


Safety Data Sheets (SDS)

SECTION 1-IDENTIFICATION

Product name: 1,4-Diethylbenzene
Other names: –
Proper shipping name: 1,4-Diethylbenzene
Recommended use of the chemical and restrictions on use: Solvent; Intermediate.
Manufacturer/Supplier Name: Taiwan SM Corp., Kaohsiung plant Address: NO.7, Industrial 1st Rd, Lin-Yuan Kaohsiung County 83203, Taiwan, R.O.C. Phone No.: 886-7-6414511
Emergency phone No./Fax No.: 886-7-6414511 Ext. 221 (on duty), 886-7-6414517 (off duty)/886-7-6423828

SECTION 2-HAZARDS IDENTIFICATION

GHS Classification: Flammable Liquid Category 3 Skin Corrosion/Irritation Category 2 Serious Eye Damage/Eye Irritation Category 2 Hazardous To The Aquatic Environment (Chronic) Category 2 Aspiration Hazard Category 1 Specific Target Organ Toxicity Single Exposure Category 3
GHS Label elements: Hazard symbols 
Signal word Danger
Hazard statements May be fatal if swallowed and enters airways May cause respiratory irritation May cause drowsiness and dizziness Flammable liquid and vapor Causes skin irritation Causes eye irritation Toxic to aquatic life with long effects
Precautionary statements Use only in well ventilated area. Control of exposure by mechanical ventilation in an unventilated or confined space Avoid breathing vapors and contact with skin and eyes. Wear breathing apparatus/protective gloves/face protection. Store in well-ventilated place. Disposal must be in accordance with applicable federal, state, or local regulations.
Other hazards: –

SECTION 3-COMPOSITION/INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	wt% by weight	EINECS No.
00105-05-5	1,4-Diethylbenzene	99.0 min.	203-265-2
Synonyms	p-Diethylbenzene, 1,4-Diethylbenzol, PDEB.		
ECHA Pre-registration No.05-2117378458-27-0000			

SECTION 4-FIRST AID MEASURES

Description of necessary first aid measures Eye: 1. Flush immediately with warm water for at least 20 minutes. 2. Then seek for medical attention.
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Skin:

1. Remove contaminated clothing, shoes and leathery wearings.
2. In addition wash affected area with soap and water.
3. Launder clothing before reuse.

Ingestion:

1. If victim is conscious and alert, give 2~4 cupfuls of milk/water to dilute the substance in stomach.
2. Never give anything by mouth to an unconscious person.
3. Don't induce vomiting unless directed to do so by medical person.
4. Then seek for medical attention.

Inhalation:

1. If affected, move the person to fresh air.
2. If not breathing, give artificial respiration.
3. If not heart-beating, give cardio-pulmonary resuscitation or Oxygen.
4. Then seek for medical attention.

Most important symptoms/effects, acute and delayed

Respiratory tract irritation, Skin irritation, Eye irritation, Central nervous system depression.

Indication of immediate medical attention and special treatment needed, if necessary

Any material aspirated during vomiting may produce lung injury. Therefore emesis should not be induced mechanically or pharmacologically. Mechanical means should be used if it is considered necessary to evacuate the stomach contents; these include gastric lavage after endotracheal intubation. If spontaneous vomiting has occurred after ingestion, the patient should be monitored for difficult breathing, as adverse effects of aspiration into the lungs may be delayed up to 48 hours.

For acute or short term repeated exposures to petroleum distillates or related hydrocarbons:

1. Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
2. Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnea, intercostals retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.
3. Arrhythmias complicate some hydrocarbon ingestion and/or inhalation and electrocardiographic evidence of myocardial injury has been reported; intravenous lines and cardiac monitors should be established in obviously symptomatic patients. The lungs excrete inhaled solvents, so that hyperventilation improves clearance.
4. A chest x-ray should be taken immediately after stabilization of breathing and circulation to document aspiration and detect the presence of pneumothorax.
5. Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitization to catecholamines. Inhaled cardio selective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.

SECTION 5-FIRE FIGHTING MEASURES

Extinguishing media

Foam · CO₂ · Dry chemical powder · Water spray or fog – Large fires only.

Specific hazards arising from the chemical

1. Liquid and vapor are flammable.
2. Moderate fire hazard when exposed to heat or flame.
3. Vapor forms an explosive mixture with air.
4. Moderate explosion hazard when exposed to heat or flame.
5. Vapor may travel a considerable distance to source of ignition.
6. Heating may cause expansion or decomposition leading to violent rupture of containers.
7. On combustion, may emit toxic fumes of carbon monoxide (CO).

Special protective equipment and precautions for fire-fighters

1. Keep vapors away from possible ignition sources.
2. When ignited, toxic fumes may be given off.
3. Must wear MSHA/NOISH approved self-contained breathing apparatus and protective clothing.
4. Its vapor heavier than air, which may concentrated at bottom of vessels or ground level.
5. The liquid may evaporate and forms vapors which can catch fire and burn with explosive violence.

SECTION 6-ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedure

1. Personal protective equipment (specified in Section 8)
Eyes : Wear appropriate protective eyeglasses or chemical goggles.
Skin : Wear neoprene gloves or appropriate protective gloves.
Clothing : When direct contact is likely, Use rubberized coveralls or apron.

- Respiratory : When limits are exceeded, wear a respirator approved by NIOSH/MSHA for protection against organic dust, mists and vapors.
- Remove all sources of ignition. No smoking, naked lights or ignition sources. Ventilate area of leak or spill.
 - Keep unnecessary and unprotected personnel from entering. Evacuate personnel from the danger area. Consult with an expert about the emergency procedures.

Environmental precautions

- Prevent spillage from entering drains, surface, and groundwater.
- Contain and recover liquid when possible. Use non-sparking tools and equipment.
- Collect liquid in an appropriate container or absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container.
- Report the accidental spill/release to Local/State government.

Methods and materials for containment and cleaning up

Minor spill:

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapors and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

Major spill

- Clear area of personnel and move upwind.
- Alert emergency responders and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear breathing apparatus plus protective gloves.
- Prevent spillage from entering drains or water course.
- No smoking, naked lights or ignition sources. Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse/absorb vapor.
- Contain spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labeled containers for recycling..
- Absorb remaining product with sand, earth or vermiculite.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- If contamination of drains or waterways occurs, advise emergency services.

SECTION 7-HANDLING AND STORAGE

Precautions for safe handling

- Personal protective equipment should be worn to eliminate skin contact and to prevent inhalation of fumes.
- Soak up with sand, earth, or other noncombustible absorbent and transfer to a covered metal container for disposal.
- Avoid contact with heat, sparks and flame.
- Avoid ingestion and inhalation.

Conditions for safe storage, including any incompatibilities

- Para-diethyl benzene is stable in storage in closed containers at room temperature. It does not polymerize but should be kept away from oxidizing agents, strong acids and bases.
- Iron, galvanized iron, and steel are suitable metals for tanks.
- Storage should be located away from any area subject to fire hazards. Storage tanks located in the open or underground minimize the danger of fire, vapor and health problems.
- All openings in the system should terminate outdoors and be protected by flash screen.
- Electrical installation should conform to the National Electrical Code.
- Storage tanks should be electrically bonded and grounded to prevent dangerous accumulations of static electricity. (see NFPA pamphlet "Static Electricity")
- Natural ventilation is all that is needed for outdoor storage installation.
- For indoor storage : Good natural ventilation may be sufficient. The generally considered maximum allowable concentration is 200 ppm by volume in air for an eight-hour working exposure. A concentration of 10,000 ppm may be fatal in thirty to sixty minutes. If other than natural ventilation is required, the ventilation equipment should be designed to handle the heavy para-diethyl benzene vapor. Since para-diethyl benzene vapor is heavier than air, a down draft mechanical exhaust is indicated in those operation in which general ventilation should be to ensure a substantial air flow away from the work area. All ventilating systems require periodic inspection.

SECTION 8-EXPOSURE CONTROLS, PERSONAL PROTECTION

Control parameters
 OSHA STEL : None listed.
 OSHA Ceiling : None listed.
 ACGIH TLV-TEL : None listed.
 ACGIH TLV-STEEL : None listed.
 Taiwan TWA : None listed.
 Taiwan STEL : None listed.
 Taiwan Ceiling : None listed.
 Taiwan BEI : None listed.

Engineering control

1. Process should be located at least 17 meter (50 feet) away from open flames and all high temperature operations likely to cause ignition of the para-diethyl benzene vapor.
2. In venting para-diethyl benzene vapors, consideration should be given to possible halogenation of the vapors by low concentrations of free chlorine and bromine with the resultant formation of lacrimations.
3. Process should be designed so that the operator is not exposed to direct contact with para-diethyl benzene or the vapor. The technical problems of designing equipment, providing adequate ventilation and operating procedures which promise maximum security and economy, can best be handled by competent engineers.
4. It is essential for safety that equipment be used and maintained as recommended by the manufacturer.
5. Tanks used to store or process para-diethyl benzene should be closed vessels vented to a safe point of discharge in the outside atmosphere away from operating stations, roadways, and at least 17 meter (50 feet) from possible sources of ignitions. All sparks, flames, heated surface, or other sources of ignition should be kept away from all vents. It is advisable, to provide suction on vessels when inspection or observation openings are made, to minimize or eliminate escape of vapors.

Personal protective equipment

Eye 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 protection:
 Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Clothing:
 Wear appropriate protective clothing (rubberized coveralls or apron.) to prevent skin exposure.

Respirators:
 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.

SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Transparent liquid	Upper/lower explosive limits : 0.7% ~6.0%
Odour : Aromatic hydrocarbon odor	Vapor Pressure : 1 mmHg @20°C/68°F
Odour threshold : —	Vapor Density : 4.6 (air=1)
PH : Not available	Relative density : 0.86 (water=1)
Melting/Freezing Point : -43°C	Solubility : Immiscible in water
Initial boiling point/boiling range : 183°C	Partition coefficient : — (n-octanol/water)
Flash point : 55°C (Closed cup)	Auto-ignition temperature : 430°C
Evaporation Rate : Not available	Decomposition temperature : Not available
Flammability (solid/gas) : Not available	Viscosity : Not available
Molecular Formula : C ₁₀ H ₁₄	Molecular Weight : 134.22

SECTION 10-STABILITY AND REACTIVITY

Reactivity Vapor is explosive when exposed to strong oxidizing agent.
Chemical stability Stable under normal temperatures and pressures.
Possibility of hazardous reaction Has not been reported.
Condition to avoid Thermal decomposition.

Incompatible materials Strong oxidizing agent.
Hazardous decomposition products Carbon monoxide, Carbon dioxide.

SECTION 11-TOXICOLOGICAL INFORMATION

Routes of exposure Eye, Skin, inhalation, Ingestion.
Symptoms (treatments as indicated in Section 4) Eye: Although the liquid is not thought to be an irritant, direct contact with the eye may produce transient discomfort characterized by tearing or conjunctival redness (as with windburn). Skin: Skin contact with the material may damage the health of the individual; systemic effects may result following absorption. There is some evidence to suggest that this material can cause inflammation of the skin on contact in some persons. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected. Aromatic hydrocarbons may produce sensitivity and redness of the skin. They are not likely to be absorbed into the body through the skin but branched species are more likely to. Ingestion: Accidental ingestion of the material may be damaging to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. Inhalation: Inhalation may produce health damage. Inhalation of vapors or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation hazard is increased at higher temperatures. Inhalation of vapors may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo. Inhalation of high concentrations of gas/vapor causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and incoordination. Central nervous system depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness. Serious poisonings may result in respiratory depression and may be fatal. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. Chronic exposure: Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or biochemical systems. Chronic solvent inhalation exposures may result in nervous system impairment and liver and blood changes.
Toxicity LD50: 2520~5000 mg/kg (rat, oral) LC50: —
Chronic effect Carcinogenicity: Not listed by ACGIH, IARC, NIOSH, NTP, or OSHA Epidemiology: Not available Teratogenicity: Not available Reproductive Effects: Not available Neurotoxicity: Not available Mutagenicity: Not available

SECTION 12-ECOLOGICAL INFORMATION

Ecotoxicity LC ₅₀ (96 hr.) Fish: — EC ₅₀ (48 hr.) Water flea: — Biocentration factor (BCF): 530 (estimated)

Persistence and degradability

1. The material are expected to form a slick on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxyl radicals.
2. Some of the material will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor. Marine sediments may be either aerobic or anaerobic. The material, in probability, is biodegradable, under aerobic conditions. Evidence also suggests that the hydrocarbons may be degradable under anaerobic conditions although such degradation in benthic sediments may be a relatively slow process.
3. Under aerobic conditions the material will degrade to water and carbon dioxide, while under anaerobic processes it will produce water, methane, carbon dioxide and carbon dioxide.
4. Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods.

Half-life (Air): —

Half-life (Surface water): —

Half-life (Ground water): —

Half-life (Soil): —

Bioaccumulative potential

Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods.

Mobility in soil

In soil, substance will biodegrade and leach with a low to moderate soil mobility.



Other adverse effects: —

SECTION 13-DISPOSAL CONSIDERATIONS

Residues and spilled material are hazardous waste due to ignitability. Disposal must be in accordance with applicable federal, state, or local regulations.

The container for this product can present explosion or fire hazards, even when emptied. To avoid risk of injury, do not cut, puncture, or weld on or near this container. Since the emptied containers retain product residue, follow label warnings even after container is emptied.

SECTION 14-TRANSPORTATION INFORMATION

US DOT	Shipping Name	DIETHYLBENZENE	Hazard Labels	
	Hazard Class	3		
	UN Number	2049		
	Packing Group	III		
IMO	No information available			
IATA	No information available			
RID/ADR	No information available			
Canadian TDG	Shipping Name	DIETHYLBENZENE	Hazard Labels	
	Hazard Class	3		
	UN Number	2049		

SECTION 15-REGULATORY INFORMATION**US FEDERAL****TSCA**

CAS# 105-05-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA	
Section 302 (RQ/TPQ)	None of the chemicals in this material have an RQ/a TPQ.
Section 313	No chemicals are reportable under Section 313.
Clean Air Act	
	This material does not contain any hazardous air pollutants, any class 1 and Class 2 Ozone depletors.
Clean Water Act	
	None of the chemicals in this product are listed as Hazardous Substances, Priority Pollutants and Toxic Pollutants under CWA.
OSHA	
	None of the chemicals in this product are considered highly hazardous by OSHA.
STATE	
1,4-Diethylbenzene, 98% can be found on the following state right to know lists : Florida, Pennsylvania, Massachusetts. California No Significant Risk Level : None of the chemicals in this product are listed.	
European/International Regulations	
European Labeling in Accordance with EC Directives	
	Hazard Symbols : Not available.
	Risk Phrases :
	Safety Phrases : S 24/25 Avoid contact with skin and eyes.
CANADA	
	None of the chemicals in this product are listed on the DSL/NDSL list.
	This product does not have a WHMIS classification.
	CAS# 105-05-5 is not listed on Canada's Ingredient Disclosure List.

SECTION 16-OTHER INFORMATION

References and sources		
1. RETECS Data Bank, TOMES CPS CD, Vol.71, 2007		
2. Chemwatch Data Bank, 2007-1		
3. OHS MSDS Data Bank, 2007		
4. HSDB Data Bank, TOMES CPS CD, Vol.71,2007		
5. SDS, GHS in Taiwan, Council of Labor Affairs, Executive Yuan, ROC (Taiwan)		
Version	Date	Remark
Version 1	06/01/1998	Original Version.
Version 2	04/20/2001	Updated 10 sections to 16 sections.
Version 3	08/01/2003	Updated "SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES".
Version 4	01/01/2006	Updated "SECTION 14-TRANSPORTATION INFORMATION".
Version 5	11/28/2008	Updated each section by GHS SDS.
Version 6	08/01/2011	Checked each section by SHE
Prepared by	Safety & Environment Protection Section, Taiwan SM Corporation Kaohsiung Plant.	