|  |  |
| --- | --- |
| **IDENTITY** *(As Used on Label and List)* | **Note: Blank spaces are not permitted.** If any item is not applicable, or no information is available, the space must be marked to indicate that. |

**Section I**

|  |  |
| --- | --- |
| **Manufacturer's Name** | **Emergency Telephone Number** |
| **Address** *(Number, Street, City, State, and ZIP Code)* | **Telephone Number for Information** |
|    | **Date Prepared** |
| **Signature & Date of Preparer**  |

**Section II - Hazardous Ingredients/Identity Information**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Hazardous Components (Specific Chemical Identity; Common Name(s))** | **OSHA PEL** | **ACGIH TLV** | **Other Limits Recommended** | **%*(optional)*** |
|    |
|    |
|    |
|    |
|    |
|    |

**Section III - Physical/Chemical Characteristics**

|  |  |  |  |
| --- | --- | --- | --- |
| Boiling Point |   | Specific Gravity (H2O = 1)  |   |
| Vapor Pressure (mm Hg) |   | Melting Point |    |
| Vapor Density (AIR = 1) |   | Evaporation Rate(Butyl Acetate = 1) |    |
| Solubility in Water  |
| Appearance and Odor  |

**Section IV - Fire and Explosion Hazard Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Flash Point (Method Used) | Flammable Limits | LEL  | UEL  |
| Extinguishing Media  | Autoignition Temperature (oF) |
| Special Fire Fighting Procedures  |
|    |
| Unusual Fire and Explosion Hazards  |
|    |

**Section V - Reactivity Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Stability | Unstable |   | Conditions to Avoid  |
|   | Stable |   |    |
| Incompatibility *(Materials to Avoid)*  |
| Hazardous Decomposition or Byproducts  |
| HazardousPolymerization | May Occur |   | Conditions to Avoid  |
|   | Will Not Occur |   |    |

**Section VI - Health Hazard Data**

|  |  |  |  |
| --- | --- | --- | --- |
| Route(s) of Entry: | Inhalation? | Skin? | Ingestion?  |
| Health Hazards *(Acute and Chronic)*  |
|    |
|    |
| Carcinogenicity: | NTP? | IARC Monographs? | OSHA Regulated?  |
|    |
| Signs and Symptoms of Exposure  |
|    |
| Medical Conditions Generally Aggravated by Exposure |
|    |
| Emergency and First Aid Procedures  |
|    |

**Section VII - Precautions for Safe Handling and Use**

|  |
| --- |
| Steps to Be Taken in Case Material is Released or Spilled  |
|    |
|    |
| Waste Disposal Method  |
|    |
| Precautions to Be taken in Handling and Storing  |
|    |
| Other Precautions  |
|    |

**Section VIII - Control Measures**

|  |
| --- |
| Respiratory Protection *(Specify Type)*  |
| Ventilation | Local Exhaust | Special  |
|   | Mechanical *(General)* | Other  |
| Protective Gloves  | Eye Protection |
| Other Protective Clothing or Equipment |
| Work/Hygienic Practices |

|  |
| --- |
|  |

Each MSDS must be reviewed for correctness and completeness every three years.

Reviewed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Reviewed by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Revision date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**INSTRUCTIONS FOR PREPARING
MATERIAL SAFETY DATA SHEETS (MSDS)**

Chemical manufacturers are required by law to supply "Material Safety Data Sheets" (MSDS) (OSHA Form 174 or its equivalent) upon request by their customers. Each MSDS must be reviewed for correctness and completeness every three years. These sheets have nine sections providing information about the chemical.

This section provides information for researchers who may need to prepare a MSDS. An MSDS must be prepared for a newly created *hazardous* chemical or an intermediate product produced in a chemical reaction if:

1. The newly created chemical or intermediate is going to be shipped by the originator off a LSCS Campus or,
2. The newly created chemical or intermediate is going to be kept in the lab on an on-going basis for use by LSCS employees or students, in the lab where it was originally made or at another LSCS facility.

**Note:** If a newly created *hazardous* chemical is going to be used by a number of persons over time it may be required that a Right-to-Know chemical container label be prepared for the new chemical.

It is important to remember that all sections must be completed when writing an MSDS. If a particular characteristic is unknown, you must state "unknown", "not available" or "N/A." Under Section V, Health Hazard Data, you may be able to say, "The toxicological effects of this chemical have not (or not fully) been investigated."

Below are section-by-section instructions to follow in preparing a MSDS. If additional assistance is needed in completing a MSDS, please contact your Lab Manager or the LSCS Office of Emergency Management at 281.290.3680 or emailing denise.c.walker@lonestar.edu.

**SECTION I**

This section lists the name and address of the manufacturer and an emergency phone number where questions about toxicity and chemical hazards can be directed. Large chemical manufacturers have 24-hour hotlines serviced by chemical safety professionals who will answer questions regarding spills, leaks, chemical exposure, fire hazard, etc.

Other information that may be contained in this section are:

1. **Trade Name:** This is the manufacturer's name for the product.

1. **Chemical Name and Synonyms:** This refers to the generic or standard names for the chemical.
2. **Chemical Family:** This classification allows one to group the substance along with a class of similar substances, such as mineral dusts, acids, caustics, etc. The potential hazards of a substance can sometimes be gauged by experience with other chemicals of that class.

**SECTION II - HAZARDOUS INGREDIENTS/IDENTITY INFORMATION**

This section describes the percent composition of the substance, listing chemicals present in the mixture. It lists Threshold Limit Values (TLVs) for each chemical present. TLVs are values for airborne toxic materials that are used as guides in the control of health hazards. They represent concentrations to which nearly all workers (workers without special sensitivities) can be exposed to for extended periods without harmful effect. TLV's are usually expressed as parts per million (ppm), the parts of gas or vapor in each million parts of air. TLV's are also expressed as mg/m3, the milligrams of dust or vapor per cubic meter of air.

**SECTION III – PHYSICAL/CHEMICAL CHARACTERISTICS**

1. **Vapor Pressure:** Vapor pressure (VP) is used as a measure of how volatile a substance is. That is, how quickly it evaporates. VP is measured in units of millimeters of mercury (mm Hg). For comparison, the VP of water (at 20o Centigrade) is 17.5 mm Hg. The VP of Vaseline (a nonvolatile substance) would be close to zero mm Hg, while the VP of diethyl ether (a very volatile substance) is 440 mm Hg.
2. **Vapor Density:** This figure expresses whether the vapor is lighter or heavier than air. The density of air is 1.0. A density greater than 1.0 indicates a heavier vapor; a density less than 1.0 indicates a lighter vapor. Vapors heavier than air (gasoline vapor for instance) can flow just above the ground and can collect in depressions where they may pose a fire or explosion hazard.
3. **Specific Gravity:** This figure states whether the liquid is lighter or heavier than water. Water has a density of 1.0.
4. **Percent Volatile by Volume:** States how much of the substance will evaporate away.

**SECTION IV - FIRE AND EXPLOSION HAZARD DATA**

This section provides important information used for preventing and extinguishing fires and explosions. If a fire does occur, this information should be made available to fire fighters.

1. **Flash Point:** This is the lowest temperature at which a liquid gives off enough vapor to ignite when a source of ignition is present. At or above this temperature, a fire or explosion hazard may exist if the substance is used in the presence of a spark or flame.
2. **Flammable Limits:** To be flammable, a substance must be mixed with a certain amount of air (as in an automobile carburetor). A mixture that is too "lean" (not enough chemical) or too "rich" (not enough air) will not ignite. The Lower Explosive Limit (LEL) and the Upper Explosive Limit (UEL) define the range of concentration in which combustion can occur.

**SECTION V - REACTIVITY DATA**

Chemical substances may be hazardous not just in themselves, but may be hazardous when they decompose (break down into other substances) or when they react with other chemicals.

1. **Stability:**
	1. **Unstable** indicates that a chemical can decompose spontaneously under normal temperatures, pressures, or mechanical shocks. Rapid decomposition may be hazardous because it produces heat or may cause a fire or an explosion.
	2. **Stable** compounds do not decompose under normal conditions.
2. **Incompatibility:** Certain chemicals should never be mixed because the mixture creates hazardous conditions. Incompatible chemicals should not be stored together where an accident could cause them to mix.
3. **Hazardous Decomposition Products:** Other chemical substances may be created when a chemical burns or decomposes.
4. **Hazardous Polymerization:** Some chemicals can undergo a type of chemical reaction (rapid polymerization) which may produce enough heat to cause containers to explode. Conditions to avoid are listed in this section.

**SECTION VI – HEALTH HAZARD DATA**

This section describes the potential health effects resulting from overexposure to the chemical, and outlines emergency and first aid procedures. The symptoms and effects listed are the effects of exposure at hazardous levels: most chemicals are safe in normal use and the vast majority of workers never suffer toxic harm. It is important to remember that any chemical can be toxic in high concentrations, and the precautions outlined in the MSDS must be followed.

The Health Hazards section also contains any information on the toxicity of the substance not previously mentioned. The data is usually presented are the results of animal experiments. For example, "LD50 (mouse) = 250 mg/kg." The usual measure of toxicity is dose level expressed as weight of chemical per unit body weight of the animal-usually milligrams of chemical per kilogram of body weight (mg/kg). The LD50 or "Lethal Dose Fifty," is the dose of substance that will cause the death of half the experimental animals. The LC50 is the concentration of the substance in air that will cause the death of half the experimental animals. A rough and somewhat arbitrary classification: when evaluating rodent LD50's, materials with an oral LD50 less than 50 mg/kg are considered highly toxic, and those with an oral LD50 of 50-500 mg/kg are considered moderately toxic.

Health hazard information may also distinguish the effects of acute and chronic exposure.

1. **Acute exposure:** a single, massive exposure.
2. **Chronic exposure:** regular exposure to small amounts of a substance over a long period.

**SECTION VII – PRECAUTIONS FOR SAFE HANDLING AND USE and SECTION VIII – CONTROL MEASURES**

These sections describe other precautionary and protection information. Some of the precautions presented are intended for large-scale users and may not be necessary for use of small quantities of chemical. Any questions about precautions or health effects should be referred to your lab manager or LSCS OEM at 281.290.3680 or denise.c.walker@lonestar.edu.