

SAFETY DATA SHEET



BENZENE

Lotte Chemical Titan (M) Sdn Bhd

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	BENZENE
Chemical Name	Benzene
Synonyms	Benzene, C6H6
Proper shipping name	BENZENE
Chemical formula	C6H6
Other means of identification	Not Available
CAS number	71-43-2

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Manufacture of chemicals including styrene, dyes, and many other organic chemicals. Has been used in artificial leather, linoleum, oil cloth, airplane dopes, lacquers; as solvent for waxes, resins, oils etc. May also be a minor component of gasoline, petrol. Exposure should be minimised by use in closed systems. Handling procedures and control measures should be evaluated for exposure before commencement of use in plant operations
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Details of the manufacturer/importer

Registered company name	Lotte Chemical Titan (M) Sdn Bhd
Address	PLO 312, Jalan Tembaga 4, Pasir Gudang Industrial Estate, 81700 Pasir Gudang, Johor, Malaysia
Telephone	+607 253 8888
Fax	+607 251 0784
Website	www.lottechem.my
Email	mcchan@lotte.net

Emergency telephone number

Association / Organisation	Not Available
Emergency telephone numbers	+607 253 8888 Ext: 8654 (Office hours only) Ext: 3158 (24 hours)

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

CLASS Classification	Flammable Liquid Category 2, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Germ Cell Mutagen Category 1B, Carcinogen Category 1A, STOT - RE Category 1, Aspiration Hazard Category 1
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Label elements

CLASS label elements	
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SIGNAL WORD	DANGER
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Hazard statement(s)

H225	Highly flammable liquid and vapour
H315	Causes skin irritation
H319	Causes serious eye irritation
H340	May cause genetic defects
H350	May cause cancer
H372	Causes damage to organs through prolonged or repeated exposure
H304	May be fatal if swallowed and enters airways

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use only outdoors or in a well-ventilated area.

Precautionary statement(s) Response

P301+P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor/physician/first aider
P308+P313	IF exposed or concerned: Get medical advice/attention.
P331	Do NOT induce vomiting.
P370+P378	In case of fire: Use alcohol resistant foam or normal protein foam for extinction.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

CAS No	%[weight]	Name	CLASS Classification
71-43-2	99.9	Benzene	Flammable Liquid Category 2, Skin Corrosion/Irritation Category 2, Eye Irritation Category 2, Germ Cell Mutagen Category 1B, Carcinogen Category 1A, STOT - RE Category 1, Aspiration Hazard Category 1; H225, H315, H319, H340, H350, H372, H304

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none">Wash out immediately with fresh running water.Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.Seek medical attention without delay; if pain persists or recurs seek medical attention.Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none">Immediately remove all contaminated clothing, including footwear.Flush skin and hair with running water (and soap if available).Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none">If fumes, aerosols or combustion products are inhaled remove from contaminated area.Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none">If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.If swallowed do NOT induce vomiting.If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.Observe the patient carefully.Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.Seek medical advice.Avoid giving milk or oils.Avoid giving alcohol.

Indication of any immediate medical attention and special treatment needed

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:

- Primary threat to life, from pure petroleum distillate ingestion and/or inhalation, is respiratory failure.
- Patients should be quickly evaluated for signs of respiratory distress (e.g. cyanosis, tachypnoea, intercostal retraction, obtundation) and given oxygen. Patients with inadequate tidal volumes or poor arterial blood gases (pO₂ 50 mm Hg) should be intubated.
- 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.
- A chest x-ray should be taken immediately after stabilisation of breathing and circulation to document aspiration and detect the presence of pneumothorax.
- Epinephrine (adrenalin) is not recommended for treatment of bronchospasm because of potential myocardial sensitisation to catecholamines. Inhaled cardioselective bronchodilators (e.g. Alupent, Salbutamol) are the preferred agents, with aminophylline a second choice.
- Lavage is indicated in patients who require decontamination; ensure use of cuffed endotracheal tube in adult patients. [Ellenhorn and Barceloux: Medical Toxicology]

Consider complete blood count. Evaluate history of exposure.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

	<ul style="list-style-type: none">▶ Foam.▶ Dry chemical powder.▶ BCF (where regulations permit).▶ Carbon dioxide.
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Special hazards arising from the substrate or mixture

Fire Incompatibility	▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result
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Advice for firefighters

Fire Fighting	<ul style="list-style-type: none">▶ Alert Fire Brigade and tell them location and nature of hazard.▶ May be violently or explosively reactive.▶ Wear full body protective clothing with breathing apparatus.▶ Prevent, by any means available, spillage from entering drains or water course.
Fire/Explosion Hazard	<ul style="list-style-type: none">▶ Liquid and vapour are highly flammable.▶ Severe fire hazard when exposed to heat, flame and/or oxidisers.▶ Vapour may travel a considerable distance to source of ignition.▶ Heating may cause expansion or decomposition leading to violent rupture of containers.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	<ul style="list-style-type: none">▶ Remove all ignition sources.▶ Clean up all spills immediately.▶ Avoid breathing vapours and contact with skin and eyes.▶ Control personal contact with the substance, by using protective equipment.
Major Spills	<ul style="list-style-type: none">▶ Clear area of personnel and move upwind.▶ Alert Fire Brigade and tell them location and nature of hazard.▶ May be violently or explosively reactive.▶ Wear full body protective clothing with breathing apparatus.

	Personal Protective Equipment advice is contained in Section 8 of the SDS.
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SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none">▶ Containers, even those that have been emptied, may contain explosive vapours.▶ Do NOT cut, drill, grind, weld or perform similar operations on or near containers.▶ DO NOT allow clothing wet with material to stay in contact with skin▶ Electrostatic discharge may be generated during pumping - this may result in fire.▶ Ensure electrical continuity by bonding and grounding (earthing) all equipment.
Other information	<ul style="list-style-type: none">▶ Store in original containers in approved flame-proof area.▶ No smoking, naked lights, heat or ignition sources.▶ DO NOT store in pits, depressions, basements or areas where vapours may be trapped.▶ Keep containers securely sealed.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none">▶ Packing as supplied by manufacturer.▶ Plastic containers may only be used if approved for flammable liquid.▶ Check that containers are clearly labelled and free from leaks.▶ For low viscosity materials (i) : Drums and jerry cans must be of the non-removable head type.
Storage incompatibility	<ul style="list-style-type: none">▶ Vigorous reactions, sometimes amounting to explosions, can result from the contact between aromatic rings and strong oxidising agents.▶ Aromatics can react exothermically with bases and with diazo compounds. <p>Benzene:</p> <ul style="list-style-type: none">▶ reacts violently with iodine pentafluoride.▶ hydrogenation to cyclohexane was effected in a fixed bed reactor at 210-230 deg C, but a fall in conversion was apparent; increasing the bed temp by 10 deg C and the hydrogen flow led to a large increase in reaction rate which the interbed cooling coils could not handle; an exotherm to 280 deg C developed, with a hot spot around 600 deg C which bulged the reactor wall.

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA


Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US ACGIH Threshold Limit Values (TLV)	benzene	Benzene	0.5 ppm	2.5 ppm	Not Available	TLV® Basis: Leukemia; BEI

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
benzene	Benzene	Not Available	Not Available	Not Available

Ingredient	Original IDLH	Revised IDLH
benzene	3,000 ppm	500 ppm

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment.</p>
Personal protection	
Eye and face protection	<p>Safety glasses with side shields.</p> <p>Chemical goggles.</p> <p>Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task.</p>
Skin protection	See Hand protection below
Hands/feet protection	<p>Wear chemical protective gloves, e.g. PVC.</p> <p>Wear safety footwear or safety gumboots, e.g. Rubber</p> <p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p>
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> Employees working with confirmed human carcinogens should be provided with, and be required to wear, clean, full body protective clothing (smocks, coveralls, or long-sleeved shirt and pants), shoe covers and gloves prior to entering the regulated area. [AS/NZS ISO 6529:2006 or national equivalent] Employees engaged in handling operations involving carcinogens should be provided with, and required to wear and use half-face filter-type respirators with filters for dusts, mists and fumes, or air purifying canisters or cartridges. A respirator affording higher levels of protection may be substituted. [AS/NZS 1715 or national equivalent] Emergency deluge showers and eyewash fountains, supplied with potable water, should be located near, within sight of, and on the same level with locations where direct exposure is likely.
Thermal hazards	Not Available

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Clear, highly flammable liquid; floats on water. Characteristic aromatic odour. Highly volatile. Mixes with alcohol, chloroform, ether, carbon disulfide, carbon tetrachloride, glacial acetic acid, acetone and oils.		
Physical state	Liquid	Relative density (Water = 1)	0.879 @ 20 C
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	562
pH (as supplied)	Not Applicable	Decomposition temperature	Not Available
Melting point / freezing point (°C)	5.5	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	80	Molecular weight (g/mol)	78.12
Flash point (°C)	-11	Taste	Not Available
Evaporation rate	Fast	Explosive properties	Not Available
Flammability	HIGHLY FLAMMABLE.	Oxidising properties	Not Available
Upper Explosive Limit (%)	7.9	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1.3	Volatile Component (%vol)	100
Vapour pressure (kPa)	9.95 @ 20 C	Gas group	Not Available
Solubility in water (g/L)	1.84 g/L (30 °C)	pH as a solution	Not Applicable
Vapour density (Air = 1)	2.77	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<div><div>► Unstable in the presence of incompatible materials.</div><div>► Product is considered stable.</div><div>► Hazardous polymerisation will not occur.</div></div>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo.
Ingestion	Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733) Although ingestion is not thought to produce harmful effects (as classified under EC Directives), the material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g. liver, kidney) damage is evident. Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.
Skin Contact	The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering. Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions. Open cuts, abraded or irritated skin should not be exposed to this material
	Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Liquid is an irritant and may cause burning and blistering of skin on prolonged exposure.
Eye	There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain.
Chronic	There is sufficient evidence to suggest that this material directly causes cancer in humans. Based on experiments and other information, there is ample evidence to presume that exposure to this material can cause genetic defects that can be inherited. Toxic: danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. This material can cause serious damage if one is exposed to it for long periods.

benzene	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: >8260 mg/kg ^[1]	Eye (rabbit): 2 mg/24h - SEVERE
	Inhalation (rat) LC50: 44.5 mg/l ^[2]	SKIN (rabbit):20 mg/24h - moderate
	Oral (rat) LD50: 3306 mg/kg ^[2]	
Legend:	1. Value obtained from OECD SIDS 2. Healthcare Canada	

BENZENE	Inhalation (man) TClO: 150 ppm/1y - I The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
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Acute Toxicity	✗	Carcinogenicity	✓
Skin Irritation/Corrosion	✓	Reproductivity	✗
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✗
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✓
Mutagenicity	✓	Aspiration Hazard	✓

Legend:
✓ – Data required to make classification available
✗ – Data available but does not fill the criteria for classification
⊖ – Data Not Available to make classification

CMR STATUS

REPROTOXIN	benzene	ILO Chemicals in the electronics industry that have toxic effects on reproduction	H si
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SECTION 12 ECOLOGICAL INFORMATION

Toxicity

For Hydrocarbons: log Kow 1. BCF~10.
For Aromatics: log Kow 2-3.
BCF 20-200.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
benzene	HIGH (Half-life = 720 days)	LOW (Half-life = 20.88 days)

Bioaccumulative potential

Ingredient	Bioaccumulation
benzene	HIGH (BCF = 4360)

Mobility in soil

Ingredient	Mobility
benzene	LOW (KOC = 165.5)

SECTION 13 DISPOSAL INFORMATION

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none">Containers may still present a chemical hazard/ danger when empty.Return to supplier for reuse/ recycling if possible. Otherwise: <ul style="list-style-type: none">If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.Where possible retain label warnings and SDS and observe all notices pertaining to the product.
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SECTION 14 TRANSPORTATION INFORMATION

Labels Required

	
Marine Pollutant	NO
HAZCHEM	3WE

Land transport (UN)

UN number	1114
Packing group	II
UN proper shipping name	BENZENE
Environmental hazard	No relevant data
Transport hazard class(es)	Class 3 Subrisk Not Applicable
Special precautions for user	Special provisions Not Applicable Limited quantity 1 L

Air transport (ICAO-IATA / DGR)

UN number	1114
Packing group	II
UN proper shipping name	Benzene
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class 3 ICAO / IATA Subrisk Not Applicable ERG Code 3H
Special precautions for user	Special provisions Not Applicable Cargo Only Packing Instructions 364 Cargo Only Maximum Qty / Pack 60 L Passenger and Cargo Packing Instructions 353 Passenger and Cargo Maximum Qty / Pack 5 L Passenger and Cargo Limited Quantity Packing Instructions Y341 Passenger and Cargo Limited Maximum Qty / Pack 1 L

Sea transport (IMDG-Code / GGVSee)

UN number	1114
Packing group	II

UN proper shipping name	BENZENE		
Environmental hazard	Not Applicable		
Transport hazard class(es)	IMDG Class	3	
	IMDG Subrisk	Not Applicable	
Special precautions for user	EMS Number	F-E , S-D	
	Special provisions	Not Applicable	
	Limited Quantities	1 L	

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	benzene	Y

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

benzene(71-43-2) is found on the following regulatory lists	"Malaysia Permissible Exposure Limits","International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs"
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This safety data sheet is in compliance with the Occupational Safety and Health (Classification, Labelling and Safety Data Sheet of Hazardous Chemicals) Regulations 2013 (CLASS).

SECTION 16 OTHER INFORMATION

Revision Date: 01/04/2021

This information supplied has been based upon the current level of information available, for the purpose of specifying the requirements regarding environment, health and safety in conjunction with the product. They are not to be interpreted as a warranty for specific product characteristics.

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