



# MATERIAL SAFETY DATA SHEET

Prepared to U.S. OSHA, CMA, ANSI and Canadian WHMIS Standards

## BASIC CHEMICAL SOLUTIONS

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

#### 1. PRODUCT IDENTIFICATION

**TRADE NAME (AS LABELED):** **BCS SUPER-K CIP**

**CHEMICAL NAME/CLASS:** Alkali Solid Mixture

**PRODUCT USE:** Cleaning Compound

**PRODUCT CODE:** BCS05XX

**SUPPLIER/MANUFACTURER'S NAME:** **BASIC CHEMICAL SOLUTIONS, L.L.C.**

**ADDRESS:** **Corporate Office**  
525 Seaport Blvd  
Redwood City, CA 94063

**BUSINESS PHONE:** 1-800-411-4227

**EMERGENCY PHONE:** **CHEMTREC:** 1-800-424-9300

**DATE OF PREPARATION:** June 7, 2010

**DATE OF REVISION:** None

#### 2. COMPOSITION and INFORMATION ON INGREDIENTS

CHEMICAL NAME	CAS #	%w/w	EXPOSURE LIMITS IN AIR					
			ACGIH		OSHA			OTHER
			TLV mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	PEL mg/m <sup>3</sup>	STEL mg/m <sup>3</sup>	IDLH mg/m <sup>3</sup>	
Potassium Hydroxide	1310-58-3	70-90	NE	2,C	2, (Vacated 1989 PELs)	NE	NE	NIOSH REL: STEL: 2
Potassium Polyphosphate	7320-34-5	< 10	NE	NE	NE	NE	NE	NE
Sodium Metasilicate, Anhydrous	6834-92-0	< 10	NE	NE	NE	NE	NE	NE
Other ingredients which are each present in less than 1 percent concentration in this product.		Balance	The components present in the balance of this product do not have established exposure limits nor contribute any significant, additional hazards. All hazard information pertinent to this product has been presented in the remaining sections of this Material Safety Data Sheet, per the requirements of Federal Occupational Safety and Health Hazard Communication Standard (29 CFR 1910.1200).					

NE = Not Established. C = Ceiling Limit. See Section 16 for Definitions of Terms Used. mppcf: Millions of particles per cubic foot.  
NOTE: All WHMIS required information is included. It is located in appropriate sections based on the ANSI Z400.1-1993 format.

### 3. HAZARD IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a off-white, granular solid with a mild odor. The primary health hazard during emergency response to releases of this product is the potential for severe irritation and chemical burns of skin, eyes, and other contaminated tissue. This product is not flammable. Direct contact of this product with water will release heat. Emergency responders must wear the proper personal protective equipment suitable for the situation to which they are responding.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The most significant routes of occupational overexposure are inhalation and contact with skin and eyes. The symptoms of overexposure to this product are as follows:

**INHALATION:** If dusts or particulates of this mixture are inhaled, this product may cause pulmonary irritation, irritation of the mucus membranes, coughing, and a sore throat. Damage to the tissues of the respiratory system may occur. Severe inhalation overexposures may be fatal.

**CONTACT WITH SKIN or EYES:** Contact with the eyes will cause irritation, pain, tissue damage, and may result in blindness. Skin contact may result in a "soapy" feel and cause reddening, discomfort and may cause ulcerating burns which could leave scars. The burns may not be immediately painful or visible.

**SKIN ABSORPTION:** Skin absorption is not anticipated to be a significant route of overexposure to any component of this product.

**INGESTION:** Though ingestion is not anticipated to be a significant route of overexposure to this product, if ingestion does occur, burning and irritation of the mouth, throat, esophagus, and other tissues of the digestive system will occur immediately upon contact. Ingestion of large quantities may be fatal.




**INJECTION:** Though injection is not anticipated to be a significant route of overexposure to this product, if it occurs (via puncture by a contaminated object), local reddening, tissue swelling, discomfort, and chemical burns may result.

**HEALTH EFFECTS OR RISKS FROM EXPOSURE:** An Explanation in **Lay Terms.**

**ACUTE:** This mixture is corrosive, and can burn and damage eyes, skin, mucous membranes, and any other exposed tissue. If inhaled, irritation of the respiratory system may occur, with coughing, and breathing difficulty. Though unlikely to occur during occupational use, ingestion of large quantities or severe inhalation overexposures may be fatal.

**CHRONIC:** Repeated skin contact with this product may result in dermatitis (inflammation and reddening of the skin) and allergic skin reactions. Refer to Section 11 (Toxicological Information) for additional data.

**TARGET ORGANS:** Skin, eyes, respiratory system.

HAZARDOUS MATERIAL INFORMATION SYSTEM			
HEALTH		(BLUE)	3
FLAMMABILITY		(RED)	0
REACTIVITY		(YELLOW)	1
PROTECTIVE EQUIPMENT			D
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		
For routine industrial applications			

## PART II *What should I do if a hazardous situation occurs?*

### 4. FIRST-AID MEASURES

**SKIN EXPOSURE:** If the product contaminates the skin, remove as much solid as possible by brushing off the affected area and then immediately begin decontamination with running water. Minimum flushing is for 15 minutes. Remove contaminated clothing, taking care not to contaminate eyes. Victim must seek medical attention if adverse effects occur.

**EYE EXPOSURE:** If this product enters the eyes, open victim's eyes while under gentle running water. Use sufficient force to open eyelids. Have victim "roll" eyes. Minimum flushing is for 15 minutes. Victim must seek immediate medical attention.

**INHALATION:** If dusts or particulates of this product are inhaled, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Remove or cover gross contamination to avoid exposure to rescuers.

**INGESTION:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If professional advice is not available, do not induce vomiting. Victim should drink milk, egg whites, or large quantities of water. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or unable to swallow. Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take a copy of the label and MSDS to health professional with victim.

### 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not flammable.

AUTOIGNITION TEMPERATURE,: Not flammable.

FLAMMABLE LIMITS (in air by volume, %):

Lower (LEL): Not applicable.

Upper (UEL): Not applicable.

FIRE EXTINGUISHING MATERIALS:

Water Spray: NO

Carbon Dioxide: YES

Foam: YES

Dry Chemical: YES

Halon: YES

Other: Any "ABC" Class.

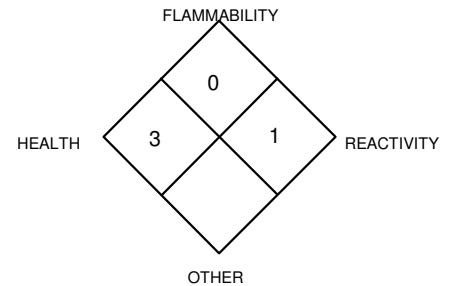
UNUSUAL FIRE AND EXPLOSION HAZARDS: This mixture is a corrosive alkali and presents a significant contact hazard to firefighters. Though the product is not flammable, it can react with water, to release heat and to cause spattering. When involved in a fire, this material may decompose and produce caustic vapors and toxic gases (including carbon monoxide, carbon dioxide, silicate, potassium and sodium compounds).

Explosion Sensitivity to Mechanical Impact: Not sensitive.

Explosion Sensitivity to Static Discharge: Not sensitive.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural fire fighters must wear Self-Contained Breathing Apparatus and full protective equipment. Move fire-exposed containers, if it can be done without risk to firefighters. If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas. If necessary, discard or decontaminate fire response equipment using caustic-neutralizing agent before returning such equipment to service.

## NFPA RATING



## 6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: In case of a release, clear the affected area, protect people, and respond with trained personnel. Uncontrolled releases should be responded to by appropriately trained personnel in proper personal protective equipment, using pre-planned procedures.

The proper personal protective equipment for incidental releases (e.g., 1 pound of mixture) includes gloves, safety goggles, and appropriate body protection. A dust mask and faceshield should be worn if excessive dusts or particulates will be generated during clean-up. In the event of a non-incidental release (e.g., 350 pounds of material), minimum Personal Protective Equipment should be **Level B: triple-gloves (rubber gloves and nitrile gloves over latex gloves), chemical resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus**. Sweep-up or vacuum released solid. Neutralize residue with caustic neutralizing agent (i.e. citric acid). Decontaminate the area thoroughly. Test area with litmus paper to confirm neutralization. Place all spill residue in a suitable container. If necessary, discard or decontaminate spill response equipment using caustic-neutralizing agent before returning such equipment to service. Place all spill residue in a suitable container. Dispose of in accordance with Federal, State, and local hazardous waste disposal regulations (see Section 13, Disposal Considerations).

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

### 7. HANDLING and STORAGE

WORK PRACTICES 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 dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Never add water to this product, always add product, with constant stirring, slowly to surface of lukewarm water, to assure product is being completely dissolved as it is added. Never add more product than can be absorbed by solution, to prevent spattering of solution. Use in a well-ventilated location.

Use fiberboard drums in good condition to store this product. Protect from direct contact with excessive moisture. Do not drop onto, or slide across, sharp objects. Do not store on side. Avoid creasing or impacting of side walls. Open fiberboard drums slowly, on a stable surface. Containers of this product must be properly labeled. Store containers in a cool, dry location, and away from sources of intense heat. Store fiberboard drums away from incompatible chemicals (See Section 10, Stability and Reactivity). Keep drums tightly closed when not in use. Storage areas should be made of fire-resistant materials. Inspect all incoming containers before storage, to ensure containers are properly labeled and not damaged. Empty containers may contain residual material; therefore, empty containers should be handled with care.

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## 7. HANDLING and STORAGE (Continued)

PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT: Follow practices indicated in Section 6 (Accidental Release Measures). If necessary, make certain equipment is locked and tagged-out safely.

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## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use a ventilation system which ensures that there that exposures are kept below limits indicated in section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below exposure limits listed in Section 2 (Composition and Information on Ingredients). If respiratory protection is needed, use only protection authorized in 29 CFR 1910.134, or applicable State regulations. Use supplied air respiration protection if oxygen levels are below 19.5% or are unknown.

EYE PROTECTION: Splash goggles or safety glasses. Face-shields are required when working with more than 10 pounds of this product, or when the operation can generate excessive dusts.

HAND PROTECTION: Wear neoprene gloves for routine industrial use. Use triple gloves for spill response, as stated in Section 6 of this MSDS (Accidental Release Measures).

BODY PROTECTION: Use body protection appropriate for task. Cover-all, rubber aprons, or chemical protective clothing made from natural rubber are generally acceptable, depending upon the task.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

RELATIVE VAPOR DENSITY (air = 1): Not applicable.

SPECIFIC GRAVITY (water = 1): > 1

SOLUBILITY IN WATER: Completely soluble.

VAPOR PRESSURE, mm Hg @ 25 °C: Not applicable.

ODOR THRESHOLD: Not applicable.

LOG WATER/OIL DISTRIBUTION COEFFICIENT: Not applicable.

APPEARANCE AND COLOR: This mixture is a granular, off-white, solid with a mild odor.

HOW TO DETECT THIS SUBSTANCE (warning properties): The appearance may be a distinguishing characteristic of this product. Litmus paper will turn blue-purple upon contact with solutions of this product.

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## 10. STABILITY and REACTIVITY

STABILITY: Stable. This product can absorb moisture and carbon dioxide from the air.

DECOMPOSITION PRODUCTS: Thermal decomposition products of this mixture can include caustic vapors, carbon monoxide, carbon dioxide, silicate, potassium and sodium compounds.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: This product reacts to strong acids, strong oxidizers, ammonia (and other nitrogen-containing compounds), sugars, organic compounds, hydrogen fluoride, and fluorine. Prolonged contact with metals (e.g., aluminum, tin, lead, and zinc) may be corrosive and produce flammable hydrogen gas. Due to the presence of Potassium Hydroxide, avoid contact with leather and wool.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Avoid extremely high temperatures and incompatible chemicals.

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

### **11. TOXICOLOGICAL INFORMATION**

**TOXICITY DATA:** Toxicology information for components greater than 1 percent in concentration is provided below.

**POTASSIUM HYDROXIDE:**

Skin-Human: 50 mg/24 hours, Severe irritation effects  
Skin-Rabbit: adult 50 mg/24 hours, Severe irritation effects  
Eye effects-Rabbit, adult: 1 mg/24 hours, rinse - Moderate irritation effects  
Cytogenetic Analysis-Rat/ast: 1800 mg/kg  
Oral-Rat LD<sub>50</sub>: 273 mg/kg;

**SODIUM METASILICATE, ANHYDROUS:**

Skin-Human 250 mg/24 hours; Severe irritation effects  
Skin-Rabbit, adult 250 mg/24 hours; Severe irritation effects  
Skin-Guinea Pig, adult 250 mg/24 hours, Moderate irritation effects  
Oral-Rat TDLo: 15 g/kg (14W male/14W pre-3W post): Reproductive effects  
Oral-Dog, adult LDLo: 250 mg/kg  
Oral-Rat LD<sub>50</sub>: 1153 mg/kg  
Oral-Mouse LD<sub>50</sub>: 770 mg/kg Oral-Pig LDLo: 250 mg/kg  
Intraperitoneal-Guinea Pig, adult LDLo: 200 mg/kg

**SUSPECTED CANCER AGENT:** The product's components are not found on the following lists: FEDERAL OSHA Z LIST, NTP, IARC, CAL/OSHA and are, therefore, not considered to be, nor suspected to be, cancer-causing agents by these agencies.

**IRRITANCY OF PRODUCT:** This mixture is severely irritating to contaminated tissue and can cause chemical burns.

**SENSITIZATION TO THE PRODUCT:** Not Established.

**REPRODUCTIVE TOXICITY INFORMATION:** Listed below is information concerning the effects of this product and its components on the human reproductive system.

**Mutagenicity:** This product is not reported to produce mutagenic effects in humans.

**Embryotoxicity:** This product is not reported to produce embryotoxic effects in humans.

**Teratogenicity:** This product is not reported to cause teratogenic effects in humans.

**Reproductive Toxicity:** This product is not reported to cause reproductive effects in humans.

*A **mutagen** is a chemical which causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical which causes damage to a developing embryo (i.e. within the first eight weeks of pregnancy in humans), but the damage does not propagate across generational lines. A **teratogen** is a chemical which causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance which interferes in any way with the reproductive process.*

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Skin disorders can be aggravated by over-exposure to this mixture. Inhalation of this product may aggravate respiratory conditions.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and eliminate over-exposure to this product.

**BIOLOGICAL EXPOSURE INDICES:** Currently, Biological Exposure Indices (BEIs) are not applicable to components of this product.

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## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.

ENVIRONMENTAL STABILITY: The components of this product are relatively stable in the environment. The following environmental data are available for the components of this product:

POTASSIUM HYDROXIDE: Water solubility = 111 g/ 100 ml (25 °C).

EFFECT OF MATERIAL ON PLANTS or ANIMALS: This product is harmful or fatal to plant and animal life if released into the environment. Refer to section 11 (Toxicology Information) for additional toxicity data.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This product can substantially raise the pH of an aquatic environment and can be extremely toxic to fish and aquatic plants.

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## 13. DISPOSAL CONSIDERATIONS

PREPARING WASTES FOR DISPOSAL: Waste disposal must be in accordance with appropriate Federal, State, and local regulations. This product, if unaltered by use, may be disposed of by treatment at a permitted facility or as advised by your local hazardous waste regulatory authority.

EPA WASTE NUMBER: Not applicable.

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## 14. TRANSPORTATION INFORMATION

THIS MATERIAL IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.

PROPER SHIPPING NAME: Corrosive solid, basic, inorganic, n.o.s. (Potassium Hydroxide, Sodium Metasilicate)

HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive Material)

UN IDENTIFICATION NUMBER: UN 3262

PACKING GROUP: II

DOT LABEL(S) REQUIRED: Corrosive

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (1996): 154

MARINE POLLUTANT: This product does not contain any components which are designated by the Department of Transportation to be Marine Pollutants. (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Use the above information for the preparation of Canadian Shipments.

Note: The latest DOT information is provided, please verify all DOT information as it subject to change without notice.

## 15. REGULATORY INFORMATION

SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act are as follows.

COMPONENT	SARA 302	SARA 304	SARA 313
Potassium Hydroxide	No	Yes	No

U.S. SARA THRESHOLD PLANNING QUANTITY: Not applicable.

U.S. CERCLA REPORTABLE QUANTITY (RQ): Potassium Hydroxide = 1000 lb.

CANADIAN DSL INVENTORY: The components of this product are listed on the DSL Inventory.

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

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## 15. REGULATORY INFORMATION (Continued)

**STATE REGULATORY INFORMATION:** Components of this product are covered under specific State regulations, as denoted below:

<b>Alaska - Designated Toxic and Hazardous Substances:</b> Potassium Hydroxide.	<b>Michigan - Critical Materials Register:</b> Potassium Hydroxide.	<b>Pennsylvania - Hazardous Substance List:</b> Potassium Hydroxide
<b>California - Permissible Exposure Limits for Chemical Contaminants:</b> Potassium Hydroxide.	<b>Minnesota - List of Hazardous Substances:</b> Potassium Hydroxide.	<b>Rhode Island - Hazardous Substance List:</b> Potassium Hydroxide
<b>Florida - Substance List:</b> Potassium Hydroxide.	<b>Missouri - Employer Information/Toxic Substance List:</b> Potassium Hydroxide.	<b>Texas - Hazardous Substance List:</b> Potassium Hydroxide.
<b>Illinois - Toxic Substance List:</b> Potassium Hydroxide.	<b>New Jersey - Right to Know Hazardous Substance List:</b> Potassium Hydroxide,	<b>West Virginia Substance List:</b> Potassium Hydroxide.
<b>Kansas - Section 302/313 List:</b> Potassium Hydroxide.	<b>North Dakota - List of Hazardous Chemicals, Reportable Quantities:</b> Potassium Hydroxide.	<b>Wisconsin - Toxic and Hazardous Substances:</b> Potassium Hydroxide.
<b>Massachusetts - Substance List:</b> Potassium Hydroxide.		

**CALIFORNIA PROPOSITION 65:** No component of this product is on the California Proposition 65 lists.

**LABELING (Precautionary Statements: DANGER! CORROSIVE MATERIAL. CAN CAUSE SEVERE BURNS TO ALL BODY TISSUE. MAY BE FATAL IF SWALLOWED. HARMFUL IF INHALED. MAY CAUSE LUNG DAMAGE. REACTS WITH WATER AND ACIDS. AVOID SPATTERING BY SLOWLY ADDING TO SOLUTION. Do not get into eyes, on skin or clothing. Avoid breathing dusts or particulates. Do not take internally. Use with adequate ventilation and employ respiratory protection when exposed to dusts. When handling, wear chemical splash goggles, face shield, rubber gloves and protective clothing. Do not transfer to unlabeled containers. Wash thoroughly after handling. Keep container closed when not in use. FIRST-AID: In case of contact, immediately flush skin or eyes for at least 15 minutes. If inhaled, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. If ingested, do not induce vomiting. Get medical attention. IN CASE OF FIRE: Use dry chemical, CO<sub>2</sub> or alcohol foam. IN CASE OF SPILL: Sweep-up or vacuum material. Refer to MSDS for additional information.**

**CANADIAN WHMIS SYMBOLS:**

**Class E:** Corrosive.



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## 16. OTHER INFORMATION

**INFORMATION SOURCE:**

CHEMICAL SAFETY ASSOCIATES, Inc.  
9163 Chesapeake Drive, San Diego, CA 92123-1002  
619/565-0302

**PREPARED BY:**

**BASIC CHEMICAL SOLUTIONS**

THIS INFORMATION IS DRAWN FROM RECOGNIZED SOURCES BELIEVED TO BE RELIABLE. BASIC CHEMICAL SOLUTIONS MAKES NO GUARANTEES NOR ASSUMES ANY LIABILITY IN CONNECTION WITH THIS INFORMATION. THE USER SHOULD BE AWARE OF CHANGING TECHNOLOGY, RESEARCH, REGULATIONS AND ANALYTICAL PROCEDURES THAT MAY REQUIRE CHANGES HEREIN. THE ABOVE DATA IS SUPPLIED UPON THE CONDITION THAT PERSONS WILL EVALUATE THIS INFORMATION AND THEN DETERMINE ITS SUITABILITY FOR THEIR USE.
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## 16. OTHER INFORMATION

### DEFINITIONS OF TERMS

A large number of abbreviations and acronyms appear on a MSDS. Some of these which are commonly used include the following:

**CAS #:** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching.

#### EXPOSURE LIMITS IN AIR:

**ACGIH** - American Conference of Governmental Industrial Hygienists, a professional association which establishes exposure limits.

**TLV - Threshold Limit Value** - an airborne concentration of a substance which represents conditions under which it is generally believed that nearly all workers may be repeatedly exposed without adverse effect. The duration must be considered, including the 8-hour **Time Weighted Average (TWA)**, the 15-minute **Short Term Exposure Limit**, and the instantaneous **Ceiling Level**. Skin absorption effects must also be considered.

**OSHA** - U.S. Occupational Safety and Health Administration.

**PEL - Permissible Exposure Limit** - This exposure value means exactly the same as a TLV, except that it is enforceable by OSHA. The OSHA Permissible Exposure Limits are based in the 1989 PELs and the June, 1993 Air Contaminants Rule (Federal Register: 58: 35338-35351 and 58: 40191). Both the current PELs and the vacated PELs are indicated. The phrase, "Vacated 1989 PEL," is placed next to the PEL which was vacated by Court Order.

**IDLH - Immediately Dangerous to Life and Health** - This level represents a concentration from which one can escape within 30-minutes without suffering escape-preventing or permanent injury. **The DFG - MAK** is the Republic of Germany's Maximum Exposure Level, similar to the U.S. PEL. **NIOSH** is the National Institute of Occupational Safety and Health, which is the research arm of the U.S. Occupational Safety and Health Administration (**OSHA**). NIOSH issues exposure guidelines called **Recommended Exposure Levels (RELs)**. When no exposure guidelines are established, an entry of **NE** is made for reference.

#### HAZARD RATINGS:

##### HAZARDOUS MATERIALS IDENTIFICATION SYSTEM:

Health Hazard: **0** (minimal acute or chronic exposure hazard); **1** (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 and may be fatal); **4** (extreme acute exposure hazard; onetime overexposure can be fatal). Flammability Hazard: **0** (minimal hazard); **1** (materials that require substantial pre-heating before burning); **2** (combustible liquid or solids; liquids with a flash point of 38-93°C [100-200°F]); **3** (Class IB and IC flammable liquids with flash points below 38°C [100°F]); **4** (Class IA flammable liquids with flash points below 23°C [73°F] and boiling points below 38°C [100°F]). Reactivity Hazard: **0** (normally stable); **1** (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 when initiated or which can react explosively with water); **4** (materials that can detonate at normal temperatures or pressures).

**NATIONAL FIRE PROTECTION ASSOCIATION:** Health Hazard: **0** (material that on exposure under fire conditions would offer no hazard beyond that of ordinary combustible materials); **1** (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 could cause death or major residual injury). Flammability Hazard and Reactivity Hazard: Refer to definitions for "Hazardous Materials Identification System".

#### FLAMMABILITY LIMITS IN AIR:

Much of the information related to fire and explosion is derived from the **National Fire Protection Association (NFPA)**. Flash Point - Minimum temperature at which a liquid gives off sufficient vapors to form an ignitable mixture with air. Autoignition Temperature: The minimum temperature required to initiate combustion in air with no other source of ignition. LEL - the lowest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source. UEL - the highest percent of vapor in air, by volume, that will explode or ignite in the presence of an ignition source.

#### TOXICOLOGICAL INFORMATION:

Possible health hazards as derived from human data, animal studies, or from the results of studies with similar compounds are presented. Definitions of some terms used in this section are: **LD<sub>50</sub>** - Lethal Dose (solids & liquids) which kills 50% of the exposed animals; **LC<sub>50</sub>** - Lethal Concentration (gases) which kills 50% of the exposed animals; **ppm** concentration expressed in parts of material per million parts of air or water; **mg/m<sup>3</sup>** concentration expressed in weight of substance per volume of air; **mg/kg** quantity of material, by weight, administered to a test subject, based on their body weight in kg. Data from several sources are used to evaluate the cancer-causing potential of the material. The sources are: **IARC** - the International Agency for Research on Cancer; **NTP** - the National Toxicology Program, **RTECS** - the Registry of Toxic Effects of Chemical Substances, **OSHA** and **CAL/OSHA**. IARC and NTP rate chemicals on a scale of decreasing potential to cause human cancer with rankings from 1 to 4. Subrankings (2A, 2B, etc.) are also used. Other measures of toxicity include **TDLo**, the lowest dose to cause a symptom and **TCLo** the lowest concentration to cause a symptom; **TDo**, **LDLo**, and **LDo**, or **TC**, **TCo**, **LCLo**, and **LCo**, the lowest dose (or concentration) to cause death. **BEI** - Biological Exposure Indices, represent the levels of determinants which are most likely to be observed in specimens collected from a healthy worker who has been exposed to chemicals to the same extent as a worker with inhalation exposure to the TLV.

#### REGULATORY INFORMATION:

This section explains the impact of various laws and regulations on the material. **EPA** is the U.S. Environmental Protection Agency. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **DOT** and **TC** are the U.S. Department of Transportation and the Transport Canada, respectively. Superfund Amendments and Reauthorization Act (SARA); the Canadian Domestic Substances List (DSL); the U.S. Toxic Substance Control Act (TSCA); Marine Pollutant status according to the **DOT**; California's Safe Drinking Water Act (**Proposition 65**); the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or Superfund); and various state regulations. This section also includes information on the precautionary warnings which appear on the material's package label.