

The background of the slide is a grayscale, slightly blurred photograph of a desk. On the desk, there are several sheets of paper, some with faint diagrams or text. A pen is visible on the right side, and a calculator is partially visible at the top right. The overall scene suggests a professional or technical workspace.

Understanding Safety Data Sheets

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Introduction

- Safety Data Sheets (SDS) formerly known as Material Safety Data Sheets (MSDS).
- Provide comprehensive information of a substance or mixture for use in the workplace
- Specific to the product
- This information
 - Allows a company to develop worker protection measures
 - Allows a company to provide protective measure for the environment
 - Provides needed technical information to make informed design decisions
 - Provides safety information for users of the material

Safety Data Sheet (SDS) versus Material Safety Data Sheet (MSDS)

- SDS have specific format across the globe
 - 16 sections describing specific properties of the chemical
 - SDS use standardized hazard classification system
 - Developed by the United Nations
 - Globally Harmonized System (GHS) of classification and labeling of chemicals
 - Common signal words (Warning or Danger)
 - Use of “H” (Hazard) and “P” (Precautionary) statements
 - Use of Pictograms to provide graphical symbol of hazard
 - Compliance with 29CFR 1910.1200(g) Hazard Communication Standard
-
- MSDS had varying formats, company preference
 - MSDS hazard classification based on local requirements
 - MSDS may not have contained all “needed” information

When is an SDS required?

- A substance or mixture meets the GHS harmonized criteria for physical, health, and environmental hazards.
- Mixtures containing substances meeting criteria for carcinogenicity, toxicity for reproduction, or specific target organ toxicity, in concentrations exceeding cut-off values
- Other substances or mixtures not meeting the criteria for classification as hazardous, but containing hazardous substances in certain concentrations, if required by a regulatory entity.

SDS Sections

- 1 Identification
- 2 Hazard(s) identification
- 3 Composition / information on ingredients
- 4 First aid measures
- 5 Fire fighting measures
- 6 Accidental release measures
- 7 Handling and storage
- 8 Exposure controls / personal protection
- 9 Physical and chemical properties
- 10 Stability and reactivity
- 11 Toxicological information
- 12 Ecological information
- 13 Disposal considerations
- 14 Transportation information
- 15 Regulatory information
- 16 Other information

Section 1 – Identification

- Product Identification
 - Product name
 - Synonyms
 - May include CAS or other number
- Product use
- Supplier Information
- Emergency Contact Information

Section 1 Example - Styrene

SECTION 1 : Product And Company Identification

1.1. Product Identifier

Product Name : Styrene Monomer

Product Form : Liquid

1.2. Relevant Use

Recommended Use : Base chemical for the production of polystyrene, rubbers, resins, plastics, and polyesters

1.3. Supplier Information

Americas Styrenics LLC
Suite 1200
24 Waterway Avenue
The Woodlands, TX 77380
USA

Telephone: : 844-512-1212

Email: : productsteward@amsty.com

1.4. Emergency Telephone

Chemtrec® : 800-424-9300

Local Emergency Contact : 800-510-8510

Section 2 – Hazard(s) Identification

- GHS classification of the substance
 - Hazard Category
- GHS Labeling Requirements
 - Hazard Pictograms
 - Signal Word
 - Hazard Statements
- Other Hazards

Hazard Pictograms

- Graphical composition that includes a symbol and other graphic elements, such as a border, background pattern, or color that is intended to convey specific information
- Characteristics
 - Shape – Square set on a point (Diamond shape)
 - Colors
 - Border – **Red**
 - Background – White
 - Symbol – Black
- Nine standard pictograms to indicate hazards of substance

Hazard Pictograms – Physical Hazards



- **Gas Cylinder**
- Gases under Pressure



- **Flame**
- Flammables
- Pyrophorics
- Self-Heating
- Emits Flammable Gas
- Self-Reactives
- Organic Peroxides



- **Explosion Bomb**
- Explosives
- Self-Reactive
- Organic Peroxides



- **Flame over Circle**
- Oxidizers

Hazard Pictograms – Health Hazards



- **Health Hazard**

- Carcinogen
- Mutagenicity
- Reproductive Toxicity
- Respiratory Sensitizer
- Target Organ Toxicity
- Aspiration Toxicity



- **Corrosion**

- Skin Corrosion / Burns
- Eye Damage
- Corrosive to Metals



- **Exclamation Mark**

- Irritant (skin and eye)
- Skin Sensitizer
- Acute Toxicity (harmful)
- Narcotic effects
- Respiratory Tract Irritant
- Hazardous to Ozone Layer



- **Skull and Crossbones**

- Acute Toxicity
(Fatal or Toxic)

Hazard Pictograms – Environmental Hazards



- **Environment**
- Aquatic Toxicity

Signal Words

- Word used on labels and SDS to indicate the relative level of severity of hazard and alert user to the potential hazard of the substance. Found in Section 2 Hazard Identification of the SDS.
- **“Danger”** used for more severe hazard categories 1 and 2
- **“Warning”** used for less severe hazard categories
- No signal word used for nonhazardous categories

Examples – Pictograms and Signal Words

Triethylamine

Pictogram



Signal word

Danger

Methyl Methacrylate

Hazard pictograms



Signal word: **DANGER!**

#2 Diesel Fuel



Signal Word: **Danger**

Butyl Acrylate

Pictogram:



Signal Word:
Warning

Hazard Statements

- Assigned to hazard class and category
 - Physical
 - Health
 - Environmental
- Describes nature of the hazards for the substance
- Describes varying degrees of hazard
 - Highly / Extremely
 - Harmful / Toxic / Fatal
 - Harmful / Toxic / Very Toxic

Hazard Statements

- Specific wording for each hazard statement
 - Unique, but generic
 - May be translated, but not changed
- Coded by number (Hxxx)
 - Starts with an “H” for Hazard Statement
 - Three digit number
 - First digit describes type of hazard
 - “2” Physical Hazards
 - “3” Health Hazards
 - “4” Environmental Hazards
 - Next two digits ordered numbering of hazard related to properties of substance
- **Codes are reference only, not part of the hazard statement**

Hazard Statement Examples

- Physical Hazards
 - H220 Extremely flammable gas
 - H221 Flammable gas
 - H226 Flammable liquid and vapor
- Health Hazards
 - H300 Fatal if swallowed
 - H301 Toxic if swallowed
 - H302 Harmful if swallowed
- Environmental Hazards
 - H400 Very toxic to aquatic life
 - H401 Toxic to aquatic life
 - H402 Harmful to aquatic life

Precautionary Statements

- Recommended measures that should be taken to minimize or prevent adverse effects resulting from exposure or improper storage or handling of a substance.
- Five types of precautionary statements
 - General
 - Prevention
 - Response (spills, exposure, emergency response, first aid)
 - Storage
 - Disposal

Precautionary Statements

- Specific wording for each hazard statement
 - Unique, but generic
 - May be translated, but not changed
- Coded by number (Pxxx)
 - Starts with an “P” for Precautionary Statement
 - Three digit number
 - First digit describes type of hazard
 - “1” General precautionary statements
 - “2” Prevention precautionary statements
 - “3” Response precautionary statements
 - “4” Storage precautionary statements
 - “5” Disposal precautionary statements
 - Next two digits sequentially numbering of precautionary statement
- Codes are reference only, not part of the precautionary text

Precautionary Statement Examples

- General
 - P102 Keep out of reach of children
 - P103 Read label before use
- Prevention
 - P222 Do not allow contact with air
 - P223 Do not allow contact with water
- Response
 - P331 Do NOT induce vomiting
 - P376 Stop leak if safe to do so
- Storage
 - P402 Store in a dry place
 - P420 Store separately
- Disposal
 - P501 Dispose of contents / container to...

Word of caution

GHS classification system uses 1 as the most severe hazard and 4 as the least severe hazard. NFPA 704 numbering system uses 0 as the least hazardous and 4 as the most hazardous. See example.

GHS Flammable Liquid Classification Criteria	
Category	Criteria
1	Flashpoint < 23 °C and initial boiling point ≤ 35 °C
2	Flashpoint < 23 °C and initial boiling point ≥ 35 °C
3	Flashpoint ≥ 23°C and ≤ 60 °C
4	Flashpoint ≥ 60°C and ≤ 93 °C

NFPA 704 Degrees of Flammability Hazard	
Degree	Criteria
4	Any liquid or gaseous material that is liquid while under pressure and has a flash point below 22.8°C and a boiling point below 37.8°C
3	Liquids having a flash point below 22.8°C and having a boiling point at or above 37.8°C and those liquids having a flash point at or above 22.8°C and below 37.8°C
2	Liquids having a flash point at or above 37.8°C and below 93.4°C
1	Liquids, solids, and semisolids having a flash point at or above 93.4°C
0	Materials that will not burn in air when exposed to a temperature of 816°C

Section 2 Example – 2,3,5,6-Tetrachloropyridine

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H301

Toxic if swallowed.

Precautionary statement(s)

P264

Wash skin thoroughly after handling.

P270

Do not eat, drink or smoke when using this product.

P301 + P310

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.

P321

Specific treatment (see supplemental first aid instructions on this label).

P330

Rinse mouth.

P405

Store locked up.

P501

Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

Section 3 – Composition/Information on Ingredients

- Substances
 - Chemical Identity
 - Common name, synonym
 - CAS or EG Numbers
 - Impurities or stabilizing additives
- Mixtures
 - Chemical Identity of hazardous ingredients
 - CAS or EG Numbers
 - Concentration Range

Section 3 Example – Toluene and Dowtherm A

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Toluene	108-88-3	<=100

3. COMPOSITION/INFORMATION ON INGREDIENTS

This product is a mixture.

Component	CASRN	Concentration
Diphenyl oxide	101-84-8	73.0%
Biphenyl	92-52-4	27.0%

Section 4 – First Aid Measures

- Description of Preventative and First Aid Measures
 - Eye Contact
 - Skin Contact
 - Inhalation
 - Ingestion
- Symptoms and Effects of contact with chemical
 - Eye Contact
 - Skin Contact
 - Inhalation
 - Ingestion
- Immediate Medical Attention and Special Treatment

Section 4 Example – Methyl Methacrylate

4. FIRST AID MEASURES

Description of first aid measures

Inhalation: Move to fresh air. Oxygen or artificial respiration if needed. Call a physician immediately.

Skin contact: Wash off with soap and plenty of water. Wash contaminated clothing before re-use. If skin irritation persists, call a physician.

Eye contact: Rinse with plenty of water. If eye irritation persists, consult a specialist.

Ingestion: Drink 1 or 2 glasses of water. Never give anything by mouth to an unconscious person. Consult a physician. If vomiting occurs spontaneously, keep airway clear.

Most important symptoms and effects, both acute and delayed:

Aside from the information found under Description of first aid measures (above) and Indication of immediate medical attention and special treatment needed (below), any additional important symptoms and effects are described in Section 11: Toxicology Information.

Indication of any immediate medical attention and special treatment needed

Notes to physician: Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.

Section 5 – Fire Fighting Measures

- How to put out a fire involving the substance
 - Acceptable extinguishing media
 - Unacceptable extinguishing media
- Special Hazards
 - Combustion products
 - For solids, details on dust fires and explosions
- Advice to Fire Fighters
 - Procedures for fighting fires
 - Required personal protective equipment

Section 5 Example – Magnum 275 ABS Resin

5. Fire Fighting Measures

Suitable extinguishing media

Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam.

Special hazards arising from the substance or mixture

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide. Combustion products may include trace amounts of: Styrene. Hydrogen cyanide.

Unusual Fire and Explosion Hazards: Pneumatic conveying and other mechanical handling operations can generate combustible dust. To reduce the potential for dust explosions, do not permit dust to accumulate. Dense smoke is produced when product burns.

Advice for firefighters

Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Soak thoroughly with water to cool and prevent re-ignition. If material is molten, do not apply direct water stream. Use fine water spray or foam. Cool surroundings with water to localize fire zone. Hand held dry chemical or carbon dioxide extinguishers may be used for small fires.

Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Section 6 – Accidental Release Measures

- Personal Precautions and Emergency Procedures
 - General measures
 - Non-emergency personnel
 - Emergency responders
 - Reference to Section 8 Exposure Controls / Personal Protection
- Environmental Precautions
 - Do not allow to reach waterways or soil
 - Reference to Section 12 Ecological Information
- Clean-up Methods
 - Absorbent materials
 - Containment and clean-up procedures
 - Reference to Section 13 Disposal Considerations

Section 6 Example – Dowtherm Q

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures: Isolate area. Keep unnecessary and unprotected personnel from entering the area. Refer to section 7, Handling, for additional precautionary measures. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.

Environmental precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information. Spills or discharge to natural waterways is likely to kill aquatic organisms.

Methods and materials for containment and cleaning up: Contain spilled material if possible. Small spills: Absorb with materials such as: Non-combustible material. Collect in suitable and properly labeled containers. Large spills: Dike area to contain spill. Pump into suitable and properly labeled containers. Wash the spill site with water. See Section 13, Disposal Considerations, for additional information.

Section 7 – Handling and Storage

- Precautions for safe handling
 - Conditions to avoid
 - Heat/Sparks/Open Flames
 - Dust Generation
 - Contact with eyes, skin, or clothing
 - Adequate ventilation
- Conditions for safe storage
 - Temperature limits
 - Time limits
 - Incompatible materials
 - Other special requirements based on substance

Section 7 Example – Divinylbenzene 63 US

7. HANDLING AND STORAGE

Precautions for safe handling: Do not heat. Keep away from heat, sparks and flame. Avoid prolonged or repeated contact with skin. Avoid contact with eyes, skin, and clothing. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Containers, even those that have been emptied, can contain vapors. Do not cut, drill, grind, weld, or perform similar operations on or near empty containers. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.

Conditions for safe storage: Do not store in: Opened or unlabeled containers. Store in the following material(s): Carbon steel. Stainless steel. Store in original unopened container. Maintain inhibitor and dissolved oxygen level. Do not purge containers of this material with nitrogen. Uninhibited monomer vapors can polymerize and plug relief devices. No smoking, open flames or sources of ignition in handling and storage area. Use of non-sparking or explosion-proof equipment may be necessary, depending upon the type of operation. Flammable mixtures may exist within the vapor space of containers at room temperature. Additional storage and handling information on this product may be obtained by calling your sales or customer service contact. Store in a dry place. Store away from direct sunlight. Keep away from high temperatures and hot pipes. Ask for a product brochure. See Section 10 for more specific information. The shelf-life of stored divinylbenzene can be extended with timely aeration. A 5-10 minute air sparge is recommended on a monthly basis for drums and pails stored at temperatures between 21-27°C. Divinylbenzene containers stored at temperatures from 4-21°C need to be aerated according to the table below. With aeration and maintenance of p-tert butylcatechol (TBC) levels above 400-600 ppm the clock is effectively reset to the recommended storage times.

Storage stability

Storage temperature:	Storage Period:	Aerate within:
4 °C (39 °F)	12 Month	6 Month
4 - 10 °C (39 - 50 °F)	8 Month	6 Month
10 - 16 °C (50 - 61 °F)	4 Month	4 Month
16 - 21 °C (61 - 70 °F)	2 Month	2 Month
21 - 27 °C (70 - 81 °F)	1 Month	1 Month

Section 8 – Exposure Controls/Personal Protection

- Exposure control parameters
 - Regulatory requirements for exposure (inhalation, eye/skin contact, ingestion)
- Exposure Controls
 - Engineering controls (ventilation requirements)
 - Personal Protective Measures
 - Eye/Face Protection
 - Skin Protection
 - Respiratory Protection
 - May include PPE pictograms

Section 8 Example – Dichloromethane

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Methylene chloride	TWA: 50 ppm	(Vacated) TWA: 500 ppm (Vacated) STEL: 2000 ppm (Vacated) Ceiling: 1000 ppm TWA: 25 ppm STEL: 125 ppm	IDLH: 2300 ppm	TWA: 50 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

Section 9 – Physical and Chemical Properties

- Physical State (solid / liquid / gas)
- Color
- Odor
- Odor Threshold
- pH
- Freezing Point
- Melting Point
- Boiling Point (Boiling Point Range)
- Flash Point
- Evaporation Rate
- Flammability (solid / gas)
- Flammability Limits (upper / lower)
- Vapor Pressure
- Vapor Density
- Liquid Density
- Solubility in Water or other liquids
- Partial Coefficient: n-octanol/water
- Autoignition Temperature
- Decomposition Temperature
- Viscosity
- Molecular Weight
- Explosive Properties
- Oxidizing Properties
- Others, as needed

Section 9 Example – LPG

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Gas
Appearance	: Colorless gas.
Molecular mass	: 44 g/mol
Color	: Colorless.
Odor	: Poor warning properties at low concentrations. Stenchant often added. Sweetish.
Odor threshold	: No data available
pH	: Not applicable.
Relative evaporation rate (butyl acetate=1)	: No data available
Relative evaporation rate (ether=1)	: Not applicable.
Melting point	: No data available
Freezing point	: -187.69 °C (-305.8°F)
Boiling point	: -42.1 °C (-44.32°F)
Flash point	: -104.4 °C (-155.2°F) TCC
Critical temperature	: 96.8 °C (206°F)
Auto-ignition temperature	: 450 °C (842°F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: 2.1 – 9.5 vol %
Vapor pressure	: 8.58 bar (109.73 psig)
Relative vapor density at 20 °C	: No data available
Relative density	: 0.58
Density	: 0.506 – 0.583 g/cm ³ (at 15 °C)
Relative gas density	: 1.5
Solubility	: Water: 75 mg/l
Partition coefficient n-octanol/water (Log Pow)	: 2.36
Partition coefficient n-octanol/water (Log Kow)	: Not applicable.
Viscosity, kinematic	: Not applicable.
Viscosity, dynamic	: Not applicable.
Explosive properties	: Not applicable.
Oxidizing properties	: None.
Explosion limits	: No data available

9.2. Other information

Gas group	: Press. Gas (Liq.)
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Section 10 – Stability and Reactivity

- Reactivity
- Chemical Stability
- Possibility of Hazardous Reactions
- Conditions to Avoid
- Incompatible Materials
- Hazard Decomposition Products

Section 10 Example – Clorox Bleach

10. Stability and Reactivity

Reactivity	This product may react with strong oxidizing agents.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Chemical stability	Material is stable under normal conditions.
Conditions to avoid	Do not mix with other chemicals. Do not use or mix with other household chemicals, such as toilet bowl cleaners, rust removers, acids or products containing ammonia. To do so will release hazardous, irritating gases.
Incompatible materials	Oxidizers. Caustics. Acids.
Hazardous decomposition products	May include and are not limited to: Oxides of carbon.

Section 11 – Toxicological Information

- Routes of Exposure
- Acute Toxicity
 - Ingestion / Skin Contact / Inhalation
 - LD50 / LC50 – Lethal exposure to 50% of test subjects
 - Eye Damage / Irritation
 - Skin Corrosion / Irritation
- Long Term Exposure Effects
 - Carcinogenicity / Mutagenicity / Reproductive Toxicity
 - Target Organs
 - Sensitivity

Section 11 Example – Chlorine

11. TOXICOLOGICAL INFORMATION

Toxicological information appears in this section when such data is available.

Acute toxicity

Acute oral toxicity

Swallowing is unlikely because of the physical state.
Single dose oral LD50 has not been determined.

Acute dermal toxicity

Not likely to be absorbed through skin in harmful amounts.
As product: The dermal LD50 has not been determined.

Acute inhalation toxicity

Brief exposure (minutes) to easily attainable concentrations may cause serious adverse effects, even death. Vapor may cause severe irritation of the upper respiratory tract (nose and throat). May cause severe pulmonary edema (fluid in the lungs). Excessive exposure may cause lung injury. In humans, symptoms may include: Dizziness. Shortness of breath. Headache. Fever. Drowsiness. Anesthetic or narcotic effects.

LC50, Rat, male and female, 1 Hour, vapour, 1.321 mg/l

Skin corrosion/irritation

Brief contact may cause severe skin burns. Symptoms may include pain, severe local redness and tissue damage.

Serious eye damage/eye irritation

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.
Vapor may cause severe eye irritation and corneal injury.

Section 12 – Ecological Information

- Impact to the environment
- Toxicity to aquatic and/or land organisms
- Persistence and Degradability in the environment
- Bioaccumulative Potential
- Soil Mobility
- Results of PBT and vPvB assessments
 - PBT - Persistent ,Bioaccumulative, and Toxic
 - vPvB - very Persistent and very Bioaccumulative
 - Not required, if assessment is not required
- Other adverse effects

Section 12 Example – Reagent Alcohol

SECTION 12: Ecological information

12.1 Ecotoxicity

Fish toxicity:

Ethanol absolute - LC50: 11000 mg/l (96 h) - Bengtsson, B.E., L. Renberg, and M. Tarkpea 1984. Molecular Structure and Aquatic Toxicity - an Example with C1-C13 Aliphatic Alcohols. *Chemosphere* 13(5/6):613-622

Methanol - LC50: 24000 mg/l (96 h) - Poirier, S.H., M.L. Knuth, C.D. Anderson-Buchou, L.T. Brooke, A.R. Lima, and P.J. Shubat 1986. Comparative Toxicity of Methanol and N,N-Dimethylformamide to Freshwater Fish and Invertebrates. *Bull.Environ.Contam.Toxicol.* 37(4):615-621

2-Propanol - LC50: 9640 mg/l (96 h) - Brooke, L.T., D.J. Call, D.L. Geiger, and C.E. Northcott 1984. Acute Toxicities of Organic Chemicals to Fathead Minnows (*Pimephales promelas*), Vol. 1. Center for Lake Superior Environmental Stud., Univ. of Wisconsin-Superior, Superior, WI :414

Daphnia toxicity:

Ethanol absolute - LC50: 9280 mg/l (48 h) - Takahashi, I.T., U.M. Cowgill, and P.G. Murphy 1987. Comparison of Ethanol Toxicity to *Daphnia magna* and *Ceriodaphnia dubia* Tested at Two Different Temperatures: Static Acute Toxicity Test Results. *Bull.Environ.Contam.Toxicol.* 39(2):229-236

Ethanol absolute - EC50: 9950 mg/l (48 h) - Barera, Y., and W.J. Adams 1983. Resolving Some Practical Questions About *Daphnia* Acute Toxicity Tests. In: W.E.Bishop (Ed.), *Aquatic Toxicology and Hazard Assessment*, 6th Symposium, ASTM STP 802, Philadelphia, PA :509-518

Methanol - LC50: 3290 mg/l (48 h) - Guilhermino, L., T. Diamantino, M.C. Silva, and A.M.V.M. Soares 2000. Acute Toxicity Test with *Daphnia magna*: An Alternative to Mammals in the Prescreening of Chemical Toxicity?. *Ecotoxicol.Environ.Saf.* 46(3):357-362

Methanol - EC50: 24500 mg/l (48 h) - Randall, T.L., and P.V. Knopp 1980. Detoxification of Specific Organic Substances by Wet Oxidation. *J.Water Pollut.Control Fed.* 52(8):2117-2130

2-Propanol - LC50: 1400 mg/l (48 h) - Blackman, R.A.A. 1974. Toxicity of Oil-Sinking Agents. *Mar.Pollut.Bull.* 5:116-118

Algae toxicity:

no data available

Bacteria toxicity:

no data available

12.2 Persistence and degradability

no data available

12.3 Bioaccumulative potential

Partition coefficient: n-octanol/water: no data available

12.4 Mobility in soil:

no data available

Section 13 – Disposal Considerations

- Provide information on how to dispose of the substance
 - Biotreatment
 - Landfill
 - Incineration
- May include information on disposal of packaging

Section 13 Example – #2 Diesel

13. DISPOSAL CONSIDERATIONS

Description of waste residues	This material may be a flammable liquid waste.
Safe handling of wastes	Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.
Disposal of wastes / methods of disposal	The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.
Contaminated packaging disposal	Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

Section 14 – Transportation Information

- UN Number
 - UN Proper Shipping Name
 - Transportation Hazard Classes (Air / Land / Sea)
 - Packaging Group
 - Environmental Hazards
 - Special Precautions
-
- May include restricted modes of transportation

Section 14 Example – Triethylamine

SECTION 14: Transport information

DOT (US)

UN number: 1296 Class: 3 (8)
Proper shipping name: Triethylamine
Reportable Quantity (RQ): 5000 lbs
Poison Inhalation Hazard: No

Packing group: II

IMDG

UN number: 1296 Class: 3 (8)
Proper shipping name: TRIETHYLAMINE

Packing group: II

EMS-No: F-E, S-C

IATA

UN number: 1296 Class: 3 (8)
Proper shipping name: Triethylamine

Packing group: II

Section 15 – Regulatory Information

- Specific to substance and/or components in mixture
 - Safety
 - Health
 - Environmental
 - Country specific information (may vary across regions)
- May include reference to additional safety assessments, if required by regulatory group

Section 15 Example – Loctite Chisel Paint Stripper

15. REGULATORY INFORMATION

United States Regulatory Information

TSCA 8 (b) Inventory Status:	All components are listed as active or are exempt from listing on the Toxic Substances Control Act (TSCA) inventory.
TSCA 6 Risk Management Rules	This product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal. Please contact Henkel Product Safety & Regulatory Affairs for further information.
TSCA 12 (b) Export Notification:	Methylene chloride (CAS# 75-09-2).
CERCLA/SARA Section 302 EHS:	None above reporting de minimis.
CERCLA/SARA Section 311/312:	Fire, Pressure, Immediate Health, Delayed Health
CERCLA/SARA Section 313:	This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 (40 CFR 372). Methanol (CAS# 67-56-1). Methylene chloride (CAS# 75-09-2).
CERCLA Reportable quantity:	Methylene chloride (CAS# 75-09-2) 1,000 lbs. (454 kg)
California Proposition 65:	This product contains a chemical known in the State of California to cause cancer. This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

Canada Regulatory Information

CEPA DSL/NDSL Status:	All components are listed on or are exempt from listing on the Canadian Domestic Substances List.
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Section 16 – Other Information

- Revision data
- Key or legend of abbreviations or acronyms
- Literature references
- NFPA / HMIS information
- Full text of hazard phrases, if abbreviated above
- Legal statements
- Other information not included in the previous sections

Section 16 Example – CLR Mold & Mildew Remover

SECTION 16 – OTHER INFORMATION

Precautions to be taken in Handling and Storing: Avoid exposure to excess heat and prevent from freezing.

NFPA: 1, 0, 0. None

Total VOC (wt. %): 0.09% - does not include any CARB applicable exemptions (Volatile Organic Compounds)/California Air Resources Board

CLR® MOLD & MILDEW CLEAR STAIN REMOVER CHEMICAL FATE INFORMATION: 28-day biodegradation. The matter is readily biodegradable. OECD 301D

Other Precautions: None required.

SDS ABBREVIATIONS:

N. A.:	Not Applicable
N. D.:	Not Determined
N.E.:	Not Established
C:	Ceiling Limit
HAP:	Hazardous Air Pollutant
VOC:	Volatile Organic Compound

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Thank you