATIONS**

**Preparing Wastes for Disposal:** Waste disposal must be in accordance with U.S. Federal, State and local regulation or those of Canada and its Provinces. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous regulatory authority.

**U.S. EPA Waste Number:** Not applicable

#### **14. TRANSPORTATION INFORMATION**

THIS MATERIAL IS NOT HAZARDOUS PER 40 CFR 172. 1 0 1, U.S. DEPARTMENT OF TRANSPORTATION

**Proper Shipping Name:** NA

**Hazard Class Number and Description:** NA

**UN Identification Number:** NA

**Packing Group:** NA

**DOT Label (S) Required:** NA

**North American Emergency Response Guide Number - 2000 NA**

**Marine Pollutant:** No component of this product is listed as a DOT Marine Pollutant (49CFR172.101,AppendixB).

**Canada Transportation Of Dangerous Goods Regulations:** This material is not considered dangerous goods.



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### **15. REGULATORY INFORMATION**

ADDITIONAL INFORMATION.

**U.S. SARA Reporting Requirements:** The components of this product are not subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization, as follows.

**U.S. SARA Threshold Planning Quantity:** NA

**U.S. CERCLA Reportable Quantity (RQ):** NA

**U.S. TSCA Inventory Status:** The components of this product are listed on the TSCA Inventory.

**Other U.S. Regulations:** NA

**U.S. State Regulatory Information:** Components of this product are not covered under specific State regulations.

Alaska - Designated Toxic and Hazardous Substances: No

California - Permissible Exposure Limits for Chemical Contaminants: No

Florida - Substance List: No

Kansas - Section 302/313 List: No

Michigan - Critical Materials Register: No

Missouri - Employer Information/Toxic Substance List: No

New Jersey - Right to Know Hazardous Substance List: No

North Dakota - List of Hazardous Chemicals Reportable Quantities: No

Pennsylvania - Hazardous Substance List: No

Rhode Island - Hazardous Substance: No

West Virginia - Hazardous Substance List: No

Illinois - Toxic Substance List: No

Massachusetts - Substance List: No

Minnesota - List of Hazardous Substances: No

Texas - Hazardous Substance List: No

Wisconsin - Toxic and Hazardous Substances: No

**California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):** No Component of this product is on the California Proposition 65 Lists.

**ANSI Labeling: CAUTION!** MAY CAUSE SKIN, EYE AND RESPIRATORY SYSTEM IRRITATION. HARMFUL IF SWALLOWED. FOR INDUSTRIAL OR AGRICULTURAL USE ONLY. KEEP AWAY FROM CHILDREN. Avoid contact with skin, eyes, and clothing. Avoid prolonged skin contact. Wash thoroughly after handling. Use in well ventilated areas. Use gloves, safety goggles, and appropriate body protection.

**FIRST AID:** In case of skin or eye contact, flush with generous amounts of water. Recommended flushing time is for 15 minutes. If inhaled, remove to fresh air. If ingested, DO NOT INDUCE VOMITING. If adverse reactions occur, get medical attention.

**IN CASE OF FIRE:** Use water fog, dry chemical, CO<sub>2</sub> or "alcohol" foam.

**IN CASE OF SPILL:** Absorb with an inert material (i.e. Polypads) and then place in a suitable container. Consult MSDS.

**Additional Canadian Regulations:**

**CANADIAN DSL/NDL INVENTORY STATUS:** The components of this product are on the DSL/NDL Lists.

**OTHER CANADIAN REGULATIONS:** NA

**CANADIAN ENVIRONMENTAL PROTECTION AGENCY (CEPA) PRIORITIES SUBSTANCES LISTS:** N/A

**CANADIAN WI-IMIS SYMBOLS:** N/A

### **16. OTHER INFORMATION**

**WAIVER:** The information in this MSDS was obtained from current, reliable sources, and intended for persons having related technical skills. However, the data is provided without warranty, expressed or implied, regarding its correctness or accuracy. It is the user's responsibility to determine safe conditions for use of this product and to assume liability for loss, injury, damage, or expense resulting from improper use.

## Definitions Of Terms

**Acute Exposure:** A single brief contact with a toxic substance

**Carcinogen:** A substance or agent that can cause a growth of abnormal tissue or tumors in humans or animals. A material identified as an animal carcinogen does not necessarily cause cancer in humans. Examples of human carcinogens include coal tar, which can cause skin cancer, and vinyl chloride, which can cause liver cancer.

**CAS:** Chemical Abstracts Service. A Columbus, Ohio organization, which indexes information published in Chemical Abstracts by the American Chemical Society and provides index guides by which information about particular substances may be located in the Abstracts when needed. CAS numbers identify specific chemicals.

**Chronic Effects:** An adverse effect on a human or animal body that can take months or years to develop after exposure. Examples include cancer and irreversible damage to certain organs. Chronic effects are usually from a long-term exposure to a very low level of contaminant.

**Flash Point:** The temperature at which a liquid will give off enough flammable vapor to ignite if an ignition source is present. There are several flash point test methods and flash points may vary for the same material depending on the method used, so the test method is indicated when the flash point is given (150 PMCC, 200 TCC, etc.).

**Hazard Warning:** Any words, pictures or combination thereof appearing on a label or another appropriate form of warning that conveys the hazards of the chemical(s) in the container(s).

**Hazardous Materials Identification System:** Health Hazard: - 0 (minimal acute or chronic exposure hazard); I (slight acute or chronic exposure hazard); 2 (moderate acute or significant chronic exposure hazard); 3 (severe acute exposure hazard: onetime overexposure can result in permanent injury can be fatal); 4 (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: 0 (minimal hazard; I (materials that require substantial pre-heating before burning); 2 (combustible liquids or solids: liquids with a flash point of 3893°C [100-200°F); 3 (Class IB & IC flammable liquids with flash points below 38°C [100°F)); 4 (Class 1A flammable liquids with flash points below 230C[73F] and boiling points below 38°C [100°F). Reactivity Hazard: 0 (normally stable); I (material that can become unstable at elevated temperatures or which can react slightly with water); 2 (materials that are unstable but do not detonate or which can react violently with water); 3 (materials that can detonate initiated or which can react explosively with water); 4 (materials that can detonate at normal temperatures or pressures).

**LEL:** Lower Explosive Limit or lower flammable limit of a vapor or gas. The lowest concentration (lowest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At concentrations lower than the LEL, the mixture is too "lean" to burn. Also See UEL.

**National Fire Protection Association:** Health Hazard: 0 (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); I (materials that on exposure under fire conditions could cause irritation or minor residual injury); 2 (materials that on intense or continued exposure under fire conditions could cause temporary incapacitation or possible residual injury); 3 (materials that can on short exposure could cause serious temporary or residual injury); 4 (materials that under very short exposure causes death or major residual injury).

**PEL:** Permissible Exposure Limit. The legally enforced exposure limit for a substance established by OSHA regulatory authority. The PEL indicates the permissible concentration of air contaminants to which nearly all workers may be repeatedly exposed eight (8) hours a day, forty (40) hours a week, over a working lifetime (30 years) without adverse health effects.

**PH:** The symbol relating the hydrogen ion (I-F) concentration to that of a given standard solution. A pH of 7 is neutral. Numbers increasing from 7 to 14 indicate greater alkalinity. Numbers decreasing from 7 to 0 indicate greater acidity.

**Reportable Quantity (RQ):** The chemical quantity at or above which a non-exempt accidental release of a CERCLA hazardous substance or a SARA Title III EHS must be reported to emergency response officials.

**TLV:** Threshold Limit Value. A term used by ACGIH to express the airborne concentration of a material to which nearly all persons can be exposed day after day, without adverse effects. ACGIH expresses TLVs in three ways: 1) TLV-TWA: the allowable time-weighted average concentration for a normal 8-hour workday or 40 hour workweek. 2) TLV-STEL: The short-term exposure limit or maximum concentration for a continuous 15-minute period (maximum of four such periods per day, with at least 60 minutes between exposure periods and provided that the daily TLV-TWA is not exceeded). 3) TLV-C: the ceiling limit - the concentration that should not be exceeded even instantaneously.

**UEL:** Upper Explosive Limit or upper flammable limit of a vapor or gas. The highest concentration (highest percentage of the substance in air) that will produce a flash of fire when an ignition source (heat, arc, or flame) is present. At higher concentrations, the mixture is too "rich" to burn. Also see LEL.

**Vapor:** The gas given off by a solid or liquid substance at ordinary temperatures.