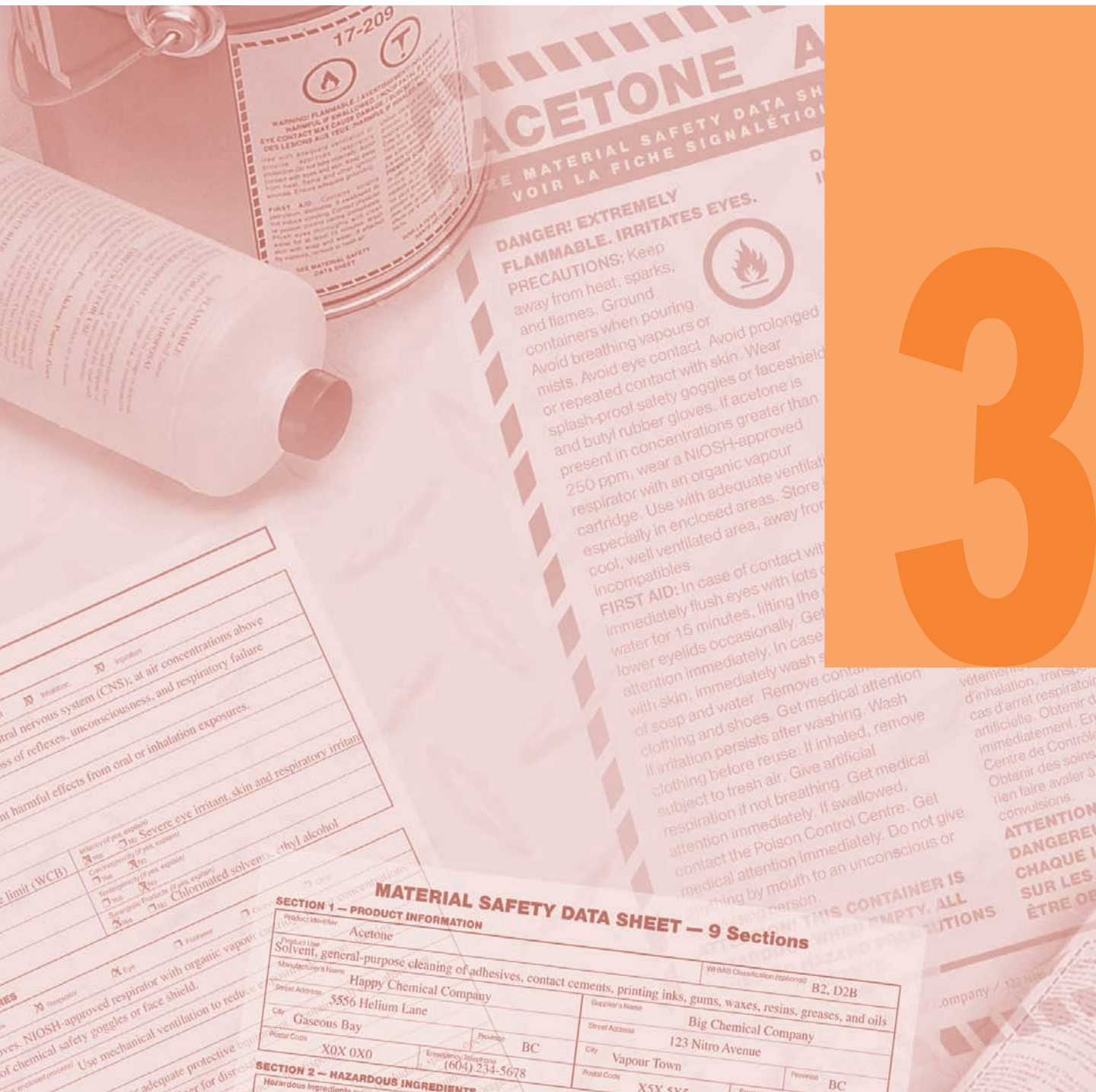


STEP 3

Prepare the MSDS



MATERIAL SAFETY DATA SHEET — 9 Sections

| | |
|---|--|
| SECTION 1 — PRODUCT INFORMATION | |
| Product Identifier Acetone | WHMIS Classification (Optional) B2, D2B |
| Product Use Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, gums, waxes, resins, greases, and oils | |
| Manufacturer's Name Happy Chemical Company | Supplier's Name Big Chemical Company |
| Street Address 5586 Helium Lane | Street Address 123 Nitro Avenue |
| City Gaseous Bay | City Vapour Town |
| Postal Code X0X 0X0 | Province BC |
| Emergency Telephone (604) 234-5678 | Province BC |
| SECTION 2 — HAZARDOUS INGREDIENTS | |
| Hazardous Ingredients (as listed on the label) | |

Step 3: Prepare the MSDS

BASIC INFORMATION

A Material Safety Data Sheet is a technical bulletin that provides specific hazard information, safe handling information, and emergency procedures for a controlled product. The MSDS contains detailed health and safety information specific to each controlled product, and should be used as a key source of information for developing training programs and safe work procedures. The MSDS is also a valuable source of health and safety information for workers, health and safety committees, and emergency service personnel. To be useful, the MSDS should be complete, legible, and understandable by workers and employers. For more detailed information on MSDSs, see the *WHMIS Core Material* manual. (To obtain a copy of this manual, see page 217.)

SUPPLIER RESPONSIBILITIES

The supplier has the following responsibilities:

- Developing or obtaining an accurate and complete MSDS for each product imported or sold in Canada.
- Preparing an MSDS in both official languages (English and French), and transmitting it in either or both languages, as requested.
- Providing the current MSDS (no more than three years old) to purchaser on or before the day of purchase.
- Ensuring that information required on the MSDS is not disclaimed or contradicted by other information that is not required but is also disclosed on the MSDS. If abbreviations are used, they should be explained in the text.
- Updating each MSDS three years from its date of preparation or as soon as new information becomes available.
- Providing confidential business information to medical personnel in case of emergency.

General MSDS Requirements

MSDSs must:

- Contain nine categories of information
- Include information items listed in *CPR*, Schedule I (if available and applicable)
- Contain no unregistered trade secrets for controlled products sold or imported
- Be available in English and French
- Be no more than three years old

REQUIREMENTS IN CANADA

Information Items on an Acceptable Canadian MSDS

WHMIS legislation lists the minimum content requirements for an MSDS:

- The *CPR* requires that nine headings, which may appear as subheadings under another heading, appear on the MSDS.
- Schedule I of the *CPR* requires that an MSDS have specific information items, if available and applicable.
- No section of the MSDS can be left blank. If no information exists that the supplier is aware of, then N/AV “not available” or N/AP “not applicable” must be used.
- Canada accepts the International Labour Organization (ILO), International Standards Organization (ISO), or European Union (EU) 16-section MSDSs, as long as all of items of *CPR*, Schedule I are addressed. Information on [The 16-section MSDS](#) is given in this guide on page 101.
- OSHA MSDSs do not meet *CPR* requirements.

No standard format exists for an MSDS. However, the following format is recommended for presenting the nine

section headings and information items. See the back of this guide for a blank [sample 9-section MSDS](#).

MATERIAL SAFETY DATA SHEET — 9 Sections

| SECTION 1 — PRODUCT INFORMATION | | | | | |
|---|---------------------------------------|--|--|---|--|
| Product Identifier Acetone | | | WHMIS Classification (optional) B2, D2B | | |
| Physical Use Solvent, general-purpose cleaning of adhesives, contact cements, printing inks, gums, waxes, resins, greases, and oils | | | | | |
| Manufacturer's Name Happy Chemical Company | | | Supplier's Name Big Chemical Company | | |
| Street Address 5556 Helium Lane | | Street Address 123 Nitro Avenue | | | |
| City Gaseous Bay | Province BC | City Vapour Town | | Province BC | |
| Postal Code X0X 0X0 | Emergency Telephone (604) 234-5678 | Postal Code X5X 5X5 | Emergency Telephone (604) 345-6789 | | |
| SECTION 2 — HAZARDOUS INGREDIENTS | | | | | |
| Hazardous Ingredients (specify) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) | |
| Acetone | 99-100 | 67-64-1 | 5,800 mg/kg (oral, rat) | 30,000 ppm (inhal, 4 hrs) | |
| | | | | | |
| | | | | | |
| SECTION 3 — PHYSICAL DATA | | | | | |
| Physical State Liquid | | Odour and Appearance Clear, colourless liquid with mildly pungent, sweet and fruity odour | | Odour Threshold (ppm) 62 (average) | |
| Specific Gravity 0.791 at 20°C | Vapour Density (air = 1) 2.0 | Vapour Pressure (kPa) 24-24.71 kPa | | Flashpoint (°C) -18°C (cc) | |
| Boiling Point (°C) 56.2 | Freezing Point (°C) -94.6 | pH n/a/p | Coefficient of Expansion (°C) 0.53 | | |
| SECTION 4 — FIRE AND EXPLOSION DATA | | | | | |
| Flammability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | If yes, under which conditions? Flammable liquid | | | |
| Means of Extinction Carbon dioxide, dry chemical powder, "alcohol" foam, polymer foam. Water may be ineffective because it will not cool acetone below its flashpoint. | | | | | |
| Flashpoint (°C) and Method -18°C (cc) | | Upper Flammable Limit (% by volume) 12.8% at 25°C | | Lower Flammable Limit (% by volume) 2.5% at 25°C | |
| Autoignition Temperature (°C) 465°C | | Explosion Data — Sensitivity to Impact No | | Explosion Data — Sensitivity to Static Discharge Yes | |
| Hazardous Combustion Products Carbon monoxide and carbon dioxide | | | | | |
| SECTION 5 — REACTIVITY DATA | | | | | |
| Chemical Stability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | If no, under which conditions? | | | |
| Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | If yes, which ones? Acids (for example, nitric acid); Strong oxidizing agents (for example, hydrogen peroxide); Bases (for example, sodium hydroxide) | | | |
| Reactivity, and under what conditions? Attacks many forms of plastics and rubber, including rayon | | | | | |
| Hazardous Decomposition Products Carbon monoxide from prolonged exposure to sunlight | | | | | |

57M2 (Rev. 05) SAMPLE FORMAT PROVIDED BY THE WORKERS' COMPENSATION BOARD OF BRITISH COLUMBIA Please continue on reverse side

| Product Identifier Acetone | | |
|---|------------------------------------|-------------------------------------|
| SECTION 6 — TOXICOLOGICAL PROPERTIES | | |
| Route of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | | |
| Effects of Acute Exposure to Product Irritation; possible effects on central nervous system (CNS); at air concentrations above 8,000 ppm may cause drowsiness, incoordination, loss of reflexes, unconsciousness, and respiratory failure | | |
| Effects of Chronic Exposure to Product Dermatitis. No significant harmful effects from oral or inhalation exposures. | | |
| Exposure Limits (acute, aquatic, daily) 250 ppm, 8-hour TWA limit (WorkSafeBC) | | |
| Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Severe eye irritant, skin and respiratory irritant | | |
| Sensitization (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Reproductive Toxicity (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Mutagenicity (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| Synergistic Products (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Chlorinated solvents, ethyl alcohol | | |
| SECTION 7 — PREVENTIVE MEASURES | | |
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other | | |
| If checked, specify type Butyl rubber gloves. NIOSH-approved respirator with organic vapour cartridge for air concentrations up to 2,500 ppm. Splash-proof chemical safety goggles or face shield. | | |
| Engineering Controls (specify, such as ventilation, enclosed process) Use mechanical ventilation to reduce exposure. Use non-sparking and grounded ventilation system. | | |
| Leak and Spill Procedure Eliminate all ignition sources. Wear adequate protective equipment. Contain spill with absorbent material and place in a suitable covered and labelled container for disposal. | | |
| Waste Disposal Check with federal, provincial, and local government requirements for disposal. | | |
| Handling Procedures and Equipment Use in a well-ventilated area, away from heat and all ignition sources (including sparks, open flames, and hot surfaces). Do not use with incompatible substances. Use grounded and non-sparking equipment. | | |
| Storage Requirements Store in cool, well-ventilated area out of direct sunlight, away from heat and ignition sources. Storage facilities should be made from fire-resistant materials. | | |
| Special Shipping Information TDG shipping name: Acetone, Classification 3, Flammable liquid, Packing Group II PS# 1090 | | |
| SECTION 8 — FIRST AID MEASURES | | |
| Inhalation Remove source of contamination or move victim to fresh air. | | |
| Ingestion If conscious, have victim rinse mouth thoroughly with water; do not induce vomiting; have victim drink 240-300 mL of water. Obtain medical attention immediately. | | |
| Skin Contact Flush with water for 15 minutes. | | |
| Eye Contact Immediately flush contaminated eye(s) with lukewarm, gently flowing water for 20 minutes, while holding eyelid(s) open. Obtain medical attention immediately. | | |
| SECTION 9 — PREPARATION INFORMATION | | |
| Prepared by (Group, Department, etc.) Sally Safemeister | Telephone Number (604) 123-2222 | Preparation Date January 4, 2005 |

9-SECTION MSDS

Section 1: Product Information

This section identifies the product, the manufacturer, and the supplier, and describes the intended product use. Section 1 also provides the contact details of the

manufacturer and supplier for information and/or in case of emergency.

MATERIAL SAFETY DATA SHEET — 9 SECTIONS

SECTION 1 — Product Information

| | | | |
|----------------------------|---------------------|---------------------------------|---------------------|
| Product Identifier [1] | | WHMIS Classification (optional) | |
| Product Use [2] | | | |
| Manufacturer's Name [3] | | Supplier's Name [4] | |
| Street Address | | Street Address | |
| City | Province | City | Province |
| Postal Code | Emergency Telephone | Postal Code | Emergency Telephone |

- [1] **Product Identifier** – Give the name of the product as it appears on the product label. The product identifier is often the chemical name of the product, but can also be the trade name, common name, code name, or code number.
- [2] **Product Use** – Identify the product use intended by the manufacturer or supplier. Any other use, intended or unintended, can be dangerous.
- [3] **Manufacturer's Information** – Identify the manufacturer's name, address, and emergency phone number, which must be listed if one is available.
- [4] **Supplier's Information** – Give the supplier's (seller or distributor) name, address, and emergency phone number. Include supplier information if the supplier is different from the manufacturer.

Section 2: Hazardous Ingredients

This section lists the specific chemical names, percentages, and acute toxicity data for the individual components.

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients (specific) [5] | % [6] | CAS Number [7] | LD ₅₀ of Ingredient [8] (specify species and route) | LC ₅₀ of Ingredient [9] (specify species) |
|---|-------|----------------|---|---|
| | | | | |
| | | | | |
| | | | | |

- [5] **Specific Hazardous Ingredients** – List each **hazardous** ingredient by specific chemical name.

DO:

- Identify the specific chemical name of each hazardous ingredient if it is present at or above the cut-off concentration (as defined by *CPR* 4):
 - ≥ 1% (chronic effects, e.g., kidney or liver damage)
 - ≥ 0.1% (carcinogens, respiratory sensitizers, reproductive toxins, teratogens, mutagens, embryotoxins)
 - Include each ingredient the supplier has reason to believe may be harmful.
 - Include each ingredient for which the health hazards are not known.
 - Include each ingredient present on the Ingredient Disclosure List (IDL) at greater than or equal to the minimum concentration requiring disclosure.
 - Ensure the specific name disclosed for the hazardous ingredient matches the CAS number given.
- Identify complex, naturally occurring mixtures by the commonly known generic name corresponding to the CAS number (e.g., solvent naphtha [petroleum], light aromatic; or gasoline). Listing every component may be confusing.
 - Include the trade secret exemption statement for any secret ingredient that is not listed. If the supplier has applied for or received a Trade Secret exemption, this item may state:
 - HMIRC filing #1938, filed on April 20, 2005* (while a CBI claim is being processed)
 - CBI #1938, granted on December 5, 2005* (after a CBI claim has been granted)

DO NOT:

- List overly generic names (e.g., hydrocarbon mixture)
- List a generic name for a single ingredient, for example:
 - Alkanolamine* instead of *ethanolamine*
 - Aliphatic hydrocarbon* instead of *n-hexane*

For each listed hazardous ingredient include:

[6] **% – Percentages** – Give either the percentage or range of percentages for each hazardous ingredient (weight/weight; volume/volume; or weight/volume):

- Identify percentage (%) concentration if the exact concentration can be specified.
- Identify percentage (%) range if the concentration varies in normal production. The concentration range used must lie within both limits of a range listed in the *CPR* (see below).

| Acceptable Concentration Ranges as per <i>CPR</i> 11 | |
|--|---------|
| 0.1–1% | 10–30% |
| 0.5–1.5% | 15–40% |
| 1–5% | 30–60% |
| 3–7% | 40–70% |
| 5–10% | 60–100% |
| 7–13% | |

For example:

| Acceptable Ranges | Unacceptable Ranges |
|---|---|
| 2–4% (lies within 1–5%) | 1–8% (does not lie within any of the above listed range) |
| > 60% (represents 60–100%, which is within a listed range) | < 10% (represents 0–10%, which is not within a listed range) |

[7] **CAS Number** – State the unique registry number assigned to each hazardous ingredient by the Chemical Abstracts Services, a Division of the American Chemical Society. Information on the chemical name can be obtained from the CAS number. To date, over 27 million CAS numbers have been assigned to organic and inorganic substances. When completing this item, remember that:

- Each ingredient listed must have a corresponding CAS number.
- Each individual CAS number contains three groupings of numbers separated with hyphens. For example:

Xylene = 1330-20-7

Butanolamine = 13552-21-1

[8] **LD₅₀ of Each Ingredient** – State the LD₅₀, a measure of the immediate poisoning potential of a hazardous ingredient. LD₅₀ is the single dose at which 50% of a specified test group of animals die as a result of exposure to this substance under controlled conditions based on OECD (Organization for Economic Co-operation and Development) Test Guidelines or other accepted standards. (See Guidelines for Testing a Pure Substance or Mixture on page 246.)

The LD₅₀ can be determined for many routes of entry: oral (given by mouth), dermal (applied to skin), intramuscular (within muscle), subcutaneous (under the skin), or intraperitoneal (within the peritoneal cavity). Oral and dermal LD₅₀s are used for WHMIS classification.

When more than one LD₅₀ value is given for the same route of exposure for a chemical, use the lowest value for disclosure or classification.

The route and species tested must be specified. For example:

- Methanol has an LD₅₀ of 5628 mg/kg (oral, rat) and 15,800 mg/kg (skin, rabbit)
- Toluene has an LD₅₀ of 2600–7500 mg/kg (oral, rat) and 12,210 mg/kg (skin, rabbit)

[9] **LC₅₀ of Each Ingredient** – Give the LC₅₀, another measure of the immediate poisoning potential of a hazardous ingredient. LC₅₀ is the lethal concentration at which 50% of a specified test population die, but relates to inhalation exposure to dust, fume, vapour, or gas. The route is always inhalation. For WHMIS classification, the dose time is four hours; other dose times must be specified. The species tested must be specified as well. For example:

- Hydrogen cyanide has an LC₅₀ of 71 ppm (4 hours, rat)
- Sulphuric acid has an LC₅₀ of 255 mg/m³ (4 hours, rat)

LD₅₀ and LC₅₀ measure only immediate toxicity. Lower LD₅₀ and LC₅₀ values indicate higher immediate toxicity.

| Conversions | |
|-------------------|--|
| ppm | = $\frac{24.45 \times \text{mg/m}^3}{\text{gram molecular weight of substance}}$ |
| mg/m ³ | = $\frac{\text{ppm} \times \text{gram molecular weight of substance}}{24.45}$ |

Section 3: Physical Data

This section contains general information on the product's physical and chemical properties, such as the specific gravity, boiling point, and evaporation rate.

SECTION 3 — Physical Data

| Physical State [10] | Odour and Appearance [11] | | Odour Threshold (ppm) [12] |
|----------------------------|----------------------------------|--------------------------------|---|
| Specific Gravity [13] | Vapour Density (air = 1) [14] | Vapour Pressure (mmHg) [15] | Evaporation Rate [16] |
| Boiling Point (°C) [17] | Freezing Point (°C) [18] | pH [19] | Coefficient of Water/Oil Distribution [20] |

[10] **Physical State** – Describe the physical state of the product at room temperature. For example:

- Gas, liquid, solid, paste, powder, or gel

[11] **Odour and Appearance** – Give details that help to identify materials.

Odour describes the quality of the odour and its intensity rather than odour acceptability (pleasant, unpleasant). For example:

- Quality: almond-like, fruity, sharp, sweet, bitter
- Intensity: weak, strong, mild, faint

Appearance refers to colour (including colourless) and surface texture, and includes particle size for solids. Liquids can be described by their viscosity. For example:

- Surface texture: greasy, waxy, soft
- Particle size: finely divided particulate, flakes, granules
- Viscosity: gelatinous, viscous, thick, thin

[12] **Odour Threshold (ppm)** – State the lowest airborne concentration of the chemical that can be detected by the sense of smell. Odour threshold is always a component that is noticeable to the human nose. Because the sense of smell varies from person to person, a listed odour threshold is only a guide.

If the odour threshold of a mixture has not been determined, include the odour threshold of either the major component or a very smelly minor component.

- For example, a lacquer thinner containing a small percentage of isobutyl acetate should identify the odour threshold of this component since this substance has a much lower odour threshold than any of the other components.

Odour threshold gives an indication of the warning properties of a chemical. For example, would a worker be able to smell the airborne chemical before hazardous exposure occurred?

| Warning Properties | Odour Threshold Limit |
|--------------------|---------------------------|
| Good | 1/10 of Exposure Limit |
| Fair | 1/10 to 3X Exposure Limit |
| Poor | 3X Exposure Limit |

The relationship of odour threshold to the Threshold Limit Value (TLV) or other exposure limit is

important and may determine the type of respirator that should be used.

| Compound | Odour Threshold | Exposure Limit | Warning Properties | Respirator (3M Respirator Guide) |
|----------|-----------------|----------------|--------------------|----------------------------------|
| Toluene | 6.7 ppm | 100 ppm | Good | OV-Cartridge |
| Methanol | 6000 ppm | 200 ppm | Poor | Air-supplied |

Note: Respirator selection is dependent on the workplace conditions. These are only suggestions for respiratory protection under “normal conditions of use.” (OV-Cartridge = organic vapour cartridge).

[13] **Specific Gravity** – Give the ratio of the weight of a substance to the weight of water. The specific gravity indicates whether the substance is heavier or lighter than water.

Specific gravity > 1 means an immiscible material will sink in water

- Specific gravity of lead is 11.3

Specific gravity < 1 means an immiscible material will float in water.

- Specific gravity of mineral spirits is 0.78

Note: If the value is unknown, state whether the product is heavier or lighter than water.

[14] **Vapour Density (air = 1)** – Give the ratio of the molecular weight of a gas or vapour to the equivalent weight of air. The vapour density indicates whether a material is lighter or heavier than air. All gases and vapours will eventually mix with the air in a room, the rate depending on air currents and temperature. Those gases several times heavier than air, however, will have an initial tendency to sink to ground level. Vapour density is calculated by dividing the molecular weight of the substance by 29.

Vapour density > 1 means a product is heavier than air. For example:

- Vapour density of perchlorethylene is 5.72

Vapour density < 1 means a product is lighter than air. For example:

- Vapour density of helium is 0.138

Note: If the value is unknown, state whether the product is heavier or lighter than air.

[15] **Vapour Pressure (mmHg)** – State the vapour pressure of a liquid, one measure of its tendency to form vapours. The higher the vapour pressure number, the more quickly the liquid evaporates. Vapour pressure is measured at 20°C unless another temperature is specified. For example:

- Vapour pressure of Stoddart solvent is 2 mmHg (i.e., 2 millimetres of mercury)
- Vapour pressure of methylene chloride is 46.5 kPa (i.e., 349 mmHg)

Pressure Conversions:

1 atmosphere = 101.3 kPa = 760 mmHg = 14.7 psi

[16] **Evaporation Rate** – Give the evaporation rate, describing how fast a substance evaporates relative to a given known reference standard (usually n-butyl acetate or ether). Where n-butyl acetate = 1:

Evaporation rate > 3.0 is a fast rate.

- Evaporation of methanol is 5.9

Evaporation rate 0.8–3.0 is a medium rate.

- Evaporation of perchloroethylene is 1.5

Evaporation rate < 0.8 is a slow rate.

- Evaporation of xylene is 0.7

[17] **Boiling Point** – State the temperature at which the vapour pressure of a liquid equals the external pressure (usually normal atmospheric pressure), and the liquid changes freely to a gas or vapour.

Boiling point is an important consideration when chemicals are stored. Volumes can change significantly inside a container as the contents approach boiling point. For example:

- Outdoor storage of a chemical such as methylene chloride is dangerous, as it boils at 40°C. Even at 25°C, a significant pressure builds up in the container, which may rupture or explode.

[18] **Freezing Point (melting point)** – State the temperature, at normal room pressure, at which a liquid changes to a solid or a solid to a liquid (melting point).

Freezing point is also important to consider when storing chemicals. Containers or tanks may rupture when contents freeze, causing leaks or spills. For example:

- Glacial acetic acid freezes at 16°C. The bottle may crack due to expansion of the contents; when the temperature rises again, a serious spill may result.

Temperature Conversions:

- *CPR* (12) requires disclosure of units of measurement. In this case, units should be given in Celsius or Fahrenheit.
- The units for temperatures should be consistent within an MSDS.

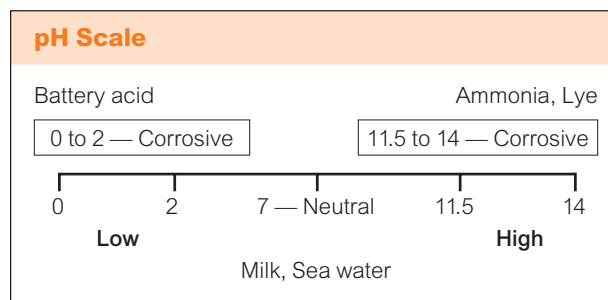
$$\text{Fahrenheit to Celsius} = (\text{°F} - 32) \times 0.556$$

$$\text{Celsius to Fahrenheit} = (1.8 \times \text{°C}) + 32$$

[19] **pH** – Give a pH value (between 0 to 14), which indicates the acidity or alkalinity of a product in aqueous solution. Low pH values are considered acidic, and high pH values are considered alkaline. The value or measurement has no relevance in non-aqueous solvents.

pH can be used as a guide to the irritant or corrosive nature of a product.

Any product with a pH of 2.0 or lower, or 11.5 or greater, can be assumed to be corrosive unless testing has been done that proves otherwise (Refer to OECD Test Guidelines 404 (skin) and 405 (eyes). See Guidelines for Testing a Pure Substance or Mixture on page 246.)



[20] **Coefficient of Water/Oil Distribution** – Give the coefficient of water/oil distribution, a number that indicates how easily the product is absorbed into the body.

Coefficient of water/oil distribution > 1 indicates that a material is water-soluble. It can enter the body through the mucous membranes of the eye, nose, and lungs.

- Coefficient of water/oil distribution for methanol is 1.9

Coefficient of water/oil distribution < 1 indicates the material dissolves better in oils and greases than water. Fatty tissue below the skin may absorb the substance and allow entry through the skin into the body.

- Coefficient of water/oil distribution for hexane is 0.0013

This information is useful for selection of proper skin protective equipment and first aid treatment.

Section 4: Fire and Explosion Data

This section lists the conditions under which the product may catch fire or explode. Section 4 also gives information for developing strategies and procedures to deal with fire and explosion hazards.

SECTION 4 — Fire and Explosion Data

| | | |
|---|--|--|
| Flammability [21] <input type="checkbox"/> Yes <input type="checkbox"/> No | If yes, under which conditions? | |
| Means of Extinction [22] | | |
| Flashpoint (°C) and Method [23] | Upper Flammable Limit (% by volume) [24] | Lower Flammable Limit (% by volume) [25] |
| Autoignition Temperature (°C) [26] | Explosion Data — Sensitivity to Impact [28] | Explosion Data — Sensitivity to Static Discharge [29] |
| Hazardous Combustion Products [27] | | |

[21] **Flammability** – State if a product is classified as flammable or combustible under WHMIS. Provide information on a product’s ability to catch fire or explode, and indicate any specific conditions under which the product may burn.

[22] **Means of Extinction** – List types and classes of fire extinguisher(s) and extinguishing materials suitable for use on the burning product or fire, and any special firefighting procedures. For example:

- Water, fogs, foam, carbon dioxide

[23] **Flashpoint and Method** – Give the product’s flashpoint (FP), the lowest temperature at which a liquid gives off enough vapour to catch fire or explode in the presence of an ignition source (e.g., heat, spark, or open flame).

A flashpoint is determined either by a “cc” (closed-cup) or “oc” (open-cup) method (see *CPR* Schedule IV).

FP < 37.8°C (< 100°F): a product with a flashpoint of less than 37.8°C is classified as flammable (Class B2). For example,

- Flashpoint of toluene is 4.4 degrees Celsius, closed-cup (very flammable)

FP ≥ 37.8°C but < 93.3°C (≥ 100°F but < 200°F): any substance with a flashpoint greater than or equal to 37.8°C but less than 93.3°C is classified as combustible.

FP ≥ 93.3°C (> 200°F): any substance with a flashpoint greater than or equal to 93.3°C may burn, but is not classified as flammable or combustible.

[24] **Upper Flammable Limit (% by volume)** and

[25] **Lower Flammable Limit (% by volume)** – Indicate flammable limits, a concentration range in which the gas or vapour is flammable. Flammable limits are the highest (UFL) and lowest (LFL) concentrations of a gas or vapour in air (expressed as a percentage) at which the product will catch fire or explode if near an ignition source (e.g., heat, spark, or open flame). For example:

- LFL for butane is 1.6%
- UFL for butane is 8.4%

These concentrations, and all concentrations in between, form the flammable range. If the vapour concentration is leaner (below the LFL) or richer (above the UFL) than this range, the flammable material will not burn.

UFL and LFL are also called UEL (upper explosive limit) and LEL (lower explosive limit).

[26] **Autoignition Temperature** – State the temperature above which the substance (usually a vapour) will spontaneously ignite **without** an external ignition source (e.g., heat, spark, or flame). Autoignition temperatures are available only for flammable liquids and gases.

- Autoignition temperature for gasoline is 250°C

[27] **Hazardous Combustion Products** – List the hazardous products produced when the substance burns or is exposed to extreme heat. These products may include carbon monoxide, carbon dioxide, phosgene, or hydrogen cyanide.

In other countries, these products are included in a section headed Hazardous Decomposition Products. In Canada, a distinction is made between the concepts of combustion product and decomposition product. (See information item [33] Hazardous Decomposition Products on page 66).

Combustion products are formed when a chemical is burned, and is an oxidation reaction. For example:

- When diethylether is burned, the hazardous combustion products are carbon dioxide and carbon monoxide

[28] **Explosion Data – Sensitivity to Mechanical Impact** – Indicate if the material is likely to explode due to physical impact. For example:

- Being dropped, bumped, knocked over, or jarred during transport

[29] **Explosion Data – Sensitivity to Static Discharge** – Indicate if the product is likely to explode or catch fire from a nearby spark from static electricity.

Static electricity can build up in a solution or on the walls of a container as the result of pouring or even by convection currents in the solution.

Grounding and bonding of containers is required.

Section 5: Reactivity Data

This section lists conditions and other substances that should be avoided to prevent dangerous reactions.

SECTION 5 — Reactivity Data

| | |
|--|--------------------------------|
| Chemical Stability [30] <input type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances [31] <input type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? |
| Reactivity, and Under What Conditions? [32] | |
| Hazardous Decomposition Products [33] | |

[30] **Chemical Stability** – Indicate if the product is chemically stable when used as intended or placed in extended storage. State if the material is unstable, and describe under what conditions the material will likely change. For example:

- Vigorously polymerize, decompose, condense, become self-reactive

Conditions could include impact, vibration, pressure, and temperature changes. For example:

- Peroxides may form

[31] **Incompatibility with Other Substances** – List any other substances (e.g., water, other chemicals, or chemical groups) that could cause dangerous reactions when the two products come in contact.

Contact may result in explosive conditions or production of toxic gases. For example:

- The salt sodium cyanide reacts with mildly acidic solutions to produce hydrogen cyanide gas
- Sodium hydroxide reacts with metals such as aluminum to produce hydrogen gas

Simply list general categories of chemicals that react with the product, rather than describing individual reactions. For example:

- Acids and caustics
- Organic materials and strong oxidizers
- Glacial acetic acid and concentrated nitric acid

[32] **Conditions of Reactivity** – Specify any special conditions under which hazardous reactions may occur.

The potential for vigorous polymerization should be included in this location. For example:

- Methyl methacrylate
- Butadiene

[33] **Hazardous Decomposition Products** – List dangerous products released by the material upon aging or reaction with airborne oxygen or moisture. Note that most products do not decompose. The typical entry here will be “None.” However, a product may

react with oxygen in air to form explosive peroxides. For example:

- Diethyl ether decomposes on contact with oxygen in air to form explosive peroxides

The product may react with moisture in air to form very toxic gases. For example:

- Stannous chloride decomposes with moisture in air to form hydrogen chloride vapour

This information item does not include the results of **burning** or excess **heating** (please refer to information item [27] Hazardous Combustion Products, page 65).

Section 6: Toxicological Properties

This section identifies how the substance enters the body and the possible health effects from single or repeated exposures. Section 6 also identifies known long-term health effects such as liver or kidney damage, sensitization, cancer, or reproductive effects.

SECTION 6 — Toxicological Properties

| | |
|--|--|
| Routes of Entry [34] <input type="checkbox"/> Skin Contact <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Eye Contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product [35] | |
| Effects of Chronic Exposure to Product [36] | |
| Exposure Limits (<i>value, source, date</i>) [37] | Irritancy (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [38] |
| Sensitization (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [39] | Carcinogenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [40] |
| Reproductive Toxicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [41] | Teratogenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [42] |
| Mutagenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [43] | Synergistic Products (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input type="checkbox"/> No [44] |

[34] **Routes of Entry** – Describe how the product enters the body during normal use.

Five routes of entry are standard: skin contact, skin absorption, eye contact, inhalation, and/or ingestion. The MSDS must identify all route(s) applicable to the product.

[35] **Effects of Acute Exposure to Product** – List the adverse health effects resulting from short-term exposure to the substance, either as a single exposure or as multiple exposures occurring within a short time, usually 24 hours or less. For example:

- Short-term exposure to relatively high concentration of an organic solvent may cause any of the typical symptoms ranging from drowsiness to stupor to coma to death.
- Exposure to high concentrations of perchlorethylene in a tanker car may cause narcosis or death.

[36] **Effects of Chronic Exposure to Product** – List the adverse health effects resulting from repeated exposure over a relatively long period of time, anywhere from several days to years, where symptoms do not appear until much later. For example:

- Multiple skin exposure over weeks or months leading to dermatitis
- Exposure to silica may cause silicosis in the lungs
- Exposure to an organic solvent may cause damage to the liver or kidneys

[37] **Exposure Limits (value, source, date)** – State the maximum allowable airborne concentration to which nearly all workers may be repeatedly exposed day after day without adverse effect.

Several types of exposure limits are in common use:

| 8-hour TWA Limit | Short-Term Exposure Limit (STEL) | Ceiling Exposure Limit (C) |
|---|--|---|
| The time-weighted average concentration for a normal 8-hour work day, or 40-hour work week, to which nearly all workers can be repeatedly exposed without adverse effect. | The short-term exposure limit, i.e., the maximum concentration to which workers can be periodically exposed for up to 15 minutes without suffering from irritation, chronic or irreversible tissue change, or narcosis of sufficient degree to increase accident proneness, or impair ability for self rescue. | The ceiling concentration of an airborne substance that must not be exceeded at <i>any</i> time. This limit is applied to substances that are predominately irritant or fast-acting and for which the TWA is inappropriate. |

The source and date of values should be referenced. The recommended exposure limits are published by the American conference of Governmental Industrial Hygienists (ACGIH), the National Institute for Occupational Safety and Health (NIOSH), or other regulatory agencies.

Because of individual susceptibility, some workers may experience discomfort at or below the exposure limit.

Aggravation of a pre-existing condition or the development of an occupational disease may affect a smaller percentage more seriously.

The legal exposure limits for a particular province or territory may be different from the ones listed on the MSDS. For example, the following is an excerpt from the *BC Occupational Health and Safety Guidelines 296/05*:

TABLE 5.4: Exposure Limits for Chemical and Biological Substances (excerpt)

| Substance [CAS No.] | TWA | STEL | Notations |
|-----------------------------|---------|----------|-----------|
| ABATE (SEE TEMEPHOS) | | | |
| ACETALDEHYDE [75-07-0] | | C 25 ppm | 2B |
| ACETAMIDE [60-35-5] | | | 2B |
| ACETIC ACID [64-19-7] | 10 ppm | 15 ppm | |
| ACETIC ANHYDRIDE [108-24-7] | 5 ppm | | |
| ACETONE [67-64-1] | 250 ppm | 500 ppm | |

K designation = possible, suspected, or confirmed human carcinogen

[38] **Irritancy of Product** – Describe the ability of the product to irritate the skin, eyes, nose, throat, respiratory system, or any other part of the body upon contact. Irritancy is the ability to produce tearing, reddening, swelling, itching, and/or pain. Such an irritation is, by definition, temporary and reversible. The following points should be kept in mind:

- Irritancy is often described as mild, moderate, or severe.
- Most substances will produce some irritation. To be classified as an irritant under WHMIS, the irritation must meet criteria as listed in *CPR 60*. Moderate to severe irritation meets this criteria.

- If no test data exists for either skin or eye irritation, the supplier must report irritancy on the basis of personal experience and knowledge (*CPR* 60)
- No product can be both an irritant (D2B) and a corrosive (E). Because corrosion is more severe than irritation, classify such products as corrosive.
- This item refers to chemical irritation rather than mechanical abrasion. For example, ordinary sand is not considered to be an irritant under WHMIS.

[39] **Sensitization** – Indicate if the substance is likely to cause an allergic skin and/or lung reaction.

A sensitizer may cause severe allergic reactions with subsequent exposure. Sensitized persons become progressively more reactive to smaller amounts of the allergen. For example:

- Products containing isocyanates, formaldehyde, or methyl methacrylate

Note: To be considered a sensitizer, a substance has to cause sensitization in the workplace to non-atopic persons. (Atopic refers to a hereditary tendency to experience immediate allergic reactions such as asthma or dermatitis because of the presence of an antibody in the skin and sometimes the bloodstream.)

[40] **Carcinogenicity** – State if the product, or one or more of the ingredients in a mixture, is classified as a possible human carcinogen by the International Agency for Research on Cancer (IARC Groups 1, 2A, or 2B), or by the ACGIH (ACGIH Groups A1, A2, or A3). For example:

- Methylene chloride
- Crystalline silica

ACGIH classification for carcinogens changed to include Group A3 in 1993 but the *CPR* requirement in section 54 has not yet been amended to reflect this change.

[41] **Reproductive Toxicity** – Indicate if the product can cause reproductive problems such as infertility or sterility in males or females. For example:

- Ethylene glycol monomethyl ether
- Ethylene glycol monoethyl ether

[42] **Teratogenicity** – Indicate if the product may cause **birth defects** to an unborn at exposures that do not cause damage or injury to the mother. For example:

- Lead
- Mercury

Note: Embryotoxicity – Indicate if a product may cause **toxic effects** to an unborn child but not the pregnant mother. For example:

- Xylene (mixed isomers)

[43] **Mutagenicity** – Indicate if the product can cause changes to the genetic material (DNA) of living cells in the body.

- Ethylene oxide

[44] **Synergistic Products** – Identify other products that, when combined with the controlled product, can cause adverse health effects that are worse than the effects of either material alone. For instance:

Each acting alone, product A increases the chance of developing cancer by two times, and product B increases the chance by two times as well. When product A and B are used together, however, the chances for developing cancer can be increased by as much as 50 times. For example:

- Asbestos plus tobacco smoke and their effect on the lungs
- Carbon tetrachloride and ethanol and their effect on the liver

Section 7: Preventive Measures

This section includes information on required protective equipment, and describes how to safely clean up spills and safely use, handle, store, dispose of, and transport the product.

SECTION 7 — Preventive Measures

| | | | | | | |
|--|---------------------------------|-------------------------------------|------------------------------|-----------------------------------|-----------------------------------|--------------------------------|
| Personal Protective Equipment [45] | <input type="checkbox"/> Gloves | <input type="checkbox"/> Respirator | <input type="checkbox"/> Eye | <input type="checkbox"/> Footwear | <input type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| If checked, specify type | | | | | | |
| Engineering Controls (<i>specify, such as ventilation, enclosed process</i>) [46] | | | | | | |
| Leak and Spill Procedure [47] | | | | | | |
| Waste Disposal [48] | | | | | | |
| Handling Procedures and Equipment [49] | | | | | | |
| Storage Requirements [50] | | | | | | |
| Special Shipping Information [51] | | | | | PIN | |

The intent of this section is to provide concise, simple information to the user of the product. Section 7 should neither discuss in detail the selection of an item of personal protective equipment (PPE), nor outline an exhaustive work procedure that is potentially applicable to every routine or emergency situation.

[45] Personal Protective Equipment – List specific PPE and types of equipment required by workers to prevent exposure to the product. This list includes gloves, respirators, eye protection, footwear, clothing, and any other protective equipment required.

This section should not include a general disclaimer, for example, that PPE is “not required under normal use conditions.” Such statements provide no useful information to the user, who may work under different “normal use” conditions such as a confined or enclosed space.

If the supplier feels that a disclaimer is necessary, it must be accompanied by the specific information suggested in the following sections:

- a) **Gloves** – if the product is toxic by skin contact or absorption, or is corrosive or an irritant, specify the type of glove that will provide a good level of protection.

No material is totally impervious or solvent-resistant. The supplier is not expected to be responsible for variations in the glove-manufacturing processes; if the supplier is concerned about potential legal liability, the information can be provided in an advisory manner. For example:



- Wear chemical-resistant gloves, such as neoprene or nitrile rubber.

The product manufacturer is expected to know best the correct glove material for the product when used as intended. The manufacturer will have already researched the degradation/permeability of glove materials when the proper protection for employees in the manufacturing plant was determined.

- b) **Respirator** – The supplier is not expected to discuss every level of respirator marketed. Instead, the supplier should identify the **minimum** level of respiratory protection that provides an effective barrier against the product. For example:

- Specifying that only air-supplied respirators can be used for work with methanol.

The user (employer) is responsible for determining the possible exposure levels that employees will face and confirming (usually with the supplier of the respirator) if the minimum protection will be sufficient.



The supplier is expected to reaffirm that a specific standard is met. For example:

- The statement “Use at least a NIOSH-approved, full-face, organic vapour cartridge respirator” provides the user with all the information necessary without the confusion of unnecessary qualifying information.

- c) **Eye** – Almost every controlled product is harmful to the eyes, and eye protection will be required.

Chemical goggles and/or a full face-shield is the norm. Safety glasses may not be recognized by Eye Protection standards as acceptable protection in some situations, even when fitted with side-shields.



Where a variety of eye protection is possible, the MSDS may refer to an applicable standard (e.g., CSA Z94.3 - 92) to help the user determine the most appropriate level of protection.

- d) **Footwear** – Identify any requirements apart from normal work footwear. For example:

- Rubber overshoes are required because the substance (e.g., ethylene oxide, acids, or hydrazine) will rapidly penetrate or degrade normal leather footwear.

- e) **Clothing** – Identify any special clothing needs apart from normal work clothes. For example:

- PVC apron, full-body, protective suit

[46] **Engineering Controls** – List the specific engineering controls recommended for reducing the hazards of the product. Engineering controls are preferred over the use of PPE. For example:

- Local exhaust ventilation, general ventilation, process equipment design

Do not try to determine the detailed ventilation needs of any individual workplace, but do identify the need for carefully engineered, local exhaust ventilation rather than general ventilation.

If appropriate, advise if the product should be used only in an approved, mechanically ventilated enclosure, such as a spray booth.

[47] **Leak and Spill Procedure** – List safe work procedures for handling spills, leaks, and other accidental releases of the product. For this item, include the following points where needed:

- Include any required PPE, neutralizing agent, absorbing agent, equipment (e.g., special vacuum) needed for clean-up.

Briefly identify any additional precautions needed – over and above any recommendations given previously.

Give general advice to remind the employer to plan for certain problems, such as:

- Controlling all sources of ignition (vapours can travel a lot further than the visible extent of a liquid spill may indicate)

- Using greater levels of PPE, such as self-contained breathing apparatus (SCBA) rather than a dual-cartridge respirator

Advise if the product can harm fish or disrupt the processes at a sewage treatment plant:

- Keep away from all watercourses and
- Do not flush down the storm sewer or sanitary sewer.

Be specific about the absorbent material needed for diking a large spill. Sand and sawdust are unlikely to be acceptable for spills of organic solvent, as they do not control vapour, but:

- Sand or soil may be useful in preventing the spread of an acid or caustic spill.

[48] Waste Disposal – Provide information such as proper waste container design, safe procedures for handling waste, and agencies to contact regarding disposal requirements. For example:

- Dispose of in accordance with local, provincial (state), and federal regulations.

[49] Handling Procedures and Equipment – Identify particular procedures and equipment required to handle the product safely. For example:

- Avoid contact with skin and eyes by wearing nitrile gloves and goggles.
- Use in a well-ventilated area or wear NIOSH-approved respirator with organic vapour cartridges.
- Keep container closed when not in use.
- Keep away from heat, sparks, and open flame.
- Ground and bond containers and equipment to avoid accumulation of static charge.
- Do not pressurize, cut, heat, or weld empty containers.

[50] Storage Requirements – Provide specific, safe-storage information such as storage temperature, control of ignition sources, separation from other incompatible materials, shelf life, testing for peroxide formation, and sensitivity to light, temperature, or moisture.

This item is intended to give brief advice to the user. For example:

- Store in a cool, dry place.
- Keep away from any sources of ignition (heat, sparks, and flames).

Also use this location to warn against unusual properties, the significance of which may not be immediately apparent to the reader. For example:

- The Physical Properties section may have specified the Freezing/Melting Point as 8°C. Since aqueous products expand when they freeze, the product must be stored in a heated storage area when temperatures drop below 8°C. Otherwise, damaged containers may start leaking their contents once they start to thaw.

[51] Special Shipping Information – Include safe-shipping information, such as sensitivity to temperature or shock. As a quick reference for those transporting the product, the TDG manifest and placard requirements may be included. For example:

- Four-digit Product Identification Number (PIN) used for shipping, also known as United Nations (UN) number or North America (NA) number. PIN refers to the product, not the ingredients.
- Packing group as determined by TDG legislation.
- Classification as determined by TDG legislation.
- Proper shipping name.

Section 8: First Aid Measures

This section contains specific instructions for the immediate treatment of a worker who has inhaled or swallowed the product, or who has had skin or eye contact with the product.

SECTION 8 — First Aid Measures [52]

| |
|--------------|
| Inhalation |
| Ingestion |
| Skin Contact |
| Eye Contact |

[52] **Specific First Aid Measures** – Provide specific, step-by-step procedures for immediate first aid.

Separate, specific procedures are needed for the management of each route of entry (eye, skin contact or absorption, ingestion and inhalation).

Indicate any specific antidotes or any other treatment. **Note:** First aid kits at the workplace should

contain antidotes, which are essential for crucial first response. For example:

- Use of calcium gluconate paste or zephiran chloride for treatment of hydrofluoric acid burns

Note: See General Guidelines for First Aid Statements, for each route of entry, on page 149 in the “Supplier Label” chapter.

Section 9: Preparation Information

This section contains the date the MSDS was prepared and the name of the person who prepared it.

SECTION 9 — Preparation Information

| | | |
|---|------------------|--------------------------|
| Prepared by (group, department, etc.) [54] | Telephone Number | Preparation Date [53] |
|---|------------------|--------------------------|

[53] **Preparation Date** – Give the date of **original** preparation (one of the most important items on the MSDS) or the date of the last review. The MSDS must be updated when significant new information arises, or at minimum of every **three years**.

Even if no significant new information appears to have been discovered about the product or its ingredients, all of the information on the MSDS must be reviewed once the MSDS is three years old to determine if current scientific research has revealed any new properties or hazards.

The date the copy was printed to send to the customer is **not** an acceptable substitute for these dates.

[54] **Prepared by (group, department, etc.)** – List the name and telephone number of the person or group who prepared the MSDS.

The phone number may be the main switchboard for the supplier’s company, but **should** be a direct line to the person who prepared the MSDS.

REVIEWING A 9-SECTION MSDS

To prepare a compliant MSDS, suppliers should start with the manufacturer's MSDS. To ensure that the manufacturer's MSDS complies with the *HPA* and *CPR*, suppliers need to review all required information items.

Suppliers can use the [MSDS Checklist \(9-Section\)](#) to identify missing or incorrect information. See below for a sample blank MSDS Checklist (9-Section).

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

MSDS CHECKLIST (9-SECTION)

SECTION 1 — Product Information

| | | | |
|--|---------------------------------------|--|---------------------------------------|
| <input type="checkbox"/> Product Identifier | | <input type="checkbox"/> [WHMIS Classification] | |
| <input type="checkbox"/> Product Use | | | |
| <input type="checkbox"/> Manufacturer's Name | | <input type="checkbox"/> Supplier's Name | |
| <input type="checkbox"/> Street Address | | <input type="checkbox"/> Street Address | |
| <input type="checkbox"/> City, Province/State, Postal/Zip Code | | <input type="checkbox"/> City, Province/State, Postal/Zip Code | |
| <input type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] | <input type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients <i>(specific chemical name for each)</i> | % | CAS Number | LD ₅₀ of Ingredient <i>(specify species and route)</i> | LC ₅₀ of Ingredient <i>(specify species)</i> |
|---|--------------------------|--------------------------|--|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION 3 — Physical Data

| | | | |
|---|---|---|--|
| <input type="checkbox"/> Physical State | <input type="checkbox"/> Odour and Appearance | | <input type="checkbox"/> Odour Threshold (ppm) |
| <input type="checkbox"/> Specific Gravity | <input type="checkbox"/> Vapour Density (air = 1) | <input type="checkbox"/> Vapour Pressure (mmHg) | <input type="checkbox"/> Evaporation Rate |
| <input type="checkbox"/> Boiling Point (°C) | <input type="checkbox"/> Freezing Point (°C) | <input type="checkbox"/> pH | <input type="checkbox"/> Coefficient of Water/Oil Distribution |

Product Identifier:

SECTION 4 — Fire and Explosion Data

| | | |
|--|---|---|
| <input type="checkbox"/> Flammability | If yes, conditions identified? | |
| <input type="checkbox"/> Means of Extinction | | |
| <input type="checkbox"/> Flashpoint (°C) and Method | <input type="checkbox"/> Upper Flammable Limit (% by volume) | <input type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input type="checkbox"/> Autoignition Temperature (°C) | <input type="checkbox"/> Explosion Data — Sensitivity to Impact | <input type="checkbox"/> Explosion Data — Sensitivity to Static Discharge |
| <input type="checkbox"/> Hazardous Combustion Products | | |

SECTION 5 — Reactivity Data

| | |
|---|---|
| <input type="checkbox"/> Chemical Stability | If yes, conditions identified? |
| <input type="checkbox"/> Incompatibility with Other Substances | If yes, incompatible substances identified? |
| <input type="checkbox"/> Reactivity, and Under What Conditions? | |
| <input type="checkbox"/> Hazardous Decomposition Products | |

SECTION 6 — Toxicological Properties

| | |
|--|---|
| Routes of Entry | |
| <input type="checkbox"/> Skin Contact | <input type="checkbox"/> Skin Absorption |
| <input type="checkbox"/> Eye Contact | <input type="checkbox"/> Inhalation |
| <input type="checkbox"/> Ingestion | |
| <input type="checkbox"/> Effects of Acute Exposure to Product | |
| <input type="checkbox"/> Effects of Chronic Exposure to Product | |
| <input type="checkbox"/> Exposure Limits (<i>value, source, date</i>) | <input type="checkbox"/> Irritancy (<i>if yes, explained?</i>) |
| <input type="checkbox"/> Sensitization (<i>if yes, explained?</i>) | <input type="checkbox"/> Carcinogenicity (<i>if yes, explained?</i>) |
| <input type="checkbox"/> Reproductive Toxicity (<i>if yes, explained?</i>) | <input type="checkbox"/> Teratogenicity (<i>if yes, explained?</i>) |
| <input type="checkbox"/> Mutagenicity (<i>if yes, explained?</i>) | <input type="checkbox"/> Synergistic Products (<i>if yes, explained?</i>) |

Product Identifier:

SECTION 7 — Preventive Measures

| | |
|---|-------------------------------------|
| Personal Protective Equipment | |
| <input type="checkbox"/> Gloves | <input type="checkbox"/> Respirator |
| <input type="checkbox"/> Eye | <input type="checkbox"/> Footwear |
| <input type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| <input type="checkbox"/> If any of above checked, type specified? | |
| <input type="checkbox"/> Engineering Controls (<i>specified, such as ventilation, enclosed process</i>) | |
| <input type="checkbox"/> Leak and Spill Procedure | |
| <input type="checkbox"/> Waste Disposal | |
| <input type="checkbox"/> Handling Procedures and Equipment | |
| <input type="checkbox"/> Storage Requirements | |
| <input type="checkbox"/> Special Shipping Information | <input type="checkbox"/> PIN |

SECTION 8 — First Aid Measures

| |
|---------------------------------------|
| <input type="checkbox"/> Inhalation |
| <input type="checkbox"/> Ingestion |
| <input type="checkbox"/> Skin Contact |
| <input type="checkbox"/> Eye Contact |

SECTION 9 — Preparation Information

| | |
|---|---|
| <input type="checkbox"/> Prepared by (<i>group, department, etc.</i>) | |
| <input type="checkbox"/> Telephone Number | <input type="checkbox"/> Preparation Date (<i>original date or date of last review</i>) |

Completed by: _____ **Date:** _____

CASE STUDY #6: REVIEWING A 9-SECTION MSDS

In Case Study #2 (page 25) and Case Study #5 (page 46), we classified **Best Brake Cleaner 123** (Step 1 in the Four Steps to Compliance) and reviewed hazardous ingredients for this product (Step 2). In this case study, we begin Step 3 by continuing the revision of the non-compliant manufacturer's MSDS.

Step 1 — Classify the Product

Best Brake Cleaner 123 is a controlled product that, based on its individual ingredients, falls into WHMIS hazard class:

- B2 – Flammable Liquid
- D2B – Chronic Toxic Effects; Skin/Eye Irritation



Step 2 — Review Hazardous Ingredients

Best Brake Cleaner 123 contains three hazardous ingredients:

| Component | CAS # | % (WT) |
|------------------|----------|--------|
| <i>n</i> -Hexane | 110-54-3 | 15–40% |
| Ethanol | 64-17-5 | 5–10% |
| Methanol | 67-56-1 | 15–40% |

Step 3 — Prepare a Compliant MSDS

The first step in preparing a compliant MSDS is reviewing the manufacturer's MSDS to identify the required information items.

This case study will show the following:

1. The non-compliant manufacturer's MSDS for Best Brake Cleaner 123 with revised hazardous ingredients.
2. The MSDS Checklist (9-Section) results for this MSDS.

Note that the MSDS Checklist (9-Section) uses the following conventions:

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

**1. Best Brake Cleaner 123 MSDS
(non-compliant with revised hazardous ingredients section)**

| Best Brake Cleaner 123 Stock Number(s): B12345, B9876, B7654 | | | | |
|--|--|-----------------------------------|----------|-----------|
| Manufacturer's Name: The Best Oil Company, Inc. | | | | |
| Address: 789 Black Gold Road, CA 34567 | | | | |
| Emergency Phone: 672-222-1212 or 800-222-3333 | | | | |
| Date Printed: 07/10/99 | | | | |
| SECTION 1 — Material Identification and Hazard Components | | | | |
| Component | CAS Number | % (WT) | OSHA PEL | ACGIH TLV |
| 1. n-Hexane | 110-54-3 | 15-40 | 50 ppm | 50 ppm |
| 2. Ethanol | 64-17-5 | 5-10 | 1000 ppm | 1000 ppm |
| 3. Methanol | 67-56-1 | 15-40 | 200 ppm | 200 ppm |
| SECTION 2 — Physical/Chemical Characteristics | | | | |
| Boiling Point: 151-156°F | | Specific Gravity: 0.68 @ 60°F | | |
| Vapour Density: | | Evaporation Test: Ethyl Ether | | |
| Water Solubility: Less than 0.01 @ 77°F | | Vapour Pressure: Hexane: 150 mmHg | | |
| | | Ethanol: 51 mmHg | | |
| | | Methanol: 96 mmHg | | |
| SECTION 3 — Fire and Explosion Hazard Data | | | | |
| Flashpoint: < 0°F | | Method: TCC based on Hexane | | |
| Flammable Limits in Air % by Volume at: Lower Explosion Limit: 1.8% | | | | |
| Upper Explosion Limit: 11.6% | | | | |
| Extinguishing Media: Use water fog, foam, alcohol foam, carbon dioxide, dry chemical | | | | |
| General Hazard: Extremely flammable. Material will readily ignite at ambient temperature. This liquid is volatile and gives off invisible vapours. Either the liquid or vapour may settle in low areas or travel some distance along the ground or surface to ignition sources where it may ignite or explode. | | | | |
| Firefighting Procedures: | Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If leak or spill has not ignited, use water spray to disperse the vapours. Either allow to burn under controlled conditions, or extinguish with foam or dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for firefighting personnel. | | | |
| Hazardous Combustion Products: Fumes and smoke | | | | |



| |
|---|
| SECTION 4 — Reactivity Hazard Data |
| Stability: Stable |
| Incompatibility: |
| Hazardous Polymerization: Unknown |
| Hazardous Decomposition Products: Fumes and smoke |
| SECTION 5 — Health Hazard Data |
| The health effects noted below are consistent with requirements under the OSHA Hazard Communication Standard (29 CFR 1910.1200). |
| <p>Eye Contact: Liquid or vapour can irritate. Prolonged contact may lead to corneal damage.</p> <p>Skin Contact: Contact may dry the skin. Prolonged contact may cause irritation.</p> <p>Inhalation: High vapour/aerosol concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.</p> <p>Ingestion: Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death. Low order of toxicity.</p> |
| SECTION 6 — Control and Protective Measures |
| <p>Respiratory Protection: None under normal conditions of use. Avoid breathing vapours.</p> <p>Skin Protection: Where contact is likely, wear chemical-resistant/impermeable gloves.</p> <p>Eye Protection: Use of safety glasses with splash guards or full face shield is recommended.</p> <p>Ventilation: Sufficient to prevent inhalation of solvent vapours.</p> <p>Protective Clothing: None under normal use.</p> <p>Hygienic Work Practices: Eye washes and safety showers in the workplace are recommended.</p> |
| SECTION 7 — Precautions for Safe Handling and Storage |
| <p>Steps To Be Taken if Material is Spilled or Released: Avoid breathing vapours. Ventilate area. Dike area to contain spill. Remove all sources of ignition. Clean up area with absorbent material and place in closed containers for disposal.</p> <p>Waste Disposal Method: Dispose of in accordance with local, state, and federal regulations. Before attempting clean-up, refer to other sections of this MSDS for hazard caution information.</p> <p>Precautions To Be Taken in Handling Storage: Store and use in cool, dry, well-ventilated areas. Keep away from heat, sparks, and open flame. If entire contents are not used, replace cap and keep tightly closed. Use adequate ventilation.</p> |
| SECTION 8 — Emergency and First Aid Procedures |
| <p>Eye Contact: Wash immediately with large volumes of fresh water.</p> <p>Skin Contact: Flush with large amounts of water. Wash with soap. Remove grossly contaminated clothing, including shoes, and launder before reuse.</p> <p>Inhalation: Remove to fresh air. Administer oxygen if needed. Apply artificial respiration if breathing has stopped. Keep at rest. Get immediate medical attention.</p> <p>Ingestion: If swallowed, DO NOT induce vomiting. Keep at rest. If unconscious, do not give anything by mouth. Immediately contact a physician.</p> <p>Health Effects: Simultaneous exposure to the vapours of n-hexane and methyl ethyl ketone or n-hexane and methyl isobutyl ketone above the recommended workplace limits increases the risk of adverse effects from n-hexane.</p> |
| SECTION 9 — Regulatory Information |
| EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE (EHS). |

2. Best Brake Cleaner 123 MSDS Checklist (9-Section) Results

- = information present as required
 = information inaccurate or missing
 N/AP = information not applicable
 N/AV = information not available
 [] = optional information

MSDS CHECKLIST (9-SECTION)

SECTION 1 — Product Information

| | | | |
|--|---------------------------------------|---|---------------------------------------|
| <input checked="" type="checkbox"/> Product Identifier <i>Best Brake Cleaner 123</i> | | <input type="checkbox"/> [WHMIS Classification] | |
| <input checked="" type="checkbox"/> Product Use <i>Missing</i> | | | |
| <input checked="" type="checkbox"/> Manufacturer's Name | | <input checked="" type="checkbox"/> Supplier's Name <i>Missing</i> | |
| <input checked="" type="checkbox"/> Street Address | | <input checked="" type="checkbox"/> Street Address <i>Missing</i> | |
| <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code <i>City missing</i> | | <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code <i>Missing</i> | |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] | <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients <i>(specific chemical name for each)</i> | % | CAS Number | LD ₅₀ of Ingredient <i>(specify species and route)</i> | LC ₅₀ of Ingredient <i>(specify species)</i> |
|---|-------------------------------------|-------------------------------------|--|--|
| <input checked="" type="checkbox"/> <i>n-Hexane</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <i>Missing</i> | <input checked="" type="checkbox"/> <i>Missing</i> |
| <input checked="" type="checkbox"/> <i>Ethanol</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <i>Missing</i> | <input checked="" type="checkbox"/> <i>Missing</i> |
| <input checked="" type="checkbox"/> <i>Methanol</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> <i>Missing</i> | <input checked="" type="checkbox"/> <i>Missing</i> |

SECTION 3 — Physical Data

| | | |
|---|---|---|
| <input checked="" type="checkbox"/> Physical State <i>Missing</i> | <input checked="" type="checkbox"/> Odour and Appearance <i>Missing</i> | <input checked="" type="checkbox"/> Odour Threshold (ppm) <i>Missing</i> |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Vapour Density (air = 1) <i>Missing</i> | <input checked="" type="checkbox"/> Vapour Pressure (mmHg) <i>State value for product if known or use values for individual ingredients.</i> |
| <input checked="" type="checkbox"/> Evaporation Rate <i>Rate is relative to ethyl ether. Actual rate is missing.</i> | <input checked="" type="checkbox"/> Freezing Point (°C) <i>Missing</i> | <input checked="" type="checkbox"/> pH <i>Missing</i> |
| <input checked="" type="checkbox"/> Boiling Point (°C) | <input checked="" type="checkbox"/> Coefficient of Water/Oil Distribution <i>Missing</i> | |

Product Identifier: Best Brake Cleaner 123

SECTION 4 — Fire and Explosion Data

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Flammability <i>Missing</i> | If yes, conditions identified? | |
| <input checked="" type="checkbox"/> Means of Extinction | | |
| <input checked="" type="checkbox"/> Flashpoint (°C) and Method | <input checked="" type="checkbox"/> Upper Flammable Limit (% by volume) | <input checked="" type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input checked="" type="checkbox"/> Autoignition Temperature (°C) <i>Missing</i> | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Impact <i>Missing</i> | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Static Discharge <i>Missing</i> |
| <input checked="" type="checkbox"/> Hazardous Combustion Products <i>Incorrect. Must specify what combustion products.</i> | | |

SECTION 5 — Reactivity Data

| | |
|--|---|
| <input checked="" type="checkbox"/> Chemical Stability | If yes, conditions identified? |
| <input checked="" type="checkbox"/> Incompatibility with Other Substances <i>Missing</i> | If yes, incompatible substances identified? |
| <input checked="" type="checkbox"/> Reactivity, and Under What Conditions? <i>Missing</i> | |
| <input checked="" type="checkbox"/> Hazardous Decomposition Products <i>Incorrect. Hazardous decomposition products are substances resulting from aging, heating, and oxidation. Fumes and smoke result from burning.</i> | |

SECTION 6 — Toxicological Properties

| | |
|--|---|
| <input checked="" type="checkbox"/> Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion Incomplete. Skin Absorption: Methanol has a SKIN designation from ACGIH; it can be absorbed through the skin contributing to the overall exposure. Ingestion: “Low order of toxicity” is incorrect. Ingestion of methanol may cause blindness and death. | |
| <input checked="" type="checkbox"/> Effects of Acute Exposure to Product <i>Incomplete. Health effects resulting from short-term exposure (single exposure or multiple exposure within a short time, usually 24 hours) must be separated from chronic health effects.</i> | |
| <input checked="" type="checkbox"/> Effects of Chronic Exposure to Product <i>Incomplete. Health effects resulting from repeated exposure to the product over a relatively long period of time must be separated from acute health effects.</i> | |
| <input checked="" type="checkbox"/> Exposure Limits (value, source, date) <i>Incomplete. None are established for the product, so need most current exposure limits for the ingredients.</i> | <input checked="" type="checkbox"/> Irritancy (if yes, explained?) |
| <input checked="" type="checkbox"/> Sensitization (if yes, explained?) <i>Missing</i> | <input checked="" type="checkbox"/> Carcinogenicity (if yes, explained?) <i>Missing</i> |
| <input checked="" type="checkbox"/> Reproductive Toxicity (if yes, explained?) <i>Missing</i> | <input checked="" type="checkbox"/> Teratogenicity (if yes, explained?) <i>Missing</i> |
| <input checked="" type="checkbox"/> Mutagenicity (if yes, explained?) <i>Missing</i> | <input checked="" type="checkbox"/> Synergistic Products (if yes, explained?) <i>Missing</i> |

SECTION 7 — Preventive Measures

| | |
|---|---|
| Personal Protective Equipment | |
| <input checked="" type="checkbox"/> Gloves | <input checked="" type="checkbox"/> Respirator |
| <input checked="" type="checkbox"/> Eye | <input type="checkbox"/> Footwear |
| <input checked="" type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> If any of above checked, type specified? <i>Incorrect. For Gloves and Eye protection, must specify type of personal protective equipment. For Respirator and Clothing, MSDS incorrectly indicates none required. (Note Section 6 Toxicological Properties indicates inhalation and skin contact/absorption are potential routes of entry).</i> | |
| <input checked="" type="checkbox"/> Engineering Controls (specified, such as ventilation, enclosed process) <i>Missing</i> | |
| <input checked="" type="checkbox"/> Leak and Spill Procedure <i>Incomplete. Must specify how to avoid breathing vapours and the type of absorbent material to use.</i> | |
| <input checked="" type="checkbox"/> Waste Disposal | |
| <input checked="" type="checkbox"/> Handling Procedures and Equipment <i>Incomplete. Product is classified as flammable; add information on grounding and bonding of containers when filling or emptying containers, and state no welding or flame-cutting containers.</i> | |
| <input checked="" type="checkbox"/> Storage Requirements | |
| <input checked="" type="checkbox"/> Special Shipping Information <i>Missing. Must provide information on safe shipment of product. Reference should be made to the TDG Regulations.</i> | <input checked="" type="checkbox"/> PIN <i>Missing</i> |

SECTION 8 – First Aid Measures

| |
|---|
| <input checked="" type="checkbox"/> Inhalation <i>Incomplete. Administration of oxygen should be performed only by a qualified person.</i> |
| <input checked="" type="checkbox"/> Ingestion |
| <input checked="" type="checkbox"/> Skin Contact |
| <input checked="" type="checkbox"/> Eye Contact <i>Incomplete. Need to indicate time required to flush eyes.</i> |
| <input checked="" type="checkbox"/> <i>Incorrect. Synergistic effects should be in Section 6 Toxicological Properties.</i> |

SECTION 9 – Preparation Information

| | |
|---|---|
| <input checked="" type="checkbox"/> Prepared by (group, department, etc.) <i>Missing</i> | |
| <input checked="" type="checkbox"/> Telephone Number <i>Missing</i> | <input checked="" type="checkbox"/> Preparation Date (original date or date of last review) <i>Missing</i> |

PREPARING A COMPLIANT 9-SECTION MSDS

To prepare a compliant MSDS, suppliers should start with the manufacturer's non-compliant MSDS, revised with the correct hazardous ingredients information. To ensure that the manufacturer's MSDS complies with the *HPA* and *CPR*, suppliers need to complete the following steps:

1. Review the MSDS. Use the MSDS Checklist (9-Section) to identify missing or incorrect information. See the back folder of this guide for a blank MSDS Checklist (9-Section).
2. Research problem areas in order to:
 - Find missing information
 - Revise incorrect information
 - Verify information (if necessary)

3. Revise the MSDS or prepare a new MSDS as required to meet Canadian requirements.

When researching problem areas, refer to these resources:

- The table, Sources for MSDS Information Items, on page 229. This table identifies various sources to check when completing the information items required on an acceptable Canadian MSDS. An excerpt of the table is shown below:

| Sources of MSDS Information Items (excerpt) | |
|---|---|
| <i>CPR</i> Items | Where to Find the Information |
| Physical Data | |
| 10. Physical state | • By Observation, Manufacturer, Supplier |
| 11. Odour and appearance | • By Observation, Harper |
| 12. Odour threshold | • 3M Respirator Guide, CCOHS (CHEMINFO), NIOSH |
| 13. Specific gravity (for pure substances) | • CCOHS (CHEMINFO), CRC, Merck, Manufacturer, Physical Laboratory Testing, Professional Judgment, Sax |

- Technical Information Contacts, page 213, which provides details (address, telephone number, etc.) for all of the information sources listed in Sources for MSDS Information Items
- WHMIS-Related Internet Sites, which are listed on page 218

CASE STUDY #7: PREPARING A COMPLIANT 9-SECTION MSDS

In Case Study #2 (page 25) and Case Study #5 (page 46), we classified **Best Brake Cleaner 123** (Step 1 in the Four Steps to Compliance) and reviewed hazardous ingredients for this product (Step 2). In Case Study #6 (page 76) we reviewed the manufacturer's MSDS for Best Brake Cleaner 123. This case study will complete Step 3 of the process.

Step 3 — Prepare 9-Section MSDS

This case study will show how to prepare a compliant MSDS for Best Brake Cleaner 123. For each of the nine MSDS sections, this case study will show the following items:

1. Each section of the manufacturer's MSDS for Best Brake Cleaner 123.
2. The MSDS Checklist (9-Section) results for each MSDS section. Potential sources for finding or verifying information are listed and can be referenced in the table Sources for MSDS Information Items. Note that different sources provide similar information.
3. The revised supplier's MSDS. The supplier will have revised the MSDS based on an information search to ensure that the MSDS is compliant in Canada. Revised information in the case study will be highlighted in red.

Note that the MSDS Checklist (9-Section) uses the following conventions:

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

Case Study #7: Section 1 — Product Information

Manufacturer's Material Safety Data Sheet

| | |
|--|-------------------------------|
| Best Brake Cleaner 123 Stock Number(s): B12345, B9876, B7654 | |
| Manufacturer's Name: | The Best Oil Company, Inc. |
| Address: | 789 Black Gold Road, CA 34567 |
| Emergency Phone: | 672-222-1212 or 800-222-3333 |
| Date Printed: | 07/10/05 |

MSDS Checklist (9-Section) Results

SECTION 1 — Product Information

| | |
|---|---|
| <input checked="" type="checkbox"/> Product Identifier | <input type="checkbox"/> [WHMIS Classification] |
| <input checked="" type="checkbox"/> Product Use | |
| <input checked="" type="checkbox"/> Manufacturer's Name | <input checked="" type="checkbox"/> Supplier's Name |
| <input checked="" type="checkbox"/> Street Address | <input checked="" type="checkbox"/> Street Address |
| <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |

Revised Material Safety Data Sheet (compliant)

SECTION 1 — Product Information

| | | | |
|--|--|--|--|
| Product Identifier <i>Best Brake Cleaner 123</i> | | WHMIS Classification (<i>optional</i>) <i>B2, D2B</i> | |
| Product Use <i>Automotive Cleaner</i> | | | |
| Manufacturer's Name <i>The Best Oil Company, Inc.</i> | | Supplier's Name <i>ABC Distributors</i> | |
| Street Address <i>789 Black Gold Road</i> | | Street Address <i>2234 Speedy Avenue</i> | |
| City <i>Windy Bay</i> | Province <i>CA, USA</i> | City <i>Toner Town</i> | Province <i>BC</i> |
| Postal Code <i>34567</i> | Emergency Telephone <i>(672) 222-1212 or 800-222-3333</i> | Postal Code <i>S2S 2S2</i> | Emergency Telephone <i>1-800-444-5555</i> |

Case Study #7: Section 2 — Hazardous Ingredients

Manufacturer's Material Safety Data Sheet

| SECTION 1 — Material Identification and Hazard Components | | | | |
|---|------------|--------|----------|-----------|
| Component | CAS Number | % (WT) | OSHA PEL | ACGIH TLV |
| 1. n-Hexane | 110-54-3 | 15–40 | 50 ppm | 50 ppm |
| 2. Ethanol | 64-17-5 | 5–10 | 1000 ppm | 1000 ppm |
| 3. Methanol | 67-56-1 | 15–40 | 200 ppm | 200 ppm |

MSDS Checklist (9-Section) Results

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients (specific chemical name for each) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|--|-------------------------------------|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> n-Hexane | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* |
| <input checked="" type="checkbox"/> Ethanol | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* |
| <input checked="" type="checkbox"/> Methanol | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* | <input checked="" type="checkbox"/> sources include CCOHS (CHEMINFO, RTECS), CSST, Sax* |

* In this case, the supplier obtained the required information (shown below) from CSST and Sax.

Revised Material Safety Data Sheet (compliant)

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients (specific) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|-------------------------------------|-------|------------|---|---|
| n-Hexane | 15–40 | 110-54-3 | 15,840 mg/kg (oral, rat) | 38,500 ppm/4 hrs (rat) |
| Ethanol | 5–10 | 64-17-5 | 7060 mg/kg (oral, rat) | 21,000 ppm/4 hrs (rat) |
| Methanol | 15–40 | 67-56-1 | 5628 mg/kg (oral, rat) | 64,000 ppm/4 hrs (rat) |

Case Study #7: Section 3 — Physical Data

Manufacturer's Material Safety Data Sheet

| SECTION 2 — Physical/Chemical Characteristics | |
|---|-----------------------------------|
| Boiling Point: 151–156°F | Specific Gravity: 0.68 @ 60°F |
| Vapour Density: | Evaporation Test: Ethyl Ether |
| Water Solubility: Less than 0.01 @ 77°F | Vapour Pressure: Hexane: 150 mmHg |
| | Ethanol: 51 mmHg |
| | Methanol: 96 mmHg |

MSDS Checklist (9-Section) Results

SECTION 3 — Physical Data

| | | |
|--|--|--|
| <input checked="" type="checkbox"/> Physical State <i>Is it a gas, liquid, or solid?</i> Sources include manufacture or observation. | <input checked="" type="checkbox"/> Odour and Appearance <i>Sources include Harper (List of Terms for Scaling Odour Quality).</i> | <input checked="" type="checkbox"/> Odour Threshold (ppm) <i>Sources include manufacturer, NIOSH, or 3M Respirator Guide.</i> |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Vapour Density (air = 1) <i>Check with manufacturer.</i> | <input checked="" type="checkbox"/> Vapour Pressure (mmHg) |
| <input checked="" type="checkbox"/> Evaporation Rate <i>Relative to ethyl ether. Check with manufacturer.</i> | <input checked="" type="checkbox"/> Boiling Point (°C) <i>Note CPR requires units of measurement; either temperature scale is acceptable.</i> | <input checked="" type="checkbox"/> Freezing Point (°C) <i>Check with manufacturer.</i> |
| <input checked="" type="checkbox"/> Coefficient of Water/Oil Distribution <i>Check with manufacturer.</i> | <input checked="" type="checkbox"/> pH <i>Test with pH meter/ paper if applicable.</i> | |

Revised Material Safety Data Sheet (compliant)

SECTION 3 — Physical Data

| | | |
|---|---|--------------------------------------|
| Physical State <i>Liquid</i> | Odour and Appearance <i>Clear, colourless liquid, faint gasoline-like odour.</i> | Odour Threshold (ppm) <i>N/AV</i> |
| Specific Gravity <i>0.68 @ 60°F</i> | Vapour Density (air = 1) <i>2.6</i> | Vapour Pressure (mmHg) <i>103</i> |
| Evaporation Rate <i>2.8 (Ethyl Ether = 1)</i> | Boiling Point (°C) <i>151–156°F</i> | Freezing Point (°C) <i>N/AV</i> |
| Coefficient of Water/Oil Distribution <i>0.7</i> | pH <i>N/AP</i> | |

Case Study #7: Section 4 — Fire and Explosion Data

Manufacturer's Material Safety Data Sheet

| SECTION 3 — Fire and Explosion Hazard Data | |
|--|---|
| Flashpoint: < 0°F | Method: TCC based on Hexane |
| Flammable Limits in Air % by Volume at: Lower Explosion Limit: 1.8% | |
| Upper Explosion Limit: 11.6% | |
| Extinguishing Media: Use water fog, foam, alcohol foam, carbon dioxide, dry chemical. | |
| General Hazard: Extremely flammable. Material will readily ignite at ambient temperature. This liquid is volatile and gives off invisible vapours. Either the liquid or vapour may settle in low areas or travel some distance along the ground or surface to ignition sources where it may ignite or explode. | |
| Firefighting Procedures: | Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If leak or spill has not ignited, use water spray to disperse the vapours. Either allow to burn under controlled conditions or extinguish with foam or dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for firefighting personnel. |
| Hazardous Combustion Products: Fumes and smoke | |

MSDS Checklist (9-Section) Results

SECTION 4 — Fire and Explosion Data

| | | |
|--|--|---|
| <input checked="" type="checkbox"/> Flammability | If yes, conditions identified? <i>Check with manufacturer, by physical laboratory testing, or by observation.</i> | |
| <input checked="" type="checkbox"/> Means of Extinction | | |
| <input checked="" type="checkbox"/> Flashpoint (°C) and Method | <input checked="" type="checkbox"/> Upper Flammable Limit (% by volume) | <input checked="" type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input checked="" type="checkbox"/> Autoignition Temperature (°C) <i>Check with manufacturer.</i> | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Impact <i>Check with manufacturer.</i> | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Static Discharge <i>Check with manufacturer.</i> |
| <input checked="" type="checkbox"/> Hazardous Combustion Products <i>Must specify what combustion products. Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include CCOHS (CHEMINFO), CSST.</i> | | |

Revised Material Safety Data Sheet (compliant)

SECTION 4 — Fire and Explosion Data

| | | |
|--|---|---|
| <p>Flammability</p> <p><input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> | <p>If yes, under which conditions?</p> <p><i>Ignition sources, static discharge.</i> General hazard: Extremely flammable. Material will readily ignite at ambient temperature. This liquid is volatile and gives off invisible vapours. Either the liquid or vapour may settle in low areas or travel some distance along the ground or surface to ignition sources where it may ignite or explode.</p> | |
| <p>Means of Extinction</p> <p><i>Extinguishing Media: Use water fog, foam, alcohol foam, carbon dioxide, dry chemical.</i></p> <p><i>Firefighting Procedures: Use water spray to cool fire exposed surfaces and to protect personnel. Shut off "fuel" to fire. If leak or spill has not ignited, use water spray to disperse the vapours. Either allow to burn under controlled conditions or extinguish with foam or dry chemical. Try to cover liquid spills with foam. Respiratory and eye protection required for firefighting personnel.</i></p> | | |
| <p>Flashpoint (°C) and Method</p> <p><i>-21.7° C (TCC based on hexane)</i></p> | <p>Upper Flammable Limit (% by volume)</p> <p>11.6%</p> | <p>Lower Flammable Limit (% by volume)</p> <p>1.8%</p> |
| <p>Autoignition Temperature (°C)</p> <p><i>266° C</i></p> | <p>Explosion Data — Sensitivity to Impact</p> <p><i>No</i></p> | <p>Explosion Data — Sensitivity to Static Discharge</p> <p><i>Material can accumulate static charges, which can cause an electrical discharge. Bond and ground containers when pouring. DO NOT cut, weld, braze, solder, drill, grind, or expose containers to heat, sparks, static electricity, or other sources of ignition. They may explode and cause injury or death.</i></p> |
| <p>Hazardous Combustion Products</p> <p><i>Carbon monoxide, carbon dioxide, and formaldehyde</i></p> | | |

Case Study #7: Section 5 — Reactivity Data

Manufacturer's Material Safety Data Sheet

| SECTION 4 — Reactivity Hazard Data |
|---|
| Stability: Stable |
| Incompatibility: |
| Hazardous Polymerization: Unknown |
| Hazardous Decomposition Products: Fumes and smoke |

MSDS Checklist (9-Section) Results

SECTION 5 — Reactivity Data

| | |
|--|---|
| <input checked="" type="checkbox"/> Chemical Stability | If yes, conditions identified? |
| <input checked="" type="checkbox"/> Incompatibility with Other Substances | If yes, incompatible substances identified? <i>Since this product is flammable, the MSDS should indicate "strong oxidizing agent." Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include CCOHS (CHEMINFO), CSST.</i> |
| <input checked="" type="checkbox"/> Reactivity, and Under What Conditions? | <i>Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include CCOHS (CHEMINFO), CSST.</i> |
| <input checked="" type="checkbox"/> Hazardous Decomposition Products | <i>Hazardous decomposition products are substances as a result of aging, heating, and oxidation. Fumes and smoke result from burning. Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include CCOHS (CHEMINFO), CSST.</i> |

Revised Material Safety Data Sheet (compliant)

SECTION 5 — Reactivity Data

| | |
|--|--|
| Chemical Stability <i>Stable.</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? <i>Keep away from strong oxidizing agents</i> |
| Reactivity, and Under What Conditions? <i>N/AP</i> | |
| Hazardous Decomposition Products <i>None</i> | |

Case Study #7: Section 6 — Toxicological Properties

Manufacturer's Material Safety Data Sheet

| SECTION 5 — Health Hazard Data |
|---|
| The health effects noted below are consistent with requirements under the OSHA Hazard Communication Standard (29 CFR 1910.1200). |
| <p>Eye Contact: Liquid or vapour can irritate. Prolonged contact may lead to corneal damage.</p> <p>Skin Contact: Contact may dry the skin. Prolonged contact may cause irritation.</p> <p>Inhalation: High vapour/aerosol concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.</p> <p>Ingestion: Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death. Low order of toxicity.</p> |

MSDS Checklist (9-Section) Results

SECTION 6 — Toxicological Properties

| <input checked="" type="checkbox"/> Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
|--|---|
| <p><i>Note: The reference to OSHA standards is not required. Skin Absorption: Methanol has a SKIN designation from ACGIH; it can be absorbed through the skin contributing to the overall exposure. Ingestion: "Low order of toxicity" is incorrect. Ingestion of methanol may cause blindness and death. Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST, Provincial/Territorial OH&S Requirements.</i></p> | |
| <p><input checked="" type="checkbox"/> Effects of Acute Exposure to Product <i>Health effects resulting from short- term exposure (single exposure or multiple exposure within a short time, usually 24 hours) should be separated from chronic health effects.</i></p> | |
| <p><input checked="" type="checkbox"/> Effects of Chronic Exposure to Product <i>Health effects resulting from repeated exposure to the product over a relatively long period of time. Check with manufacturer. In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST.</i></p> | |
| <p><input checked="" type="checkbox"/> Exposure Limits (value, source, date) <i>Identify most current values. Use exposure limits for the ingredients. Check ACGIH.</i></p> | <p><input checked="" type="checkbox"/> Irritancy (if yes, explained?)</p> |
| <p><input checked="" type="checkbox"/> Sensitization (if yes, explained?) <i>In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST, Patty's.</i></p> | <p><input checked="" type="checkbox"/> Carcinogenicity (if yes, explained?) <i>In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST.</i></p> |
| <p><input checked="" type="checkbox"/> Reproductive Toxicity (if yes, explained?) <i>In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST, Patty's.</i></p> | <p><input checked="" type="checkbox"/> Teratogenicity (if yes, explained?) <i>In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST, Patty's.</i></p> |
| <p><input checked="" type="checkbox"/> Mutagenicity (if yes, explained?) <i>In the absence of information from the manufacturer, check individual ingredients. Sources include: CCOHS (CHEMINFO), CSST.</i></p> | <p><input checked="" type="checkbox"/> Synergistic Products (if yes, explained?) <i>Check with manufacturer (Note Section 8 — First Aid Measures in this case study).</i></p> |

Revised Material Safety Data Sheet (compliant)

SECTION 6 — Toxicological Properties

| | |
|---|---|
| Routes of Entry | |
| <input checked="" type="checkbox"/> Skin Contact | <input checked="" type="checkbox"/> Skin Absorption |
| <input checked="" type="checkbox"/> Eye Contact | <input checked="" type="checkbox"/> Inhalation |
| <input checked="" type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product | |
| <p>Eye Contact: Liquid or vapour can irritate. Prolonged contact may lead to corneal damage.</p> <p>Skin Contact: Contact may dry the skin. Prolonged contact may cause irritation.</p> <p>Inhalation: High vapour/aerosol concentrations (greater than approximately 1000 ppm) are irritating to the eyes and the respiratory tract, may cause headaches, dizziness, anesthesia, drowsiness, unconsciousness, and other central nervous system effects, including death.</p> <p>Ingestion: Ingestion of methanol may cause blindness and death. Small amounts of this product aspirated into the respiratory system during ingestion or vomiting may cause mild to severe pulmonary injury, possibly progressing to death.</p> | |
| Effects of Chronic Exposure to Product | |
| <p>Long-term exposure may result in muscular weakness or "wrist-drop syndrome," a peripheral neuropathy, from n-hexane, and possible liver and kidney injuries.</p> | |
| Exposure Limits (value, source, date) n-hexane: 50 ppm (skin) ACGIH, TWA 2005 methanol: 200 ppm (skin) ACGIH, TWA 2005 ethanol: 1000 ppm ACGIH, TWA 2005 | Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Can be irritating to eyes, skin, and respiratory tract. |
| Sensitization (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Carcinogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Reproductive Toxicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No None known | Teratogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Mutagenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Synergistic Products (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Exposure to vapours of n-hexane and methyl ethyl ketone or methyl isobutyl ketone will increase the risk of the adverse health effects from n-hexane. |

Case Study #7: Section 7 — Preventive Measures

Manufacturer's Material Safety Data Sheet

| SECTION 6 — Control and Protective Measures |
|---|
| <p>Respiratory Protection: None under normal conditions of use. Avoid breathing vapours.</p> <p>Skin Protection: Where contact is likely, wear chemical-resistant/impermeable gloves.</p> <p>Eye Protection: Use of safety glasses with splash guards or full face shield is recommended.</p> <p>Ventilation: Sufficient to prevent inhalation of solvent vapours.</p> <p>Protective Clothing: None under normal use.</p> <p>Hygienic Work Practices: Eye washes and safety showers in the workplace are recommended.</p> |
| SECTION 7 — Precautions for Safe Handling and Storage |
| <p>Steps To Be Taken if Material is Spilled or Released: Avoid breathing vapours. Ventilate area. Dike area to contain spill. Remove all sources of ignition. Clean up area with absorbent material and place in closed containers for disposal.</p> <p>Waste Disposal Method: Dispose of in accordance with local, state, and federal regulations. Before attempting clean-up, refer to other sections of this MSDS for hazard caution information.</p> <p>Precautions To Be Taken in Handling Storage: Store and use in cool, dry, well-ventilated areas. Keep away from heat, sparks, and open flame. If entire contents are not used, replace cap and keep tightly closed. Use adequate ventilation.</p> |

MSDS Checklist (9-Section) Results

SECTION 7 — Preventive Measures

| | | | | | | |
|---|--|--|---|-----------------------------------|--|--------------------------------|
| Personal Protective Equipment | <input checked="" type="checkbox"/> Gloves | <input checked="" type="checkbox"/> Respirator | <input checked="" type="checkbox"/> Eye | <input type="checkbox"/> Footwear | <input checked="" type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> If any of above checked, type specified? <i>For Gloves and Eye protection, must specify type of PPE. For Respirator and Clothing, MSDS incorrectly indicates none required (Note Section 6 — Toxicological Properties indicates inhalation and skin contact/absorption are potential routes of entry). Check with manufacturer.</i> | | | | | | |
| <input checked="" type="checkbox"/> Engineering Controls (<i>specified, such as ventilation, enclosed process</i>) <i>Must specify the engineering controls to be used. Check with manufacturer.</i> | | | | | | |
| <input checked="" type="checkbox"/> Leak and Spill Procedure <i>Must specify how to avoid breathing vapours and the type of absorbent material to use. Check with manufacturer.</i> | | | | | | |
| <input checked="" type="checkbox"/> Waste Disposal | | | | | | |
| <input checked="" type="checkbox"/> Handling Procedures and Equipment <i>This product is classified as flammable; add information on grounding and bonding of containers when filling or emptying containers, and state no welding or flame-cutting containers. Check with manufacturer.</i> | | | | | | |
| <input checked="" type="checkbox"/> Storage Requirements | | | | | | |
| <input checked="" type="checkbox"/> Special Shipping Information <i>Must provide information on safe shipment of product. Reference should be made to the TDG Regulations. Sources include CANUTEC or TDG Regulations.</i> | | | | | <input checked="" type="checkbox"/> PIN | |

Revised Material Safety Data Sheet (compliant)

SECTION 7 — Preventive Measures

| | |
|---|--------------------|
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input checked="" type="checkbox"/> Clothing <input type="checkbox"/> Other | |
| If checked, specify type Respiratory Protection: Avoid breathing vapours. <i>Wear NIOSH-approved, supplied air respirator. (In confined spaces, use NIOSH-approved, self-contained breathing apparatus.)</i> Skin Protection: <i>Neoprene gloves.</i> Eye Protection: <i>Use of safety glasses with splash guards or full face shield is recommended.</i> Protective Clothing: <i>Rubber apron.</i> | |
| Engineering Controls (specify, such as ventilation, enclosed process) <i>Ventilation: Local exhaust ventilation (explosion-proof).</i> | |
| Leak and Spill Procedure <i>Steps to be taken if material is spilled or released: Emergency response personnel must wear NIOSH-approved, self-contained breathing apparatus and neoprene gloves. Ventilate area. Dike area to contain spill. Remove all sources of ignition including heat, sparks, and flames. Absorb with sand and place in a tightly sealed container for disposal.</i> | |
| Waste Disposal <i>Dispose of in accordance with local, state/provincial or territorial, and federal regulations. Before attempting clean-up, refer to other sections of this MSDS for hazard caution information.</i> | |
| Handling Procedures and Equipment <i>Store and use in cool, dry, well-ventilated areas. Ground and bond containers when filling or emptying to avoid electrical discharge. Do not weld or flame-cut the containers. Keep away from heat, sparks, and open flame.</i> | |
| Storage Requirements <i>If entire contents are not used, replace cap and keep tightly closed. Use adequate ventilation (local exhaust ventilation).</i> | |
| Special Shipping Information <i>Flammable liquids (NOS), UN1993, Class 3, Packing group I</i> | PIN 1993 |

Case Study #7: Section 8 — First Aid Measures

Manufacturer's Material Safety Data Sheet

| SECTION 8 — Emergency and First Aid Procedures |
|--|
| Eye Contact: Wash immediately with large volumes of fresh water. |
| Skin Contact: Flush with large amounts of water. Wash with soap. Remove grossly contaminated clothing, including shoes, and launder before reuse. |
| Inhalation: Remove to fresh air. Administer oxygen if needed. Apply artificial respiration if breathing has stopped. Keep at rest. Get immediate medical attention. |
| Ingestion: If swallowed, DO NOT induce vomiting. Keep at rest. If unconscious, do not give anything by mouth. Immediately contact a physician. |
| Health Effects: Simultaneous exposure to the vapours of n-hexane and methyl ethyl ketone or n-hexane and methyl isobutyl ketone above the recommended workplace limits increases the risk of adverse effects from n-hexane. |

MSDS Checklist (9-Section) Results

SECTION 8 — First Aid Measures

| |
|--|
| <input checked="" type="checkbox"/> Inhalation <i>Administration of oxygen should be performed only by a qualified person</i> |
| <input checked="" type="checkbox"/> Ingestion |
| <input checked="" type="checkbox"/> Skin Contact |
| <input checked="" type="checkbox"/> Eye Contact <i>Need to indicate time required to flush eyes</i> |
| <input checked="" type="checkbox"/> Synergistic effects should be in Section 6 — Toxicological Properties |

Revised Material Safety Data Sheet (compliant)

SECTION 8 — First Aid Measures

| |
|--|
| Inhalation <i>Remove to fresh air. Administer oxygen if needed. Administration of oxygen should be performed only by a qualified person. Apply artificial respiration if breathing has stopped. Keep at rest. Get immediate medical attention.</i> |
| Ingestion <i>If swallowed, DO NOT induce vomiting. Keep at rest. If unconscious, do not give anything by mouth. Immediately contact a physician.</i> |
| Skin Contact <i>Flush with large amounts of water. Wash with soap. Remove grossly contaminated clothing, including shoes, and launder before reuse.</i> |
| Eye Contact <i>Flush immediately with large amounts of water for at least 20 minutes. Immediately contact a physician.</i> |

Case Study #7: Section 9 — Preparation Information

Manufacturer's Material Safety Data Sheet

| |
|---|
| SECTION 9 — Regulatory Information |
| EPCRA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCE (EHS) |

MSDS Checklist (9-Section) Results

SECTION 9 — Preparation Information

| | |
|--|--|
| <input checked="" type="checkbox"/> Prepared by (<i>group, department, etc.</i>) | |
| <input checked="" type="checkbox"/> Telephone Number | <input checked="" type="checkbox"/> Preparation Date (<i>original date or date of last review</i>) |

Revised Material Safety Data Sheet (compliant)

SECTION 9 — Preparation Information

| | | |
|--|---|-------------------------------------|
| Prepared by (<i>group, department, etc.</i>) <i>A. Nother</i> | Telephone Number <i>(672) 222-1212</i> | Preparation Date <i>07/10/05</i> |
|--|---|-------------------------------------|

ADDITIONAL EXERCISE

Review a 9-Section MSDS

1. Use a photocopy of the blank MSDS Checklist (9-Section) that is in the back folder of this guide.
2. Using the checklist, review the following MSDS to determine if it meets Canadian WHMIS requirements.

MATERIAL SAFETY DATA SHEET

| Section 1: Product Information | | |
|---|-------------------|----------------------------------|
| Emergency Telephone: (604) 999-7777 | | |
| Product Name: | Super Wax Remover | |
| Date: | 02/12/05 | |
| Description of Use: | Wax stripper | |
| Small Manufacturing Company 39800 Clean Street Soapy Harbor, BC V1V 1V1 | | |
| Section 2: Hazardous Ingredients | | |
| Monoethanolamine | CAS #: 141-343-5 | > 10% |
| Ethylene glycol monobutyl ether | CAS #: 111-76-2 | > 10% |
| Ethylenediamine tetra-acetic acid, tetra sodium | CAS #: 64-02-8 | > 10% |
| NFPA Rating: Health 3; Fire 2; Reactivity 0 | | WHMIS Classification: B3, D2B, E |
| Section 3: Toxicological Information | | |
| Acute Effects of Overexposure: May irritate eyes and mucous membranes. Skin contact may produce irritation depending on length of contact time. Overexposure by inhalation may cause respiratory irritation. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders. | | |
| Chronic Effects of Overexposure: Repeated or prolonged exposure of skin can produce chronic dermatitis characterized by redness, scaling, and blistering. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. | | |
| Section 4: First Aid Procedures | | |
| Skin: Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops. | | |
| Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting upper and lower lids. Get medical attention at once. | | |
| Inhale: Move exposed person to fresh air. Get immediate medical attention. | | |
| Ingest: If swallowed, do not induce vomiting. If vomiting occurs, keep head below hip level. Immediately contact a physician. | | |

| Section 5: Physical Data | |
|---|---|
| Boiling Point: 100 deg C. | Freezing Point: -5 deg C. |
| Specific Gravity: | % Volatile: 1.013 |
| Appearance and Odour: Transparent and ammonia odour | |
| Vapour Density: | Physical State: Liquid |
| pH: Alkaline | Evaporation Rate: n/d |
| Vapour Pressure: | |
| Section 6: Preventative Measures | |
| Special Protection Information: | |
| Protective Clothing: Wear chemical-resistant gloves | Eye Protection: Recommended |
| Respiratory Protection: Recommended | Ventilation: Recommended |
| Spill and Disposal Procedures: Observe safety precautions in section 6 during cleanup. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal Method: Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Special Precautions: Do not breathe spray mists or vapours. Clothing or shoes that become contaminated with substance should be removed promptly and not reworn until thoroughly cleaned. Keep product away from skin and eyes. Keep out of reach of children. | |
| Section 7: Fire and Explosion Data | |
| Flashpoint: n/a | Conditions of Flammability: None |
| Autoignition Temperature: n/d | Flammable Limits: n/a |
| Hazardous Combustion Products: Carbon dioxide, carbon monoxide, and toxic/corrosive fumes as oxides of phosphorus | |
| Explosion Data: n/d | |
| Section 8: Reactivity Data | |
| Stability: Stable | Incompatibility: Strong acids and oxidizing agents |
| Section 9: Preparation Information | |
| Prepared By: Small Technical Department | Phone: (604) 999-8888 |

Answer:

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

MSDS CHECKLIST (9-SECTION)

SECTION 1 — Product Information

| | | | |
|--|---------------------------------------|---|---------------------------------------|
| <input checked="" type="checkbox"/> Product Identifier <i>Super Wax Remover</i> | | <input checked="" type="checkbox"/> [WHMIS Classification] <i>B3, D2B, E</i> | |
| <input checked="" type="checkbox"/> Product Use | | | |
| <input checked="" type="checkbox"/> Manufacturer's Name | | <input checked="" type="checkbox"/> Supplier's Name | |
| <input checked="" type="checkbox"/> Street Address | | <input checked="" type="checkbox"/> Street Address | |
| <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | | <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] | <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients <i>(specific chemical name for each)</i> | % | CAS Number | LD ₅₀ of Ingredient <i>(specify species and route)</i> | LC ₅₀ of Ingredient <i>(specify species)</i> |
|---|-------------------------------------|-------------------------------------|--|--|
| <input checked="" type="checkbox"/> <i>Monoethanolamine</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> <i>Monobutyl Ether</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> <i>Ethylene Glycol</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> <i>EDTA</i> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

SECTION 3 — Physical Data

| | | | |
|--|--|---|---|
| <input checked="" type="checkbox"/> Physical State | <input checked="" type="checkbox"/> Odour and Appearance | | <input checked="" type="checkbox"/> Odour Threshold (ppm) |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Vapour Density (air = 1) | <input checked="" type="checkbox"/> Vapour Pressure (mmHg) | <input checked="" type="checkbox"/> Evaporation Rate |
| <input checked="" type="checkbox"/> Boiling Point (°C) | <input checked="" type="checkbox"/> Freezing Point (°C) | <input checked="" type="checkbox"/> pH <i>Must specify value</i> | <input checked="" type="checkbox"/> Coefficient of Water/Oil Distribution |

Product Identifier: Super Wax Remover

SECTION 4 — Fire and Explosion Data

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Flammability | If yes, conditions identified? <i>Product is B3 (combustible). Conditions of flammability should be listed.</i> | |
| <input checked="" type="checkbox"/> Means of Extinction | | |
| <input checked="" type="checkbox"/> Flashpoint (°C) and Method | <input checked="" type="checkbox"/> Upper Flammable Limit (% by volume) | <input checked="" type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input checked="" type="checkbox"/> Autoignition Temperature (°C) | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Impact | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Static Discharge |
| <input checked="" type="checkbox"/> Hazardous Combustion Products | | |

SECTION 5 — Reactivity Data

| | |
|--|---|
| <input checked="" type="checkbox"/> Chemical Stability | If yes, conditions identified? |
| <input checked="" type="checkbox"/> Incompatibility with Other Substances | If yes, incompatible substances identified? |
| <input checked="" type="checkbox"/> Reactivity, and Under What Conditions? | |
| <input checked="" type="checkbox"/> Hazardous Decomposition Products | |

SECTION 6 — Toxicological Properties

| | | | | | |
|---|--|---|---|--|---|
| <input checked="" type="checkbox"/> Routes of Entry | <input checked="" type="checkbox"/> Skin Contact | <input checked="" type="checkbox"/> Skin Absorption | <input checked="" type="checkbox"/> Eye Contact | <input checked="" type="checkbox"/> Inhalation | <input checked="" type="checkbox"/> Ingestion |
| <input checked="" type="checkbox"/> Effects of Acute Exposure to Product <i>Product is Class E — Corrosive, yet no mention that it could cause burns</i> | | | | | |
| <input checked="" type="checkbox"/> Effects of Chronic Exposure to Product <i>Product is Class B3, D2B, and E, but no mention of toxic effects</i> | | | | | |
| <input checked="" type="checkbox"/> Exposure Limits (value, source, date) | | | <input checked="" type="checkbox"/> Irritancy (if yes, explained?) | | |
| <input checked="" type="checkbox"/> Sensitization (if yes, explained?) | | | <input checked="" type="checkbox"/> Carcinogenicity (if yes, explained?) | | |
| <input checked="" type="checkbox"/> Reproductive Toxicity (if yes, explained?) | | | <input checked="" type="checkbox"/> Teratogenicity (if yes, explained?) | | |
| <input checked="" type="checkbox"/> Mutagenicity (if yes, explained?) | | | <input checked="" type="checkbox"/> Synergistic Products (if yes, explained?) | | |

Product Identifier: Super Wax Remover

SECTION 7 — Preventive Measures

| | | | | | | |
|---|--|--|---|--|--|---|
| Personal Protective Equipment | <input checked="" type="checkbox"/> Gloves | <input checked="" type="checkbox"/> Respirator | <input checked="" type="checkbox"/> Eye | <input checked="" type="checkbox"/> Footwear | <input checked="" type="checkbox"/> Clothing | <input checked="" type="checkbox"/> Other |
| <input checked="" type="checkbox"/> If any of above checked, type specified? <i>Not specific</i> | | | | | | |
| <input checked="" type="checkbox"/> Engineering Controls (<i>specified, such as ventilation, enclosed process</i>) <i>Not specific</i> | | | | | | |
| <input checked="" type="checkbox"/> Leak and Spill Procedure | | | | | | |
| <input checked="" type="checkbox"/> Waste Disposal | | | | | | |
| <input checked="" type="checkbox"/> Handling Procedures and Equipment | | | | | | |
| <input checked="" type="checkbox"/> Storage Requirements | | | | | | |
| <input checked="" type="checkbox"/> Special Shipping Information | | | | | <input checked="" type="checkbox"/> PIN | |

SECTION 8 — First Aid Measures

| |
|--|
| <input checked="" type="checkbox"/> Inhalation |
| <input checked="" type="checkbox"/> Ingestion |
| <input checked="" type="checkbox"/> Skin Contact |
| <input checked="" type="checkbox"/> Eye Contact |

SECTION 9 — Preparation Information

| | |
|--|--|
| <input checked="" type="checkbox"/> Prepared by (<i>group, department, etc.</i>) | |
| <input checked="" type="checkbox"/> Telephone Number | <input checked="" type="checkbox"/> Preparation Date (<i>original date or date of last review</i>) |

Comments: Verify the classification with the manufacturer by obtaining missing information (such as %, flammability, and toxicological properties).

THE 16-SECTION MSDS

Basic Information

The following statements summarize the requirements for both 9- and 16-section MSDSs:

- The *CPR* specifies that an MSDS in Canada should contain nine sections. However, American and European MSDSs that have 16 sections instead of nine are also acceptable.
- Canada accepts the International Labour Organization, International Standards Organization or European Union 16-section MSDS.
- The 9-section headings must be similar to those specified in the *CPR*.
- The 16-section headings must be similar to those specified in the following acceptable standards:
 - American National Standards Institute (ANSI) Standard Z400.1-1998
 - European Economic Community (EEC) Directive 91/155/EEC and 93/112/EEC
 - International Standards Organization (ISO) 11014-1:1994(E)
- If the 16-heading format is used, state in the Regulatory Information section:
 - This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the MSDS contains all of the information required by the *CPR*.
- If sections are combined, the section heading must clearly indicate that both *CPR* sections are included, and the sections must have some commonality. For example,
 - “Health Hazards and First Aid Measures” **but not**
 - “*First Aid Measures and Fire and Explosion Data*”
- The 16-section format is only acceptable if **all information items are included**, if available. A 16-section MSDS with the required items highlighted follows this page. A description of the information items can be found on pages 58–72). Suppliers can use the [MSDS Checklist \(16-Section\)](#) to review a 16-section MSDS and ensure it contains all required information. See the back folder of this guide for a blank MSDS Checklist (16-Section).

16-Section MSDS with Information Items Highlighted

MATERIAL SAFETY DATA SHEET — 16 SECTIONS

SECTION 1 — Chemical Product and Company Identification

| | | | |
|----------------------------|--------------------------|------------------------|---------------------|
| Product Identifier [1] | | [WHMIS Classification] | |
| Product Use [2] | | | |
| Manufacturer's Name [3] | | Supplier's Name [4] | |
| Street Address | | Street Address | |
| City | Province | City | Province |
| Postal Code | Emergency Telephone | Postal Code | Emergency Telephone |
| Date MSDS Prepared [53] | MSDS Prepared by [54] | Phone Number | |

SECTION 2 — Composition/Information on Ingredients

| Hazardous Ingredients (specific) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|-------------------------------------|-----|------------|---|---|
| [5] | [6] | [7] | [8] | [9] |
| | | | | |
| | | | | |

SECTION 3 — Hazards Identification

| | | | | | |
|----------------------------|---------------------------------------|--|--------------------------------------|-------------------------------------|------------------------------------|
| Routes of Entry [34] | <input type="checkbox"/> Skin Contact | <input type="checkbox"/> Skin Absorption | <input type="checkbox"/> Eye Contact | <input type="checkbox"/> Inhalation | <input type="checkbox"/> Ingestion |
| [Emergency Overview] | | | | | |
| [WHMIS Symbols] | | | | | |
| [Potential Health Effects] | | | | | |

SECTION 4 — First Aid Measures

| |
|----------------------|
| Skin Contact [52] |
| Eye Contact [52] |
| Inhalation [52] |
| Ingestion [52] |

Product Identifier:

SECTION 5 — Firefighting Measures

| | | |
|---|--|--|
| Flammability [21] <input type="checkbox"/> Yes <input type="checkbox"/> No | If yes, under which conditions? | |
| Means of Extinction [22] | | |
| Flashpoint (°C) and Method [23] | Upper Flammable Limit (% by volume) [24] | Lower Flammable Limit (% by volume) [25] |
| Autoignition Temperature (°C) [26] | Explosion Data — Sensitivity to Impact [28] | Explosion Data — Sensitivity to Static Discharge [29] |
| Hazardous Combustion Products [27] | | |
| [NFPA] | | |

SECTION 6 — Accidental Release Measures

| |
|-----------------------------------|
| Leak and Spill Procedures [47] |
|-----------------------------------|

SECTION 7 — Handling and Storage

| |
|---|
| Handling Procedures and Equipment [49] |
| Storage Requirements [50] |

SECTION 8 — Exposure Control/Personal Protection

| |
|---|
| Exposure Limits [37] <input type="checkbox"/> ACGIH TLV <input type="checkbox"/> OSHA PEL <input type="checkbox"/> Other (specify) |
| Specific Engineering Controls (such as ventilation, enclosed process) [46] |
| Personal Protective Equipment [45] <input type="checkbox"/> Gloves <input type="checkbox"/> Respirator <input type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other |
| If checked, specify type |

Product Identifier:

SECTION 9 — Physical and Chemical Properties

| | | |
|--------------------------|---|--------------------------------|
| Physical State [10] | Odour and Appearance [11] | Odour Threshold (ppm) [12] |
| Specific Gravity [13] | Vapour Density (air = 1) [14] | Vapour Pressure (mmHg) [15] |
| Evaporation Rate [16] | Boiling Point (°C) [17] | Freezing Point (°C) [18] |
| pH [19] | Coefficient of Water/Oil Distribution [20] | [Solubility in Water] |

SECTION 10 — Stability and Reactivity

| | |
|--|--------------------------------|
| Chemical Stability [30] <input type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances [31] <input type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? |
| Reactivity, and Under What Conditions? [32] | |
| Hazardous Decomposition Products [33] | |

SECTION 11 — Toxicological Information

| | |
|--|-----------------------------------|
| Effects of Acute Exposure [35] | |
| Effects of Chronic Exposure [36] | |
| Irritancy of Product [38] | |
| Skin Sensitization [39] | Respiratory Sensitization [39] |
| Carcinogenicity — IARC [40] | Carcinogenicity — ACGIH [40] |
| Reproductive Toxicity [41] | Teratogenicity [42] |
| Embryotoxicity [42] | Mutagenicity [43] |
| Name of Synergistic Products/Effects [44] | |

Product Identifier:

SECTION 12 — Ecological Information

| |
|--------------------|
| [Aquatic Toxicity] |
|--------------------|

SECTION 13 — Disposal Considerations

| |
|------------------------|
| Waste Disposal [48] |
|------------------------|

SECTION 14 — Transport Information

| | |
|--------------------------------------|--------|
| Special Shipping Information [51] | PIN |
| TDG | [DOT] |
| [IMO] | [ICAO] |

SECTION 15 — Regulatory Information

| | |
|------------------------|--------|
| [WHMIS Classification] | [OSHA] |
| [SERA] | [TSCA] |

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the MSDS contains all of the information required by the *CPR*.

SECTION 16 — Other Information

| |
|--|
| |
|--|

REVIEWING A 16-SECTION MSDS

To prepare a compliant MSDS, suppliers should start with the manufacturer's MSDS. To ensure that the manufacturer's MSDS complies with the *HPA* and *CPR*, suppliers need to review the MSDS to make sure all information items are present as required.

Suppliers can use the [MSDS Checklist \(16-Section\)](#) to identify missing or incorrect information. See below for a sample blank MSDS Checklist (16-Section).

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

MSDS Checklist (16-Section)

SECTION 1 — Chemical Product and Company Identification

| | | | |
|--|---|--|---------------------------------------|
| <input type="checkbox"/> Product Identifier | | <input type="checkbox"/> [WHMIS Classification] | |
| <input type="checkbox"/> Product Use | | | |
| <input type="checkbox"/> Manufacturer's Name | | <input type="checkbox"/> Supplier's Name | |
| <input type="checkbox"/> Street Address | | <input type="checkbox"/> Street Address | |
| <input type="checkbox"/> City, Province/State, Postal/Zip Code | | <input type="checkbox"/> City, Province/State, Postal/Zip Code | |
| <input type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] | <input type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |
| <input type="checkbox"/> Date MSDS Prepared | <input type="checkbox"/> MSDS Prepared by | <input type="checkbox"/> Phone Number | |

SECTION 2 — Composition/Information on Ingredients

| Hazardous Ingredients <i>(specific chemical name for each)</i> | % | CAS Number | LD ₅₀ of Ingredient <i>(specify species and route)</i> | LC ₅₀ of Ingredient <i>(specify species)</i> |
|---|--------------------------|--------------------------|--|--|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

SECTION 3 — Hazards Identification

| |
|---|
| Routes of Entry <input type="checkbox"/> Skin Contact <input type="checkbox"/> Skin Absorption <input type="checkbox"/> Eye Contact <input type="checkbox"/> Inhalation <input type="checkbox"/> Ingestion |
| <input type="checkbox"/> [Emergency Overview] |
| <input type="checkbox"/> [WHMIS Symbols] |
| <input type="checkbox"/> [Potential Health Effects] |

Product Identifier:

SECTION 4 — First Aid Measures

| |
|---------------------------------------|
| <input type="checkbox"/> Skin Contact |
| <input type="checkbox"/> Eye Contact |
| <input type="checkbox"/> Inhalation |
| <input type="checkbox"/> Ingestion |

SECTION 5 — Firefighting Measures

| | | |
|---|---|---|
| <input type="checkbox"/> Flammability <input type="checkbox"/> Yes <input type="checkbox"/> No | If yes, conditions identified? | |
| <input type="checkbox"/> Means of Extinction | | |
| <input type="checkbox"/> Flashpoint (°C) and Method | <input type="checkbox"/> Upper Flammable Limit (% by volume) | <input type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input type="checkbox"/> Autoignition Temperature (°C) | <input type="checkbox"/> Explosion Data — Sensitivity to Impact | <input type="checkbox"/> Explosion Data — Sensitivity to Static Discharge |
| <input type="checkbox"/> Hazardous Combustion Products | | |
| <input type="checkbox"/> [NFPA] | | |

SECTION 6 — Accidental Release Measures

| |
|--|
| <input type="checkbox"/> Leak and Spill Procedures |
|--|

SECTION 7 — Handling and Storage

| |
|--|
| <input type="checkbox"/> Handling Procedures and Equipment |
| <input type="checkbox"/> Storage Requirements |

Product Identifier:

SECTION 8 — Exposure Control/Personal Protection

| | | | | | | |
|---|------------------------------------|-------------------------------------|---|-----------------------------------|-----------------------------------|--------------------------------|
| Exposure Limits | <input type="checkbox"/> ACGIH TLV | <input type="checkbox"/> OSHA PEL | <input type="checkbox"/> Other (<i>specify</i>) | | | |
| <input type="checkbox"/> Specific Engineering Controls (<i>such as ventilation, enclosed process</i>) | | | | | | |
| Personal Protective Equipment | <input type="checkbox"/> Gloves | <input type="checkbox"/> Respirator | <input type="checkbox"/> Eye | <input type="checkbox"/> Footwear | <input type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| <input type="checkbox"/> If checked, type specified? | | | | | | |

SECTION 9 — Physical and Chemical Properties

| | | |
|---|--|---|
| <input type="checkbox"/> Physical State | <input type="checkbox"/> Odour and Appearance | <input type="checkbox"/> Odour Threshold (ppm) |
| <input type="checkbox"/> Specific Gravity | <input type="checkbox"/> Vapour Density (air = 1) | <input type="checkbox"/> Vapour Pressure (mmHg) |
| <input type="checkbox"/> Evaporation Rate | <input type="checkbox"/> Boiling Point (°C) | <input type="checkbox"/> Freezing Point (°C) |
| <input type="checkbox"/> pH | <input type="checkbox"/> Coefficient of Water/Oil Distribution | <input type="checkbox"/> [Solubility in Water] |

SECTION 10 — Stability and Reactivity

| | |
|--|--|
| <input type="checkbox"/> Chemical Stability <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> If no, conditions identified? |
| <input type="checkbox"/> Incompatibility with Other Substances <input type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> If yes, incompatible substances identified? |
| <input type="checkbox"/> Reactivity, and Under What Conditions? | |
| <input type="checkbox"/> Hazardous Decomposition Products | |

Product Identifier:

SECTION 11 — Toxicological Information

| | |
|---|--|
| <input type="checkbox"/> Effects of Acute Exposure | |
| <input type="checkbox"/> Effects of Chronic Exposure | |
| <input type="checkbox"/> Irritancy of Product | |
| <input type="checkbox"/> Skin Sensitization <i>(if yes, explained?)</i> | <input type="checkbox"/> Respiratory Sensitization <i>(if yes, explained?)</i> |
| <input type="checkbox"/> Carcinogenicity — IARC <i>(if yes, explained?)</i> | <input type="checkbox"/> Carcinogenicity — ACGIH <i>(if yes, explained?)</i> |
| <input type="checkbox"/> Reproductive Toxicity <i>(if yes, explained?)</i> | <input type="checkbox"/> Teratogenicity <i>(if yes, explained?)</i> |
| <input type="checkbox"/> Embryotoxicity <i>(if yes, explained?)</i> | <input type="checkbox"/> Mutagenicity <i>(if yes, explained?)</i> |
| Name of Synergistic Products/Effects | |

SECTION 12 — Ecological Information

| |
|---|
| <input type="checkbox"/> [Aquatic Toxicity] |
|---|

SECTION 13 — Disposal Considerations

| |
|---|
| <input type="checkbox"/> Waste Disposal |
|---|

SECTION 14 — Transport Information

| | |
|---|---------------------------------|
| <input type="checkbox"/> Special Shipping Information | <input type="checkbox"/> PIN |
| <input type="checkbox"/> TDG | <input type="checkbox"/> [DOT] |
| <input type="checkbox"/> [IMO] | <input type="checkbox"/> [ICAO] |

Product Identifier:

SECTION 15 — Regulatory Information

| | |
|---|---------------------------------|
| <input type="checkbox"/> [WHMIS Classification] | <input type="checkbox"/> [OSHA] |
| <input type="checkbox"/> [SERA] | <input type="checkbox"/> [TSCA] |

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the MSDS contains all of the information required by the *CPR*.

SECTION 16 — Other Information

| |
|--|
| |
|--|

Completed by:

Date:

COMPARISON OF 16-SECTION AND 9-SECTION FORMATS

| 16-Section MSDS (ANSI, EEC, ISO) | 9-Section MSDS (Canada) |
|--|--|
| 1. Chemical Product and Company Identification (Note: ISO — Product and Company Identification) | 1. Product Information 9. Preparation Information |
| 2. Composition/Information on Ingredients | 2. Hazardous Ingredients |
| 3. Hazards Identification | 6. Toxicological Properties |
| 4. First Aid Measures | 8. First Aid Measures |
| 5. Firefighting Measures | 4. Fire and Explosion Data |
| 6. Accidental Release Measures | 7. Preventive Measures |
| 7. Handling and Storage | 7. Preventive Measures |
| 8. Exposure Controls/Personal Protection | 6. Toxicological Properties 7. Preventive Measures |
| 13. Disposal Considerations | 7. Preventive Measures |
| 9. Physical and Chemical Properties | 3. Physical Data |
| 10. Stability and Reactivity | 5. Reactivity Data |
| 11. Toxicological Information | 6. Toxicological Properties |
| 12. Ecological Information | Not required under WHMIS |
| 14. Transport Information | 7. Preventive Measures (Not all of the information in the 16-section MSDS is required/available under WHMIS) |
| 15. Regulatory Information | 2. Product Information (Not all of the information in the 16-section is required/available under WHMIS) |
| 16. Other Information | Not required under WHMIS |

CASE STUDY #8: CONVERTING A 9-SECTION MSDS TO A 16-SECTION MSDS

Suppliers who supply products to various countries may wish to prepare 16-section MSDSs.

The best approach is to start with a compliant 9-section MSDS, and reformat it into 16 sections. See Preparing a Compliant 9-Section MSDS, page 83, for details and a case study on preparing a compliant 9-section MSDS.

This case study will show how a compliant 9-section MSDS can be converted into a 16-section MSDS compliant in Canada and other countries. For each of the 16 MSDS sections, the case study will:

1. Show the compliant 9-section MSDS for Super Wax Remover

2. Show the section(s) of the compliant 9-section MSDS that contain corresponding information. (See previous page for comparison table).
3. Give the MSDS Checklist (16-Section) results, which should be used to double-check that all information required under the CPR is included.
4. Show 16-section MSDS.

Note that the MSDS Checklist (16-Section) indicates:

- = information present as required
- = information inaccurate or missing
- N/AP = information not applicable
- N/AV = information not available
- [] = optional information

COMPLIANT 9-SECTION MATERIAL SAFETY DATA SHEET

Product Identifier: Super Wax Remover

SECTION 1 — Product Information

| | | | |
|---|--|--|--|
| Product Identifier <i>Super Wax Remover</i> | | WHMIS Classification (optional) <i>B3, D2B, E</i> | |
| Product Use <i>Wax Stripper</i> | | | |
| Manufacturer's Name <i>Small Manufacturing Company</i> | | Supplier's Name <i>Albert's Cleaning Supplies</i> | |
| Street Address <i>39800 Clean Street</i> | | Street Address <i>5454 Mop Road</i> | |
| City <i>Soapy Harbour</i> | Province <i>BC</i> | City <i>Blue Sky</i> | Province <i>AB</i> |
| Postal Code <i>V1V 1V1</i> | Emergency Telephone <i>(604) 999-7777</i> | Postal Code <i>Y2Y 2Y2</i> | Emergency Telephone <i>(780) 888-4444</i> |

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients (specific) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|--|--------------|-----------------|---|---|
| <i>Monoethanolamine</i> | <i>10–20</i> | <i>141-43-5</i> | <i>1720 mg/kg (oral, rat)</i> | <i>N/AV</i> |
| <i>Ethylene glycol monobutyl ether</i> | <i>30–60</i> | <i>111-76-2</i> | <i>560 mg/kg (oral, rat)</i> | <i>486 ppm/4 hrs (rat)</i> |
| <i>Ethylenediamine tetra-acetic acid, tetra sodium</i> | <i>1–5</i> | <i>64-02-8</i> | <i>3030 mg/kg (oral, rat)</i> | <i>N/AV</i> |

Product Identifier: Super Wax Remover

SECTION 3 — Physical Data

| | | |
|---|---|--|
| Physical State <i>Liquid</i> | Odour and Appearance <i>Transparent; ammonia odour</i> | Odour Threshold (ppm) <i>N/AV</i> |
| Specific Gravity <i>1.013</i> | Vapour Density (air = 1) <i>4.07</i> | Vapour Pressure (mmHg) <i>0.67</i> |
| Boiling Point (°C) <i>100 deg. C</i> | Freezing Point (°C) <i>-5 deg. C</i> | pH <i>12.5–13.0</i> |
| | | Evaporation Rate <i>0.1 (n-butyl acetate = 1)</i> |
| | | Coefficient of Water/Oil Distribution <i>2.5</i> |

SECTION 4 — Fire and Explosion Data

| | | | |
|---|--|---|--|
| Flammability <i>Combustible</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, under which conditions? <i>Keep away from strong oxidizing agents, heat, sparks, and flames</i> | | |
| Means of Extinction <i>Carbon dioxide, fog, and foam</i> | | | |
| Flashpoint (°C) and Method <i>60 deg. C (closed cup)</i> | Upper Flammable Limit (% by volume) <i>10.6%</i> | Lower Flammable Limit (% by volume) <i>1.1%</i> | |
| Autoignition Temperature (°C) <i>244 deg. C</i> | Explosion Data — Sensitivity to Impact <i>None</i> | Explosion Data — Sensitivity to Static Discharge <i>N/AV</i> | |
| Hazardous Combustion Products <i>Carbon dioxide, carbon monoxide, and toxic/corrosive fumes as oxides of phosphorus</i> <i>NFPA: Health 3; Fire 2; Reactivity 0</i> | | | |

SECTION 5 — Reactivity Data

| | |
|--|---|
| Chemical Stability <i>Stable</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? <i>Strong acids and oxidizing agents</i> |
| Reactivity, and Under What Conditions? <i>None</i> | |
| Hazardous Decomposition Products <i>None</i> | |

SECTION 6 — Toxicological Properties (excerpt)

| | |
|--|--|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product <i>May cause burns to eyes and skin. Damage to respiratory tract. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.</i> | |
| Effects of Chronic Exposure to Product <i>Repeated or prolonged exposure of skin can cause burns. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. Potential for liver, kidney, or red blood cell damage.</i> | |
| Exposure Limits (value, source, date) <i>2005 ACGIH TLVs:</i> <i>Monoethanolamine: 3 ppm (TWA)</i> <i>Ethylene glycol monobutyl ether: 20 ppm, skin (TWA)</i> <i>Ethylenediamine tetra-acetic acid, tetra sodium: N/AV</i> | Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |



Product Identifier: Super Wax Remover

| | |
|---|--|
| Sensitization (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Carcinogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Reproductive Toxicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No None known | Teratogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No None known |
| Mutagenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No None known | Synergistic Products (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No None |

SECTION 7 — Preventive Measures

| | |
|---|-------------|
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other | |
| If checked, specify type Protective Gloves: Wear chemical-resistant gloves such as nitrile gloves Respiratory Protection: Wear NIOSH-approved respirator for organic vapour Eye Protection: Splash-proof safety goggles | |
| Engineering Controls (specify, such as ventilation, enclosed process) Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits. | |
| Leak and Spill Procedure Emergency personnel should wear NIOSH-approved organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Handling Procedures and Equipment Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. | |
| Storage Requirements Store in cool, dry, well-ventilated area, away from strong oxidizing agents. | |
| Special Shipping Information Transportation of Dangerous Goods (TDG) shipping name: Corrosive liquid NOS (monoethanolamine) Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive | PIN 1760 |

SECTION 8 — First Aid Measures

| |
|---|
| Inhalation Move exposed person to fresh air. Get immediate medical attention. |
| Ingestion If swallowed, DO NOT INDUCE VOMITING. Immediately contact a physician. |
| Skin Contact Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops. |
| Eye Contact Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower lids. Get medical attention at once. |

SECTION 9 — Preparation Information

| | | |
|---|------------------------------------|------------------------------|
| Prepared by (group, department, etc.) Mr. Albert | Telephone Number (780) 888-5555 | Preparation Date 04/22/05 |
|---|------------------------------------|------------------------------|

Case Study #8: Section 1 — Chemical Product and Company Identification

9-Section Material Safety Data Sheet (compliant)

SECTION 1 — Product Information

| | | | |
|---|--|--|--|
| Product Identifier <i>Super Wax Remover</i> | | WHMIS Classification (optional) <i>B3, D2B, E</i> | |
| Product Use <i>Wax Stripper</i> | | | |
| Manufacturer's Name <i>Small Manufacturing Company</i> | | Supplier's Name <i>Albert's Cleaning Supplies</i> | |
| Street Address <i>39800 Clean Street</i> | | Street Address <i>5454 Mop Road</i> | |
| City <i>Soapy Harbour</i> | Province <i>BC</i> | City <i>Blue Sky</i> | Province <i>AB</i> |
| Postal Code <i>V1V 1V1</i> | Emergency Telephone <i>(604) 999-7777</i> | Postal Code <i>Y2Y 2Y2</i> | Emergency Telephone <i>(780) 888-4444</i> |

SECTION 9 — Preparation Information

| | | |
|--|---|-------------------------------------|
| Prepared by (group, department, etc.) <i>Mr. Albert</i> | Telephone Number <i>(780) 888-5555</i> | Preparation Date <i>04/22/05</i> |
|--|---|-------------------------------------|

MSDS Checklist (16-Section) Results

SECTION 1 — Chemical Product and Company Identification

| | | | |
|---|--|---|--|
| <input checked="" type="checkbox"/> Product Identifier | | <input checked="" type="checkbox"/> [WHMIS Classification] | |
| <input checked="" type="checkbox"/> Product Use | | | |
| <input checked="" type="checkbox"/> Manufacturer's Name | | <input checked="" type="checkbox"/> Supplier's Name | |
| <input checked="" type="checkbox"/> Street Address | | <input checked="" type="checkbox"/> Street Address | |
| <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | | <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] <i>Not required</i> | <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] <i>Not required</i> |
| <input checked="" type="checkbox"/> Date MSDS Prepared | <input checked="" type="checkbox"/> MSDS Prepared by | <input checked="" type="checkbox"/> Phone Number | |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 1 — Chemical Product and Company Identification

| | | | |
|--|---|---|---|
| Product Identifier <i>Super Wax Remover</i> | | [WHMIS Classification] <i>B3, D2B, E</i> | |
| Product Use <i>Wax Stripper</i> | | | |
| Manufacturer's Name <i>Small Manufacturing Company</i> | | Supplier's Name <i>Albert's Cleaning Supplies</i> | |
| Street Address <i>39800 Clean Street</i> | | Street Address <i>5454 Map Road</i> | |
| City <i>Soapy Harbour</i> | Province <i>BC</i> | City <i>Blue Sky</i> | Province <i>AB</i> |
| Postal Code <i>V1V 1V1</i> | Emergency Telephone <i>(604) 999-7777</i> | Postal Code <i>Y2Y 2Y2</i> | Emergency Telephone <i>(780) 888-4444</i> |
| Date MSDS Prepared <i>04/22/05</i> | MSDS Prepared by <i>Mr. Albert</i> | Phone Number <i>(780) 888-5555</i> | |

Case Study #8: Section 2 — Composition and Information on Ingredients

9-Section Material Safety Data Sheet (compliant)

SECTION 2 — Hazardous Ingredients

| Hazardous Ingredients (specific) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|---|-------|------------|---|---|
| Monoethanolamine | 10–20 | 141-43-5 | 1720 mg/kg (oral, rat) | N/AV |
| Ethylene glycol monobutyl ether | 30–60 | 111-76-2 | 560 mg/kg (oral, rat) | 486 ppm/4 hrs (rat) |
| Ethylenediamine tetra- acetic acid, tetra sodium | 1–5 | 64-02-8 | 3030 mg/kg (oral, rat) | N/AV |

MSDS Checklist (16-Section) Results

SECTION 2 — Composition/Information on Ingredients

| Hazardous Ingredients (specific chemical name for each) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|---|-------------------------------------|-------------------------------------|---|---|
| <input checked="" type="checkbox"/> Monoethanolamine | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Ethylene glycol monobutyl ether | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Ethylenediamine tetra-acetic acid, tetra sodium | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 2 — Composition/Information on Ingredients

| Hazardous Ingredients (specific) | % | CAS Number | LD ₅₀ of Ingredient (specify species and route) | LC ₅₀ of Ingredient (specify species) |
|---|-------|------------|---|---|
| Monoethanolamine | 10–20 | 141-43-5 | 1720 mg/kg (oral, rat) | N/AV |
| Ethylene glycol monobutyl ether | 30–60 | 111-76-2 | 560 mg/kg (oral, rat) | 486 ppm/4 hrs (rat) |
| Ethylenediamine tetra- acetic acid, tetra sodium | 1–5 | 64-02-8 | 3030 mg/kg (oral, rat) | N/AV |

Case Study #8: Section 3 — Hazards Identification

9-Section Material Safety Data Sheet (compliant)

SECTION 6 — Toxicological Properties

| | |
|--|--|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product <i>May cause burns to eyes and skin. Damage to respiratory tract. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.</i> | |
| Effects of Chronic Exposure to Product <i>Repeated or prolonged exposure of skin can cause burns. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. Potential for liver, kidney, or red blood cell damage.</i> | |
| Exposure Limits (<i>value, source, date</i>) 2005 ACGIH TLVs: <i>Monoethanolamine: 3 ppm (TWA)</i> <i>Ethylene glycol monobutyl ether: 20 ppm, skin (TWA)</i> <i>Ethylenediamine tetra-acetic acid, tetra sodium: N/AV</i> | Irritancy (<i>if yes, explain</i>) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Sensitization (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Carcinogenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Reproductive Toxicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Teratogenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> |
| Mutagenicity (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Synergistic Products (<i>if yes, explain</i>) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None</i> |


MSDS Checklist (16-Section) Results

SECTION 3 — Hazards Identification

| | |
|--|--|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| <input checked="" type="checkbox"/> [Emergency Overview] <i>Not required under WHMIS</i> | |
| <input checked="" type="checkbox"/> [WHMIS Symbols] | |
| <input checked="" type="checkbox"/> [Potential Health Effects] <i>Not required under WHMIS</i> | |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 3 — Hazards Identification

| | |
|--|--|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| [Emergency Overview] <i>Combustible, corrosive</i> | |
| [WHMIS Symbols]  | |
| [Potential Health Effects] <i>May cause burns to eyes, skin, and respiratory tract</i> | |

Case Study #8: Section 4 — First Aid Measures

9-Section Material Safety Data Sheet (compliant)

SECTION 8 — First Aid Measures

| |
|--|
| Inhalation <i>Move exposed person to fresh air. Get immediate medical attention.</i> |
| Ingestion <i>If swallowed, DO NOT INDUCE VOMITING. Immediately contact a physician.</i> |
| Skin Contact <i>Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops.</i> |
| Eye Contact <i>Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower lids. Get medical attention at once.</i> |

MSDS Checklist (16-Section) Results

SECTION 4 — First Aid Measures

| |
|--|
| <input checked="" type="checkbox"/> Skin Contact |
| <input checked="" type="checkbox"/> Eye Contact |
| <input checked="" type="checkbox"/> Inhalation |
| <input checked="" type="checkbox"/> Ingestion |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 4 — First Aid Measures

| |
|--|
| Skin Contact <i>Immediately flush contaminated skin with plenty of water for at least 15 minutes. Get medical attention if irritation develops.</i> |
| Eye Contact <i>Immediately flush eyes with plenty of water for at least 15 minutes, lifting upper and lower lids. Get medical attention at once.</i> |
| Inhalation <i>Move exposed person to fresh air. Get immediate medical attention.</i> |
| Ingestion <i>If swallowed, DO NOT INDUCE VOMITING. Immediately contact a physician.</i> |

Case Study #8: Section 5 — Firefighting Measures

9-Section Material Safety Data Sheet (compliant)

SECTION 4 — Fire and Explosion Data

| | | |
|---|--|---|
| Flammability <i>Combustible</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, under which conditions? <i>Keep away from strong oxidizing agents, heat, sparks, and flames</i> | |
| Means of Extinction <i>Carbon dioxide, fog, and foam</i> | | |
| Flashpoint (°C) and Method <i>60 deg. C (closed cup)</i> | Upper Flammable Limit (% by volume) <i>10.6%</i> | Lower Flammable Limit (% by volume) <i>1.1%</i> |
| Autoignition Temperature (°C) <i>244 deg. C</i> | Explosion Data — Sensitivity to Impact <i>None</i> | Explosion Data — Sensitivity to Static Discharge <i>N/AV</i> |
| Hazardous Combustion Products <i>Carbon dioxide, carbon monoxide, and toxic/corrosive fumes as oxides of phosphorus</i> <i>NFPA: Health 3; Fire 2; Reactivity 0</i> | | |

MSDS Checklist (16-Section) Results

SECTION 5 — Firefighting Measures

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Flammability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> If yes, conditions identified? | |
| <input checked="" type="checkbox"/> Means of Extinction | | |
| <input checked="" type="checkbox"/> Flashpoint (°C) and Method | <input checked="" type="checkbox"/> Upper Flammable Limit (% by volume) | <input checked="" type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input checked="" type="checkbox"/> Autoignition Temperature (°C) | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Impact | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Static Discharge |
| <input checked="" type="checkbox"/> Hazardous Combustion Products | | |
| <input checked="" type="checkbox"/> [NFPA] | | |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 5 — Firefighting Measures

| | | |
|--|--|---|
| Flammability <i>Combustible</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, under which conditions? <i>Keep away from strong oxidizing agents, heat, sparks, and flames</i> | |
| Means of Extinction <i>Carbon dioxide, fog, and foam</i> | | |
| Flashpoint (°C) and Method <i>60° C (closed-cup)</i> | Upper Flammable Limit (% by volume) <i>10.6%</i> | Lower Flammable Limit (% by volume) <i>1.1%</i> |
| Autoignition Temperature (°C) <i>244° C</i> | Explosion Data — Sensitivity to Impact <i>None</i> | Explosion Data — Sensitivity to Static Discharge <i>N/AV</i> |
| Hazardous Combustion Products <i>Carbon dioxide, carbon monoxide, and toxic/corrosive fumes as oxides of phosphorus</i> | | |
| [NFPA] <i>Health 3; Fire 2; Reactivity 0</i> | | |

Case Study #8: Section 6 — Accidental Release Measures

9-Section Material Safety Data Sheet (compliant)

SECTION 7 — Preventive Measures

| | |
|--|--------------------|
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other | |
| If checked, specify type Protective Gloves: Wear chemical-resistant gloves such as nitrile gloves Respiratory Protection: Wear NIOSH-approved respirator for organic vapour Eye Protection: Splash-proof safety goggles | |
| Engineering Controls (specify, such as ventilation, enclosed process) Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits. | |
| Leak and Spill Procedure Emergency personnel should wear NIOSH-approved organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Handling Procedures and Equipment Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. | |
| Storage Requirements Store in cool, dry, well-ventilated area, away from strong oxidizing agents. | |
| Special Shipping Information Transportation of Dangerous Goods (TDG) shipping name: Corrosive liquid NOS (monoethanolamine) Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive | PIN 1760 |

MSDS Checklist (16-Section) Results

SECTION 6 — Accidental Release Measures

| |
|---|
| <input checked="" type="checkbox"/> Leak and Spill Procedures |
|---|

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 6 — Accidental Release Measures

| |
|---|
| Leak and Spill Procedures Emergency personnel should wear NIOSH-approved, organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. |
|---|

Case Study #8: Section 7 — Handling and Storage

9-Section Material Safety Data Sheet (compliant)

SECTION 7 — Preventive Measures

| | |
|--|--|
| Personal Protective Equipment | |
| <input checked="" type="checkbox"/> Gloves | <input checked="" type="checkbox"/> Respirator |
| <input checked="" type="checkbox"/> Eye | <input type="checkbox"/> Footwear |
| <input type="checkbox"/> Clothing | <input type="checkbox"/> Other |
| If checked, specify type | |
| Protective Gloves: Wear chemical-resistant gloves such as nitrile gloves | |
| Respiratory Protection: Wear NIOSH-approved respirator for organic vapour | |
| Eye Protection: Splash-proof safety goggles | |
| Engineering Controls (specify, such as ventilation, enclosed process) | |
| Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits. | |
| Leak and Spill Procedure | |
| Emergency personnel should wear NIOSH-approved organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal | |
| Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Handling Procedures and Equipment | |
| Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. | |
| Storage Requirements | |
| Store in cool, dry, well-ventilated area, away from strong oxidizing agents. | |
| Special Shipping Information | PIN |
| Transportation of Dangerous Goods (TDG) shipping name: | 1760 |
| Corrosive liquid NOS (monoethanolamine) | |
| Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive | |

MSDS Checklist (16-Section) Results

SECTION 7 — Handling and Storage

| |
|---|
| <input checked="" type="checkbox"/> Handling Procedures and Equipment |
| <input checked="" type="checkbox"/> Storage Requirements |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 7 — Handling and Storage

| |
|--|
| Handling Procedures and Equipment |
| Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. |
| Storage Requirements |
| Store in cool, dry, well-ventilated area, away from strong oxidizing agents. |

Case Study #8: Section 8 — Exposure Controls/Personal Protection

9-Section Material Safety Data Sheet (compliant)

SECTION 6 — Toxicological Properties (excerpt)

| | |
|--|---|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product <i>May cause burns to eyes and skin. Damage to respiratory tract. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.</i> | |
| Effects of Chronic Exposure to Product <i>Repeated or prolonged exposure of skin can cause burns. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. Potential for liver, kidney, or red blood cell damage.</i> | |
| Exposure Limits (value, source, date) 2005 ACGIH TLVs: <i>Monoethanolamine: 3 ppm (TWA)</i> <i>Ethylene glycol monobutyl ether: 20 ppm, skin (TWA)</i> <i>Ethylenediamine tetra-acetic acid, tetra sodium: N/AV</i> | Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Sensitization (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Carcinogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Reproductive Toxicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Teratogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> |
| Mutagenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Synergistic Products (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None</i> |

SECTION 7 — Preventive Measures

| |
|--|
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other |
| If checked, specify type Protective Gloves: <i>Wear chemical-resistant gloves such as nitrile gloves</i> Respiratory Protection: <i>Wear NIOSH-approved respirator for organic vapour</i> Eye Protection: <i>Splash-proof safety goggles</i> |
| Engineering Controls (specify, such as ventilation, enclosed process) <i>Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits.</i> |
| Leak and Spill Procedure <i>Emergency personnel should wear NIOSH-approved, organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution.</i> |
| Waste Disposal <i>Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers.</i> |
| Handling Procedures and Equipment <i>Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container.</i> |

| | |
|---|--------------------|
| Storage Requirements <i>Store in cool, dry, well-ventilated area, away from strong oxidizing agents.</i> | |
| Special Shipping Information <i>Transportation of Dangerous Goods (TDG) shipping name:</i> <i>Corrosive liquid NOS (monoethanolamine)</i> <i>Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive</i> | PIN 1760 |

MSDS Checklist (16-Section) Results

SECTION 8 — Exposure Control/Personal Protection

| |
|--|
| Exposure Limits <input checked="" type="checkbox"/> ACGIH TLV <input type="checkbox"/> OSHA PEL <input type="checkbox"/> Other (specify) |
| <input checked="" type="checkbox"/> Specific Engineering Controls (such as ventilation, enclosed process) |
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other |
| <input checked="" type="checkbox"/> If checked, type specified? |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 8 — Exposure Control/Personal Protection

| |
|--|
| Exposure Limits <i>Monoethanolamine: 3 ppm (TWA)</i> <input checked="" type="checkbox"/> ACGIH TLV <input type="checkbox"/> OSHA PEL <input type="checkbox"/> Other (specify) <i>Ethylene glycol monobutyl ether: 20 ppm, skin (TWA)</i> 2005 <i>Ethylenediamine tetra-acetic acid, tetra sodium: N/AV</i> |
| Specific Engineering Controls (such as ventilation, enclosed process) <i>Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits</i> |
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other |
| If checked, specify type? Protective Gloves: <i>Wear chemical-resistant gloves such as nitrile gloves</i> Respiratory Protection: <i>Wear NIOSH-approved respirator for organic vapour</i> Eye Protection: <i>Splash-proof safety goggles</i> |

Case Study #8: Section 9 — Physical and Chemical Properties

9-Section Material Safety Data Sheet (compliant)

SECTION 3 — Physical Data

| | | |
|--|---|---|
| Physical State <i>Liquid</i> | Odour and Appearance <i>Transparent; ammonia odour</i> | Odour Threshold (ppm) <i>N/AV</i> |
| Specific Gravity <i>1.013</i> | Vapour Density (air = 1) <i>4.07</i> | Vapour Pressure (mmHg) <i>0.67</i> |
| Evaporation Rate <i>0.1 (n-butyl acetate = 1)</i> | Boiling Point (°C) <i>100 deg. C</i> | Freezing Point (°C) <i>-5 deg. C</i> |
| pH <i>12.5–13.0</i> | Coefficient of Water/Oil Distribution <i>2.5</i> | [Solubility in Water] <i>N/AV</i> |

MSDS Checklist (16-Section) Results

SECTION 9 — Physical and Chemical Properties

| | | |
|--|---|---|
| <input checked="" type="checkbox"/> Physical State | <input checked="" type="checkbox"/> Odour and Appearance | <input checked="" type="checkbox"/> Odour Threshold (ppm) |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Vapour Density (air = 1) | <input checked="" type="checkbox"/> Vapour Pressure (mmHg) |
| <input checked="" type="checkbox"/> Evaporation Rate | <input checked="" type="checkbox"/> Boiling Point (°C) | <input checked="" type="checkbox"/> Freezing Point (°C) |
| <input checked="" type="checkbox"/> pH | <input checked="" type="checkbox"/> Coefficient of Water/Oil Distribution | <input type="checkbox"/> [Solubility in Water] <i>Not required</i> |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 9 — Physical and Chemical Properties

| | | |
|--|---|---|
| Physical State <i>Liquid</i> | Odour and Appearance <i>Transparent; ammonia odour</i> | Odour Threshold (ppm) <i>N/AV</i> |
| Specific Gravity <i>1.013</i> | Vapour Density (air = 1) <i>4.07</i> | Vapour Pressure (mmHg) <i>0.67</i> |
| Evaporation Rate <i>0.1 (n-butyl acetate = 1)</i> | Boiling Point (°C) <i>100 deg. C</i> | Freezing Point (°C) <i>-5 deg. C</i> |
| pH <i>12.5–13.0</i> | Coefficient of Water/Oil Distribution <i>2.5</i> | [Solubility in Water] <i>N/AV</i> |

Case Study #8: Section 10 — Stability and Reactivity

9-Section Material Safety Data Sheet (compliant)

SECTION 5 — Reactivity Data

| | |
|--|---|
| Chemical Stability <i>Stable</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? <i>Strong acids and oxidizing agents</i> |
| Reactivity, and Under What Conditions? <i>None</i> | |
| Hazardous Decomposition Products <i>None</i> | |

MSDS Checklist (16-Section) Results

SECTION 10 — Stability and Reactivity

| | |
|--|---|
| <input checked="" type="checkbox"/> Chemical Stability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input type="checkbox"/> If no, conditions identified? |
| <input checked="" type="checkbox"/> Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> If yes, incompatible substances identified? |
| <input checked="" type="checkbox"/> Reactivity, and Under What Conditions? | |
| <input checked="" type="checkbox"/> Hazardous Decomposition Products | |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 10 — Stability and Reactivity

| | |
|--|---|
| Chemical Stability <i>Stable</i> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If no, under which conditions? |
| Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | If yes, which ones? <i>Strong acids and oxidizing agents</i> |
| Reactivity, and Under What Conditions? <i>None</i> | |
| Hazardous Decomposition Products <i>None</i> | |

Case Study #8: Section 11 — Toxicological Information

9-Section Material Safety Data Sheet (compliant)

SECTION 6 — Toxicological Properties

| | |
|--|---|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion | |
| Effects of Acute Exposure to Product <i>May cause burns to eyes and skin. Damage to respiratory tract. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.</i> | |
| Effects of Chronic Exposure to Product <i>Repeated or prolonged exposure of skin can cause burns. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. Potential for liver, kidney, or red blood cell damage.</i> | |
| Exposure Limits (value, source, date) 2005 ACGIH TLVs: Monoethanolamine: 3 ppm (TWA) Ethylene glycol monobutyl ether: 20 ppm, skin (TWA) Ethylenediamine tetra-acetic acid, tetra sodium: N/AV | Irritancy (if yes, explain) <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Sensitization (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No | Carcinogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| Reproductive Toxicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Teratogenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> |
| Mutagenicity (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None known</i> | Synergistic Products (if yes, explain) <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <i>None</i> |

MSDS Checklist (16-Section) Results

SECTION 11 — Toxicological Information

| | |
|---|--|
| <input checked="" type="checkbox"/> Effects of Acute Exposure | |
| <input checked="" type="checkbox"/> Effects of Chronic Exposure | |
| <input checked="" type="checkbox"/> Irritancy of Product | |
| <input checked="" type="checkbox"/> Skin Sensitization (if yes, explained?) | <input checked="" type="checkbox"/> Respiratory Sensitization (if yes, explained?) |
| <input checked="" type="checkbox"/> Carcinogenicity — IARC (if yes, explained?) | <input checked="" type="checkbox"/> Carcinogenicity — ACGIH (if yes, explained?) |
| <input checked="" type="checkbox"/> Reproductive Toxicity (if yes, explained?) | <input checked="" type="checkbox"/> Teratogenicity (if yes, explained?) |
| <input checked="" type="checkbox"/> Embryotoxicity (if yes, explained?) | <input checked="" type="checkbox"/> Mutagenicity (if yes, explained?) |
| <input checked="" type="checkbox"/> Name of Synergistic Products/Effects | |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 11 — Toxicological Information

| | |
|--|---|
| Effects of Acute Exposure <i>May cause burns to eyes and skin. Damage to respiratory tract. Ingredients in this product may aggravate existing skin, eye, or respiratory disorders.</i> | |
| Effects of Chronic Exposure <i>Repeated or prolonged exposure of skin can cause burns. Repeated exposure to spray mists may lead to chronic eye inflammation, chronic respiratory tract irritation, or lung damage. Potential for liver, kidney, or red blood cell damage.</i> | |
| Irritancy of Product <i>Irritates respiratory tract</i> | |
| Skin Sensitization <i>No</i> | Respiratory Sensitization <i>No</i> |
| Carcinogenicity — IARC <i>No</i> | Carcinogenicity — ACGIH <i>No</i> |
| Reproductive Toxicity <i>None known</i> | Teratogenicity <i>None known</i> |
| Embryotoxicity <i>None known</i> | Mutagenicity <i>None known</i> |
| Name of Synergistic Products/Effects <i>None</i> | |

Case Study #8: Section 12 — Ecological Information

9-Section Material Safety Data Sheet (compliant)

Not required under WHMIS

MSDS Checklist (16-Section) Results

SECTION 12 — Ecological Information

[Aquatic Toxicity]

Not required under WHMIS

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 12 — Ecological Information

[Aquatic Toxicity]

Not available

Case Study #8: Section 13 — Disposal Considerations

9-Section Material Safety Data Sheet (compliant)

SECTION 7 — Preventive Measures

| | |
|--|------|
| Personal Protective Equipment | |
| <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other | |
| If checked, specify type | |
| Protective Gloves: Wear chemical-resistant gloves such as nitrile gloves Respiratory Protection: Wear NIOSH-approved respirator for organic vapour Eye Protection: Splash-proof safety goggles | |
| Engineering Controls (specify, such as ventilation, enclosed process) | |
| Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits. | |
| Leak and Spill Procedure | |
| Emergency personnel should wear NIOSH-approved organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal | |
| Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Handling Procedures and Equipment | |
| Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. | |
| Storage Requirements | |
| Store in cool, dry, well-ventilated area, away from strong oxidizing agents. | |
| Special Shipping Information | PIN |
| Transportation of Dangerous Goods (TDG) shipping name: | 1760 |
| Corrosive liquid NOS (monoethanolamine) | |
| Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive | |

MSDS Checklist (16-Section) Results

SECTION 13 — Disposal Considerations

| |
|--|
| <input checked="" type="checkbox"/> Waste Disposal |
|--|

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 13 — Disposal Considerations

| |
|---|
| Waste Disposal |
| Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. |

Case Study #8: Section 14 — Transport Information

9-Section Material Safety Data Sheet (compliant)

SECTION 7 — Preventive Measures

| | |
|---|-------------|
| Personal Protective Equipment <input checked="" type="checkbox"/> Gloves <input checked="" type="checkbox"/> Respirator <input checked="" type="checkbox"/> Eye <input type="checkbox"/> Footwear <input type="checkbox"/> Clothing <input type="checkbox"/> Other | |
| If checked, specify type Protective Gloves: Wear chemical-resistant gloves such as nitrile gloves Respiratory Protection: Wear NIOSH-approved respirator for organic vapour Eye Protection: Splash-proof safety goggles | |
| Engineering Controls (<i>specify, such as ventilation, enclosed process</i>) Use local exhaust ventilation (explosion-proof) to keep concentration of vapours below exposure limits. | |
| Leak and Spill Procedure Emergency personnel should wear NIOSH-approved organic vapour respirator, nitrile gloves, and splash-proof safety goggles. Observe safety precautions in Section 7 during clean-up. Absorb spill on inert absorbent material. Pick up and place residue in a designated waste container. Wash area thoroughly with a detergent solution. | |
| Waste Disposal Unusable material should be properly drummed. Consult local, provincial, and federal agencies for proper methods of disposal. Do not contaminate water supply when disposing of wastes or containers. | |
| Handling Procedures and Equipment Do not breathe spray mists or vapours. Keep away from skin and eyes. Use local exhaust ventilation. Clothing or shoes that become contaminated with substance should be removed promptly and not be worn until thoroughly cleaned. Keep away from sources of ignition such as heat, sparks, and flames. Bond and ground containers when pouring. Do not cut or weld empty container. | |
| Storage Requirements Store in cool, dry, well-ventilated area, away from strong oxidizing agents. | |
| Special Shipping Information Transportation of Dangerous Goods (TDG) shipping name: Corrosive liquid NOS (monoethanolamine) Hazard Class: 8, 9.2, TDG ID Number: UN 1760, TDG label/placard: Corrosive | PIN 1760 |

MSDS Checklist (16-Section) Results

SECTION 14 — Transport Information

| | |
|--|---|
| <input checked="" type="checkbox"/> Special Shipping Information | <input checked="" type="checkbox"/> PIN |
| <input checked="" type="checkbox"/> TDG | <input type="checkbox"/> [DOT] Not required under WHMIS |
| <input type="checkbox"/> [IMO] Not required under WHMIS | <input type="checkbox"/> [ICAO] Not required under WHMIS |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 14 — Transport Information

| | | |
|---|--------|-------------|
| Special Shipping Information | | PIN 1760 |
| TDG <i>Transportation of Dangerous Goods (TDG) shipping name: Corrosive liquid NOS (monoethanolamine) Hazard Class: 8, 9.2, TDG ID Number: UN 1760 TDG label/placard: Corrosive</i> | [DOT] | |
| [IMO] | [ICAO] | |

Case Study #8: Section 15 — Regulatory Information

9-Section Material Safety Data Sheet (compliant)

SECTION 1 — Product Information

| | | | |
|---|--|--|--|
| Product Identifier <i>Super Wax Remover</i> | | WHMIS Classification (optional) <i>B3, D2B, E</i> | |
| Product Use <i>Wax Stripper</i> | | | |
| Manufacturer's Name <i>Small Manufacturing Company</i> | | Supplier's Name <i>Albert's Cleaning Supplies</i> | |
| Street Address <i>39800 Clean Street</i> | | Street Address <i>5454 Mop Road</i> | |
| City <i>Soapy Harbour</i> | Province <i>BC</i> | City <i>Blue Sky</i> | Province <i>AB</i> |
| Postal Code <i>V1V 1V1</i> | Emergency Telephone <i>(604) 999-7777</i> | Postal Code <i>Y2Y 2Y2</i> | Emergency Telephone <i>(780) 888-4444</i> |

MSDS Checklist (16-Section) Results

SECTION 15 — Regulatory Information

| | |
|---|---|
| <input checked="" type="checkbox"/> [WHMIS Classification] | <input checked="" type="checkbox"/> [OSHA] <i>Not required under WHMIS</i> |
| <input checked="" type="checkbox"/> [SERA] <i>Not required under WHMIS</i> | <input checked="" type="checkbox"/> [TSCA] <i>Not required under WHMIS</i> |

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 15 — Regulatory Information

| | |
|---|--------------------------------|
| [WHMIS Classification] <i>B3, D2B, E</i> | [OSHA] <i>Not available</i> |
| [SERA] <i>Not available</i> | [TSCA] <i>Not available</i> |

This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations (CPR)* and the MSDS contains all of the information required by the *CPR*.

Case Study #8: Section 16 — Other Information

9-Section Material Safety Data Sheet (compliant)

Not required under WHMIS

MSDS Checklist (16-Section) Results

SECTION 16 — Other Information

Not required under WHMIS

Converted into 16-Section Material Safety Data Sheet (compliant)

SECTION 16 — Other Information

Not available

ADDITIONAL EXERCISE

Review a 16-Section MSDS

Use a photocopy of the blank MSDS Checklist (16-Section) in the back of this guide to review the following MSDS. Determine if it meets Canadian WHMIS requirements; if any of the required information items are missing, the MSDS needs to be revised.

MATERIAL SAFETY DATA SHEET

Product: Stop Slide

| 1. Chemical Product and Company Identification | | | | | |
|---|---|-----------------------|--|--------------|-------|
| Manufacturer: Slippery Slope Chemicals Address: 2000 Millennium Town Greenville, IL, 20202 | | | Emergency Phone Number: (888) 565-6767 Information Phone Number: (312) 999-9999 | | |
| Prepared: 01/22/01 by Mr. Tread Revised: 01/25/05 by Mr. Tread | | | | | |
| 2. Composition/Information on Ingredients | | | | | |
| Hazardous Components | CAS # | OSHA PEL | ACGIH TLV | Other Limits | % |
| Graphite, Natural (as respirable dust) | 7782-42-5 | 2.5 mg/m ³ | 2.0 mg/m ³ | None | Prop. |
| Silica, Crystalline Quartz (as respirable dust) | 14808-60-7 | 0.1 mg/m ³ | 0.1 mg/m ³ | None | N/D |
| Mineral Spirits | 8052-41-3 | 100 ppm | 100 ppm | None | Prop. |
| <i>Tests performed on natural graphite have shown quartz levels ranging from 2% to 10%.</i> | | | | | |
| 3. Hazards Identification | | | | | |
| Route(s) of Entry: | Inhalation: Yes | Skin: Yes | Ingestion: Yes | | |
| Health Hazards (acute and chronic): | | | | | |
| Acute: | Eye, skin, and respiratory system irritant. Breathing high concentrations may result in dizziness, headache, respiratory irritation, convulsions, or loss of consciousness. | | | | |
| Chronic: | None expected when good hygiene practices are employed. | | | | |
| Carcinogenicity: | NTP: No | IARC Monographs: YES | OSHA Regulated: No | | |
| Silica as quartz: Animal sufficient evidence, human sufficient evidence. | | | | | |
| Signs and Symptoms of Exposure: | | | | | |
| Inhalation: | Respiratory irritation, dizziness, headache, nausea, fatigue, drowsiness, impaired co-ordination, and eye-watering. | | | | |
| Skin: | Contact may dry the skin; prolonged contact may cause irritation. Can be absorbed through the skin. Solvent action can dry and de-fat the skin causing skin to crack, leading to dermatitis. | | | | |
| Eyes: | Liquid or vapour can irritate the eyes. | | | | |
| Ingestion: | May cause cramps and diarrhea. Small amounts aspirated into the respiratory system during ingestion or from vomiting may cause bronchopneumonia or pulmonary edema, a possibly fatal condition. | | | | |
| Medical Conditions Generally Aggravated by Exposure: None known. | | | | | |

| | | | |
|--|--|--|--------------------|
| 4. First Aid Measures | | | |
| Eyes: | Flush thoroughly with water for 15 minutes. Get medical attention. | | |
| Skin: | Wash exposed skin with soap and water. If irritation persists, get medical attention. Launder severely contaminated clothing before reuse. | | |
| Ingestion: | Do not induce vomiting. Get medical attention. | | |
| Inhalation: | Remove to fresh air. Administer oxygen if needed. Apply artificial respiration if breathing has stopped. Get medical attention. | | |
| 5. Firefighting Measures | | | |
| Flashpoint: (method) TCC 105°F | Flammable Limits: LEL: 0.9, UEL: 7.0 | | |
| Extinguishing Media: Foam, carbon dioxide, water spray (fog), and dry chemical | | | |
| Special Firefighting Procedures: Water may be ineffective as an extinguishing medium, but can be used to keep containers cool. Wear a NIOSH-approved, self-contained breathing apparatus to fight a fire involving this product. | | | |
| Unusual Fire and Explosion Hazards: Combustible liquid. Keep away from heat, sparks, open flame, and electrical equipment. Closed containers may explode when exposed to extreme heat. On burning, overexposure to decomposition products may cause a health hazard. Symptoms may not be immediately apparent. Seek medical attention. | | | |
| NFPA Hazard Rating: | Health 2 | Flammability 2 | Reactivity 0 |
| 6. Accidental Release Measures | | | |
| Spill/Leak Procedures: Avoid breathing vapours. Ventilate area. Remove all sources of ignition. Clean up area with rags and/or other absorbent material and place in closed containers for solid waste disposal. Prevent from entering sewers or waterways if possible. | | | |
| 7. Handling and Storage | | | |
| Handling and Storage Precautions: Store and use in cool, dry, well-ventilated areas. Do not store above 120°F. Do not take internally. Handle carefully to prevent spills. Keep containers tightly closed when not in use. | | | |
| Work/Hygienic Practices: Wear eye protection. Wash hands and face after handling this product. | | | |
| 8. Exposure Controls/Personal Protection | | | |
| Respiratory Protection (specify type): None under normal use. Avoid breathing vapours. In confined areas, use NIOSH-approved, vapour canister respirator. Self-contained breathing apparatus or supplied-air hose mask is required for vapour concentrations above PEL/TLC limits. | | | |
| Local Exhaust: Required | Mechanical (general): Required | Special: None | Other: None |
| Eye/Face Protection: Goggles, safety glasses, or face shield. Eye wash station should be available. | | | |
| Skin Protection: Chemical-resistant gloves. Safety shower should be available. | | | |
| 9. Physical/Chemical Characteristics | | | |
| Physical State: Liquid | Boiling Point: 305–348°F | Appearance: Black/Grey | Melting Point: N/A |
| Odour: Petroleum Solvent | Vapour Pressure (mmHg): 2 @ 68°F | Specific Gravity (H ₂ O = 1): 1.2 | |
| Vapour Density (air = 1): 4.7 | Water Solubility: Negligible | Evaporation Rate (Butyl Acetate = 1): 0.2 | |

| | |
|--|---|
| 10. Stability and Reactivity | |
| Stability: | Material is stable. |
| Incompatibility (materials to avoid): | Strong oxidizing agents, acids, and alkalis. |
| Hazardous Decomposition Products: | On burning, may release carbon dioxide and carbon monoxide. |
| Hazardous Polymerization: | Will not occur. |
| 11. Toxicological Information | |
| None available. | |
| 12. Ecological Information | |
| None available. | |
| 13. Disposal Considerations | |
| Dispose of in accordance with local, state, and federal regulations. | |
| 14. Transport Information | |
| Proper Shipping Name: Flammable liquid, NOS (contains mineral spirits), 3, UN1993, PGIII. | |
| 15. Regulatory Information | |
| All components of this product are on the TSCA inventory. | |
| 16. Other Information | |
| Disclaimer: The information contained herein is based on data available. However, no warranty is expressed or implied regarding the accuracy of the data or the results obtained from the use thereof. Because the information contained herein may be applied under conditions beyond our control, we assume no responsibility for its use. Unk. = Unknown; N/A = Not applicable; Nav = Not available; N/D = Not determined; N/E = Not established. | |

Answer:

- = information present as required
 = information inaccurate or missing
 N/AP = information not applicable
 N/AV = information not available
 [] = optional information

MSDS Checklist (16-Section)**SECTION 1 — Chemical Product and Company Identification**

| | | | |
|---|--|---|---------------------------------------|
| <input checked="" type="checkbox"/> Product Identifier <i>Stop Slide</i> | | <input type="checkbox"/> [WHMIS Classification] <i>Not required</i> | |
| <input checked="" type="checkbox"/> Product Use <i>Anti-slip lubricant</i> | | | |
| <input checked="" type="checkbox"/> Manufacturer's Name | | <input checked="" type="checkbox"/> Supplier's Name | |
| <input checked="" type="checkbox"/> Street Address | | <input checked="" type="checkbox"/> Street Address | |
| <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | | <input checked="" type="checkbox"/> City, Province/State, Postal/Zip Code | |
| <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] | <input checked="" type="checkbox"/> Emergency Telephone | <input type="checkbox"/> [Fax Number] |
| <input checked="" type="checkbox"/> Date MSDS Prepared | <input checked="" type="checkbox"/> MSDS Prepared by | <input checked="" type="checkbox"/> Phone Number | |

SECTION 2 — Composition/Information on Ingredients

| Hazardous Ingredients <i>(specific chemical name for each)</i> | % | CAS Number | LD ₅₀ of Ingredient <i>(specify species and route)</i> | LC ₅₀ of Ingredient <i>(specify species)</i> |
|---|-------------------------------------|-------------------------------------|--|--|
| <input checked="" type="checkbox"/> Graphite, Natural | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Silica, Crystalline Quartz | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |
| <input checked="" type="checkbox"/> Mineral Spirits | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

SECTION 3 — Hazards Identification

| |
|--|
| Routes of Entry <input checked="" type="checkbox"/> Skin Contact <input checked="" type="checkbox"/> Skin Absorption <input checked="" type="checkbox"/> Eye Contact <input checked="" type="checkbox"/> Inhalation <input checked="" type="checkbox"/> Ingestion |
| <input checked="" type="checkbox"/> [Emergency Overview] |
| <input type="checkbox"/> [WHMIS Symbols] |
| <input checked="" type="checkbox"/> [Potential Health Effects] |

Product Identifier: Stop Slide

SECTION 4 — First Aid Measures

| |
|---|
| <input checked="" type="checkbox"/> Skin Contact |
| <input checked="" type="checkbox"/> Eye Contact |
| <input checked="" type="checkbox"/> Inhalation <i>Administer oxygen (by qualified personnel)</i> |
| <input checked="" type="checkbox"/> Ingestion |

SECTION 5 — Firefighting Measures

| | | |
|---|--|--|
| <input checked="" type="checkbox"/> Flammability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> If yes, conditions identified? | |
| <input checked="" type="checkbox"/> Means of Extinction | | |
| <input checked="" type="checkbox"/> Flashpoint (°C) and Method | <input checked="" type="checkbox"/> Upper Flammable Limit (% by volume) | <input checked="" type="checkbox"/> Lower Flammable Limit (% by volume) |
| <input checked="" type="checkbox"/> Autoignition Temperature (°C) | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Impact | <input checked="" type="checkbox"/> Explosion Data — Sensitivity to Static Discharge |
| <input checked="" type="checkbox"/> Hazardous Combustion Products | | |
| <input checked="" type="checkbox"/> [NFPA] | | |

SECTION 6 — Accidental Release Measures

| |
|---|
| <input checked="" type="checkbox"/> Leak and Spill Procedures |
|---|

SECTION 7 — Handling and Storage

| |
|---|
| <input checked="" type="checkbox"/> Handling Procedures and Equipment |
| <input checked="" type="checkbox"/> Storage Requirements |

Product Identifier: Stop Slide

SECTION 8 — Exposure Control/Personal Protection

| | | | |
|--|---|--|---|
| Exposure Limits <i>(Note MSDS Section 2)</i> | <input checked="" type="checkbox"/> ACGIH TLV | <input checked="" type="checkbox"/> OSHA PEL | <input checked="" type="checkbox"/> Other <i>(specify)</i> |
| <input checked="" type="checkbox"/> Specific Engineering Controls <i>(such as ventilation, enclosed process)</i> | | | |
| Personal Protective Equipment | <input checked="" type="checkbox"/> Gloves | <input checked="" type="checkbox"/> Respirator | <input checked="" type="checkbox"/> Eye <input checked="" type="checkbox"/> Footwear <input checked="" type="checkbox"/> Clothing <input checked="" type="checkbox"/> Other |
| <input checked="" type="checkbox"/> If checked, type specified? <i>Non-specific</i> | | | |

SECTION 9 — Physical and Chemical Properties

| | | |
|--|---|--|
| <input checked="" type="checkbox"/> Physical State | <input checked="" type="checkbox"/> Odour and Appearance | <input checked="" type="checkbox"/> Odour Threshold (ppm) |
| <input checked="" type="checkbox"/> Specific Gravity | <input checked="" type="checkbox"/> Vapour Density (air = 1) | <input checked="" type="checkbox"/> Vapour Pressure (mmHg) |
| <input checked="" type="checkbox"/> Evaporation Rate | <input checked="" type="checkbox"/> Boiling Point (°C) | <input checked="" type="checkbox"/> Freezing Point (°C) |
| <input checked="" type="checkbox"/> pH | <input checked="" type="checkbox"/> Coefficient of Water/Oil Distribution | <input checked="" type="checkbox"/> [Solubility in Water] |

SECTION 10 — Stability and Reactivity

| | |
|--|---|
| <input checked="" type="checkbox"/> Chemical Stability <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> If no, conditions identified? |
| <input checked="" type="checkbox"/> Incompatibility with Other Substances <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | <input checked="" type="checkbox"/> If yes, incompatible substances identified? |
| <input checked="" type="checkbox"/> Reactivity, and Under What Conditions? | |
| <input checked="" type="checkbox"/> Hazardous Decomposition Products <i>Hazardous combustion products listed</i> | |

Product Identifier: Stop Slide

SECTION 11 — Toxicological Information

| | |
|--|---|
| <input checked="" type="checkbox"/> Effects of Acute Exposure <i>(in MSDS Section 3)</i> | |
| <input checked="" type="checkbox"/> Effects of Chronic Exposure | |
| <input checked="" type="checkbox"/> Irritancy of Product | |
| <input checked="" type="checkbox"/> Skin Sensitization <i>(if yes, explained?)</i> | <input checked="" type="checkbox"/> Respiratory Sensitization <i>(if yes, explained?)</i> |
| <input checked="" type="checkbox"/> Carcinogenicity — IARC <i>(if yes, explained?)</i> <i>Unclear</i> | <input type="checkbox"/> Carcinogenicity — ACGIH <i>(if yes, explained?)</i> |
| <input checked="" type="checkbox"/> Reproductive Toxicity <i>(if yes, explained?)</i> | <input checked="" type="checkbox"/> Teratogenicity <i>(if yes, explained?)</i> |
| <input checked="" type="checkbox"/> Embryotoxicity <i>(if yes, explained?)</i> | <input checked="" type="checkbox"/> Mutagenicity <i>(if yes, explained?)</i> |
| <input checked="" type="checkbox"/> Name of Synergistic Products/Effects | |

SECTION 12 — Ecological Information

| |
|--|
| <input checked="" type="checkbox"/> [Aquatic Toxicity] |
|--|

SECTION 13 — Disposal Considerations

| |
|--|
| <input checked="" type="checkbox"/> Waste Disposal |
|--|

SECTION 14 — Transport Information

| | |
|--|---|
| <input checked="" type="checkbox"/> Special Shipping Information | <input checked="" type="checkbox"/> PIN |
| <input checked="" type="checkbox"/> TDG | <input type="checkbox"/> [DOT] |
| <input type="checkbox"/> [IMO] | <input type="checkbox"/> [ICAO] |

Product Identifier: Stop Slide

SECTION 15 — Regulatory Information

| | |
|---|---------------------------------|
| <input type="checkbox"/> [WHMIS Classification] | <input type="checkbox"/> [OSHA] |
| <input type="checkbox"/> [SERA] | <input type="checkbox"/> [TSCA] |

This product has been classified in accordance with the hazard criteria of the **Controlled Products Regulations (CPR)** and the MSDS contains all of the information required by the CPR.

SECTION 16 — Other Information

| |
|--|
| |
|--|