

# MATERIAL SAFETY DATA SHEET

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

## PART I

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

### 1. PRODUCT IDENTIFICATION

SYNONYMS:

**ELECTROCLEANING SOLUTION**

CHEMICAL NAME/CLASS:

Alkaline Solution

PRODUCT USE:

Jewelry Cleaning

SUPPLIER/MANUFACTURER'S NAME:

COHLER ENTERPRISES, INC.

ADDRESS:

101 North Haven Street,  
Baltimore, MD 21224

EMERGENCY PHONE:

1-800-424-9300 (CHEMTREC)

BUSINESS PHONE:

(410) 342-1400

DATE OF PREPARATION /LAST REVISION:

May 27, 1999/May 1, 2005

### 2. COMPOSITION and INFORMATION ON INGREDIENTS

This product is packaged in 1 quart containers. The information presented in this document is directed to potential exposure and release situations pertinent to this product's volume.

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>	
Sodium Hydroxide	1310-73-2	0.6%	2,C	NE	2	NE	NIOSH REL: C, 2 mg/m <sup>3</sup> NIOSH IDLH: 10
Water and other components. Each of the other components are present in less than 1 percent concentration (0.1% concentration for potential carcinogens, reproductive toxins, respiratory tract sensitizers, and mutagens).		Balance	None of the other components contribute significant additional hazards at the concentrations present in this product. All pertinent hazard information has been provided in this document, per the requirements of the Federal Occupational Safety and Health Administration Standard (29 CFR 1910.1200), U.S. State equivalent Standards and Canadian Workplace Hazardous Materials Identification System Standards (CPR 4).				

NE = Not Established; C = Ceiling Limit; See Section 16 for Definitions of Terms Used

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 is a clear, colorless, odorless liquid. **Health Hazards:** This product is severely irritating and corrosive to exposed tissue. Contact with this solution can lead to chemical burns. **Flammability Hazards:** This product is not reactive nor flammable under normal conditions; however if heated to decomposition, this solution may produce extremely irritating vapors. **Reactivity Hazards:** This product is not normally reactive at standard temperatures and pressures. **Emergency Response:** Emergency responders must wear proper personal protective equipment and have adequate fire protection for the incident to which they are responding. Caution must be used when responding to spills.

### 3. HAZARD IDENTIFICATION (Continued)

The image is a GHS hazard pictogram for a chemical product. It features a yellow border with 'HMIS' text repeated along the edges. At the top, it says 'HMIS' and 'HMIS'. Below this, there are three horizontal bars: a blue bar for 'HEALTH' with a white square containing the number '3', a red bar for 'FLAMMABILITY' with a white square containing the number '0', and an orange bar for 'PHYSICAL HAZARD' with a white square containing the number '0'. Below these bars is a white box labeled 'Personal Protection' containing a pictogram of a person wearing eye protection, gloves, and a flame, indicating the need for these safety measures.

**SYMPTOMS OF OVER-EXPOSURE BY ROUTE OF EXPOSURE:** The primary routes of over-exposure for this product would be via inhalation, contact with skin and eyes, and skin absorption. The following paragraphs describe the symptoms of overexposure, via route of entry.

**INHALATION:** Breathing the liquid or vapors can cause mild to severe respiratory system irritation, depending on the extent and duration of exposure. Symptoms of exposure can include coughing, sneezing, and tightness in the chest. Severe overexposures can damage the respiratory system and chemical pneumonitis (a potentially fatal condition).

**CONTACT WITH SKIN or EYES:** Contact with the solution can cause mild to severe skin irritation and may result in burns, depending on the duration of exposure. Symptoms of exposure can include redness, pain, and itching. Prolonged exposures can result in slow-healing burns and possible scarring. Repeated contact may result in dermatitis (red, cracked skin). Contact with the solution can cause moderate to severe eye irritation, tissue damage, and potentially blindness. Symptoms of exposure can include intense pain, redness, tearing, and visual difficulty.

**SKIN ABSORPTION:** No component of this solution is significantly absorbed into the bloodstream via skin contact.

**INGESTION:** Ingestion is not anticipated to be a significant route of occupational exposure. Swallowing may cause severe burns of mouth, throat, and stomach. Severe scarring of tissue and death may result. Symptoms may include bleeding, vomiting, diarrhea, and reduced blood pressure. Damage may appear days after exposure occurs.

**INJECTION:** Accidental injection of this liquid will cause local pain and irritation and systemic symptoms similar to those of over-exposure by "Inhalation".

**HEALTH EFFECTS OR RISKS FROM EXPOSURE:** An Explanation in **Lay Terms**. Over-exposure to this liquid may cause the following symptoms:

**ACUTE:** This product can be severely irritating and potentially damaging to contaminated tissue.

**CHRONIC:** Repeated skin contact may result in dermatitis (red, cracked skin) and scarring. Repeated inhalation of high levels of vapors or mists may result in lung effects (e.g. bronchitis, changes in pulmonary function).

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

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

### 4. FIRST-AID MEASURES

**SKIN EXPOSURE:** If this product contaminates the skin, immediately begin decontamination with running water. Remove exposed or contaminated clothing, taking care not to contaminate eyes. Minimum recommended flushing is for 15 minutes. Victim must seek immediate medical attention if any adverse effect occurs.

**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 vapors or mists 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.

## 4. FIRST-AID MEASURES (Continued)

**INGESTION:** If this product is swallowed, CALL PHYSICIAN OR POISON CONTROL CENTER FOR MOST CURRENT INFORMATION. If victim is conscious, 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 who cannot swallow.

Victims of chemical exposure must be taken for medical attention. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to physician or health professional with victim. Physicians should refer to Section 11 (Toxicology Information) for additional information.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Over-exposure to this product may aggravate pre-existing respiratory and skin conditions.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms. Pulmonary function tests may prove useful. Perform endoscopy in all cases of suspected sodium hydroxide ingestion. In cases of severe esophageal corrosion, the use of therapeutic doses of steroids should be considered. General supportive measures with continual monitoring of gas exchange, acid-base balance, electrolytes, and fluid intake are also required.

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## 5. FIRE-FIGHTING MEASURES

**FLASH POINT:** Not applicable.

**AUTOIGNITION TEMPERATURE:** Not applicable.

**FLAMMABLE LIMITS (in air by volume, %):**

**Lower (LEL):** Not applicable.

**Upper (UEL):** Not applicable.

**FIRE EXTINGUISHING MATERIALS:**

**Water Spray:** YES

**Carbon Dioxide:** NO

**Foam:** YES

**Dry Chemical:** YES

**Halon:** YES

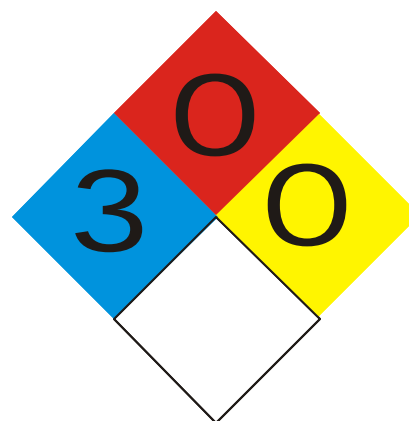
**Other:** Any "ABC" Class.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:** Possible products of thermal degradation include caustic vapors and sodium oxides. Sodium hydroxide can react with certain metals, such as aluminum, to generate flammable hydrogen gas. Containers may rupture in the heat of a fire.

**Explosion Sensitivity to Mechanical Impact:** Not sensitive.

**Explosion Sensitivity to Static Discharge:** Not sensitive.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Wear Self-Contained Breathing Apparatus for fire response. Contaminated equipment should be rinsed thoroughly with water before returning to service. If necessary, rinse with a neutralizer for bases (e.g., citric acid solution).



**NFPA RATING**

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## 6. ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** For Incidental Spills: Clear the immediate area and notify supervisor. Wear gloves, goggles, and appropriate body protection during response. Face shields must be worn for releases in which splashes or sprays can be produced during clean-up.

For Non-Incidental Spills: Minimum recommended level of Personal Protective Equipment for uncontrolled releases should be **Level B: triple-gloves (rubber gloves and nitrile gloves, over latex gloves), chemically resistant suit and boots, hard-hat, and Self-Contained Breathing Apparatus.**

Test area for contamination by using litmus paper. Containerize all waste generated in an appropriate container, which is immediately sealed and labeled. Contaminated areas and equipment can be rinsed with a neutralizer for bases (followed by a triple-rinse with water). Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations, or the appropriate standards of Canada and its provinces (see Section 13, Disposal Considerations).

## 7. HANDLING and STORAGE

**WORK AND HYGIENE PRACTICES:** Avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Avoid breathing vapors or mists generated by this product. Do not eat, drink, smoke or apply cosmetics while handling this product. Use ventilation and other engineering controls to ensure exposure limits are below those stated in Section 2 (Composition and Information on Ingredients). Always add the caustic to water while stirring; never the reverse. Do not mix with acids or organic materials. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** All employees who handle this material should be trained to handle it safely. Open containers slowly, on a stable surface. Containers of this product must be properly labeled. Empty containers may contain residual amounts of this product; therefore, empty containers should be handled with care. Do not store with aluminum or magnesium. Inspect all incoming containers for leaks. Ensure all containers are correctly labeled. Store this product away from incompatible chemicals (See Section 10, Stability and Reactivity) in a fire resistant area. Place product in secondary containment, if necessary. .

**PROTECTIVE PRACTICES DURING MAINTENANCE OF CONTAMINATED EQUIPMENT:** Follow practices indicated in Section 6 (Accidental Release Measures). Make certain application equipment is locked and tagged-out safely. Always use this product in areas where adequate ventilation is provided. Decontaminate equipment using neutralizer for bases (or triple rinse with water) before maintenance begins. Collect all rinsates and dispose of according to applicable U.S. Federal, State, or local procedures or the appropriate standards of Canada and its provinces.

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## 8. EXPOSURE CONTROLS - PERSONAL PROTECTION

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposures are below the limits provided in Section 2 (Composition and Information on Ingredients). Ensure eyewash/safety shower stations are available near areas where this product is used.

**RESPIRATORY PROTECTION:** None needed under routine circumstances of use. Maintain airborne contaminant concentrations below exposure limits 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. The following respiratory protection guidelines for Sodium Hydroxide are provided:

**CONCENTRATION RESPIRATORY PROTECTION**

UP TO 10 mg/m<sup>3</sup>: Supplied Air Respirator operated in continuous-flow mode; any air-purifying, full-facepiece respirator with high-efficiency particulate filter; any powered, air-purifying respirator with a dust or mist filter; any supplied-air respirator with a full facepiece; or, full facepiece Self Contained Breathing Apparatus.

**EMERGENCY OR PLANNED ENTRY INTO UNKNOWN CONCENTRATIONS OR IDLH CONDITIONS:**

Positive pressure, full facepiece Self Contained Breathing Apparatus; or positive pressure, full facepiece Supplied Air Respirator with an auxiliary positive pressure Self Contained Breathing Apparatus.

**ESCAPE:** Full-facepiece respirator with high-efficiency particulate filter; or escape-type Self Contained Breathing Apparatus.

**EYE PROTECTION:** Splash goggles or safety glasses with side shields are recommended. Face shields are recommended if splashes or sprays can be generated.

**HAND PROTECTION:** Wear rubber or 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 body protection as necessary to prevent body contact.

**HMIS PERSONAL PROTECTIVE EQUIPMENT RATING:** Normal Use = C (gloves, goggles, body protection). Face shields are recommended if splashes or sprays can be generated.

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## 9. PHYSICAL and CHEMICAL PROPERTIES

**RELATIVE VAPOR DENSITY**(air = 1): Not available.

**SPECIFIC GRAVITY:** Not available.

**SOLUBILITY IN WATER:** Completely soluble.

**VAPOR PRESSURE, @ 20°C (68°F):** Not available.

**EVAPORATION RATE** (nBuAc=1): Similar to water.

**FREEZING/MELTING POINT:** 0°C (32°F)

**BOILING POINT:** 100°C (212°F)

**pH:** > 12.5

ODOR THRESHOLD: Not available.

COEFFICIENT WATER/OIL DISTRIBUTION: Not available.

APPEARANCE AND COLOR: Clear, colorless, odorless liquid.

HOW TO DETECT THIS SUBSTANCE (warning properties): Litmus paper will turn blue when in contact with this liquid.

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## 10. STABILITY and REACTIVITY

STABILITY: Stable.

DECOMPOSITION PRODUCTS: The products of thermal decomposition include sodium compounds and potentially corrosive hydroxide vapors.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: Oxidizers, strong acids. Contact of this product with metals such as aluminum, tin and zinc causes formation of flammable hydrogen gas.

HAZARDOUS POLYMERIZATION: Will not occur.

CONDITIONS TO AVOID: Incompatible materials.

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## PART IV

*Is there any other useful information about this material?*

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## 11. TOXICOLOGICAL INFORMATION

TOXICITY DATA: The most pertinent toxicology information concerning this product is presented below:

### SODIUM HYDROXIDE:

Irritation data: skin, rabbit: 500 mg/24 hours (severe irritation).

Irritation data: eye, rabbit: 50 ug/24 hours (severe irritation)

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

IRRITANCY OF PRODUCT: Repeated or prolonged exposure to this product will cause severe irritation and potential skin tissue damage.

SENSITIZATION TO THE PRODUCT: This product is not known to cause sensitization effects,.

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 have mutagenic effects in humans.

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

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

Reproductive Toxicity: This product is not reported to have adverse 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.*

BIOLOGICAL EXPOSURE INDICES: Currently, no Biological Exposure Indices (BEIs) are applicable to the components of this product.

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## 12. ECOLOGICAL INFORMATION

ALL WORK PRACTICES SHOULD BE AIMED AT PREVENTING ANY RELEASE TO THE ENVIRONMENT.

ENVIRONMENTAL STABILITY:This solution is soluble in water and will react readily with many substances in the environment. This solution is soluble in water and will react readily with many substances in the environment.

EFFECT OF MATERIAL ON PLANTS or ANIMALS: Based on the corrosivity of the solution and the available toxicology data, this product can be harmful or fatal to contaminated terrestrial animal life. Contaminated plants may be harmed or killed.

EFFECT OF CHEMICAL ON AQUATIC LIFE: This solution may significantly raise the pH of contaminated bodies of water therefore, it must be assumed that this product can be harmful or fatal to contaminated aquatic life.

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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: Depending on the nature of the wastes, the following EPA waste numbers may be applicable: D002.

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## 14. TRANSPORTATION INFORMATION

THIS MATERIAL IS HAZARDOUS PER THE U.S. DEPARTMENT OF TRANSPORTATION (49 CFR 172.101).

PROPER SHIPPING NAME: Sodium Hydroxide Solution  
HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive Material)  
UN IDENTIFICATION NUMBER: UN 1824  
PACKING GROUP: II  
DOT LABEL(S) REQUIRED: Ground: Limited Quantity; Air: Corrosive

NOTE: Limited quantity exceptions are applicable for this product if requirements in 49 CFR 173.154 (b), are met. Under these exceptions, inner packagings must not be over 1.0 liters (0.3 gallon), net capacity for liquids, packed in strong outer packagings. Each package must not exceed 30 kg (66 lb) gross weight. Limited quantities which meet these requirements are excepted from labeling, unless offered or intended for transport by air. In addition, shipments of these limited quantities are not subject to Subpart F (Placarding) of Part 172. Packages must comply with Subpart B of Part 172.

NORTH AMERICAN EMERGENCY RESPONSE GUIDE NUMBER (1996): 154

MARINE POLLUTANT: No component of this product is listed as Marine Pollutants by the Department of Transportation (49 CFR 172.101, Appendix B).

TRANSPORT CANADA TRANSPORTATION OF DANGEROUS GOODS REGULATIONS: THIS MATERIAL IS CONSIDERED AS DANGEROUS GOODS. Refer to above information for shipments to Canada.

UPS GUIDE FOR SHIPPING GROUND and AIR HAZARDOUS MATERIALS:

PROPER SHIPPING NAME: Sodium Hydroxide Solution  
HAZARD CLASS NUMBER and DESCRIPTION: 8 (Corrosive Material)  
UN IDENTIFICATION NUMBER: UN 1824  
PACKING GROUP: II  
DOT LABEL(S) REQUIRED: Ground: Limited Quantity; Air: Corrosive  
AIR MAXIMUM NET QUANTITY: 1 Liter

## 15. REGULATORY INFORMATION

U.S. SARA REPORTING REQUIREMENTS: The components of this product listed in Section 2 (Composition and Information on Ingredients) are subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act.

COMPONENT	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
Sodium Hydroxide	No	Yes	No

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

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

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

CANADIAN DSL/NDSL INVENTORY STATUS: The components of this product are on the DSL or NDSL Inventory.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): No component of this product is on the California Proposition 65 Lists.

ANSI LABELING (Z129.1): **DANGER! CORROSIVE. CAUSES SKIN BURNS. Target Organs:** Skin, eyes, respiratory system. **Instructions:** Do not get in eyes, on skin, or on clothing. Do not breathe mist or vapor. Keep container tightly closed. Use with adequate ventilation. Wear suitable eye, face and hand protection. Wash thoroughly after handling. Store in cold, dry place away from incompatible chemicals. **FIRST-AID: In case of contact:** Immediately flush eyes or skin with running water for at least 15 minutes while removing contaminated clothing and shoes. **If inhaled:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. **If swallowed:** If the victim is conscious, DO NOT induce vomiting. If victim is fully conscious, give cupful of water. Never give anything by mouth to an unconscious person. **For additional aid:** Contact the U.S. Poison Control Center at 1-800-222-1222. **Note to Physician:** Treat symptoms. **GET MEDICAL ATTENTION IMMEDIATELY.** Refer to Material Safety Data Sheet for additional information.

ADDITIONAL CANADIAN REGULATIONS:



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

OTHER CANADIAN REGULATIONS: Not applicable.

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS: The components of this product are not on the CEPA Priorities Substances Lists

## 15. REGULATORY INFORMATION (Continued)

### ADDITIONAL CANADIAN REGULATIONS (continued):

CANADIAN WHMIS SYMBOLS:

E: Corrosive Material/Severely Irritating



## 16. OTHER INFORMATION

**FOR FURTHER INFORMATION:** For matters pertaining to the health hazards, safety precautions, environmental compliance issues associated with this product, please contact ADVANCED CHEMICAL SAFETY by calling (858)874-5577 or via email at [neal@chemical-safety.com](mailto:neal@chemical-safety.com)

The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the use thereof. Cohler Enterprises Inc. assumes no responsibility for injury to the vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally Cohler Enterprises, Inc. assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in his use of the material.

## DEFINITIONS OF TERMS

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

**SECTION 2: CAS #** This is the Chemical Abstract Service Number which uniquely identifies each constituent. It is used for computer-related searching. **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. 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)**. **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). **Flammability Hazard and Reactivity Hazard:** Refer to definitions for "Hazardous Materials Identification System".

**SECTION 3: HAZARDOUS MATERIALS IDENTIFICATION SYSTEM (HMIS):** **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]). **Physical 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).

**SECTION 5: NATIONAL FIRE PROTECTION ASSOCIATION (NFPA):** **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

**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.

**SECTION 11: TOXICOLOGICAL INFORMATION: Human and Animal**

**Toxicology:** 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. 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 lethal or toxic effects. **Cancer Information:** 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. A **mutagen** is a chemical that causes permanent changes to genetic material (DNA) such that the changes will propagate through generational lines. An **embryotoxin** is a chemical that 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 that causes damage to a developing fetus, but the damage does not propagate across generational lines. A **reproductive toxin** is any substance that interferes in any way with the reproductive process. **Other Information:** **BEI** - ACGIH 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.

**SECTION 12: Ecological Information:** EC is the effect concentration in water.

**BCF** = Bioconcentration Factor, which is used to determine if a substance will concentrate in lifeforms which consume contaminated plant or animal matter. **TL<sub>m</sub>** = median threshold limit; Coefficient of Oil/Water Distribution is represented by **log K<sub>ow</sub>** or **log K<sub>oc</sub>** and is used to assess a substance's behavior in the environment.

**SECTION 13: RCRA** is the Resource Conservation and Recovery Act.

**SECTION 15:** This section explains the impact of various laws and regulations on the material.

**U.S.:** **EPA** is the U.S. Environmental Protection Agency **DOT** is the U.S. Department of Transportation. **SARA** is the Superfund Amendments and Reauthorization Act. **TSCA** is the U.S. Toxic Substance Control Act. **CERCLA (or Superfund)** refers to the Comprehensive Environmental Response, Compensation, and Liability Act. Labeling is per the American National Standards Institute Standard: Hazardous Industrial Chemicals - Precautionary Labeling 2000 (**ANSI Z129.1**). **CANADA:** **CEPA** is the Canadian Environmental Protection Act. **WHMIS** is the Canadian Workplace Hazardous Materials Information System. **TC** is Transport Canada. **DSL/NDL** are the Canadian Domestic/Non-Domestic Substances Lists.