



# MATERIAL SAFETY DATA SHEET

(According to GHS rev. 5)




## BENCENO

### 1.IDENTIFICATION

<b>Company:</b> YPF S.A. <b>Address:</b> Av. Macacha Güemes n° 515 CP C1106BKK <b>Buenos Aires - ARGENTINA</b> <b>Tel# (+ 5411) 5441-2000</b> <b>Fax# (+ 5411) 5441-5796</b>	<b>Commercial name:</b> BENCENO <b>Chemical name:</b> Benzene.
	<b>Synonyms:</b> Benzol. Cyclohexatriene. Phenyl hydride.
	<b>Emergency Telephone:</b> <b>Argentina: 0800-222-2933</b> <b>Other countries: (+5411) 4611 2007</b>

### 2.HAZARD IDENTIFICATION

#### 2.1 LABEL ELEMENTS

<b>Pictograms</b>			
<b>Warning word</b>			
<b>Hazard statement</b>	H225: Highly flammable liquid and vapour.	H304: May be fatal if swallowed and enters airways. H340: May cause genetic defects. H350: May cause cancer. H372: Causes damage to organs.	H315: Causes skin irritation. H319: Causes serious eye irritation.
<b>Classification criteria</b>	Flammable liquids (Category 2)	Aspiration hazard (Category 1) Germ cell mutagenicity (Category 1B) Carcinogenicity (Category 1A) Specific target organ toxicity - repeated (Category 1)	Skin irritation (Category 2) Eye irritation (Category 2)
<b>Other regulations</b>	-		

#### OTHER HAZARDS

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### 3.COMPOSITION/INFORMATION ON INGREDIENTS

**General composition:** Benzene.

Main components	Range %	Classification	S Phrases
Benzene CAS # 71-43-2 EC # 200-753-7	100	F; R11 Carc. Cat. 1; R45 Muta. Cat. 2; R 46 T; R48/23/24/25 Xn; R65 Xi; R36/38	S53-45

#### 4. FIRST-AID MEASURES

**Inhalation:** Move the affected person to fresh air. If breathing is difficult, apply artificial respiration or administer oxygen. Call for medical attention urgently.

**Ingestion/Aspiration:** DO NOT INDUCE VOMITING because of the danger of liquid aspiration into lungs. Do not give anything by mouth if the victim is unconscious. Call for medical attention urgently.

**Contact skin/eyes:** Contact skin/eyes. Remove contaminated clothing as soon as possible. Wash the affected area thoroughly with soap and water. In case of contact with eyes, flush with copious amounts of water for up to 15 minutes. Call for medical attention.

**General measures:** Call for medical attention.

#### 5. FIRE-FIGHTING MEASURES

**Extinguishing agents:** Water spray, foam, dry chemical, CO<sub>2</sub>.

WATER SHOULD NEVER BE USED DIRECTLY

**Non suitable extinguishing agents:** NP

**Combustion products:** CO<sub>2</sub>, H<sub>2</sub>O, CO (in incomplete combustion) and toxic/irritant vapours.

**Special measures:** Move containers away from fire area. Keep fire-exposed containers cool. In case of massive fire, withdraw from area and let fire burn. Consult and follow existing emergency standard procedures.

**Special hazards:** Highly flammable/combustible liquid. Vapour/air mixtures are explosive. It may be ignited by heat, sparks, static electricity or flames. Vapours are heavier than air and may travel to a remote source of ignition and flash back. Empty containers may explode in heat of fire. Vapour explosion hazard indoors and outdoors. Runoff to drains or sewers may create fire and explosion hazard.

**Protective equipment:** Firefighters' protective clothing. At high concentration of vapours, mists or fumes, self-contained breathing apparatus will be needed.

#### 6. ACCIDENTAL RELEASE MEASURES

**Environmental precautions:** Avoid spillages to environment due to hazard of physical fouling to shoreline, soils, etc. Prevent entry into sewers and waterways.

**Cleanup methods:** Small spillages: Take up with non-combustible absorbent materials. Transfer to sealed containers for later disposal.

Large spillages: Dike far ahead of liquid spill. Cover the spill with foam to avoid vapours cloud formation. Proceed as if were a small spillage.

**Personal precautions:** Isolate the area. Keep unnecessary people away. Keep out of low confined areas where vapours can accumulate. Eliminate all ignition sources. Avoid electrostatic charges.

**Personal protection:** Impervious polyvinyl chloride gloves. Safety antistatic footwear. Safety goggles, in case of risk of splashing material to eyes. Self-contained breathing apparatus may be needed at high vapour concentration.

## 7. HANDLING AND STORAGE

### Handling:

*General precautions:* Good local ventilation system to avoid vapours, mists or aerosols formation. Avoid release vapours to the air. Wear suitable protective clothing, gloves and safety goggles to prevent skin and eyes contact with the product. Use respiratory protection to avoid vapour inhalation. Exposure monitoring at work is recommended. During transfer, use earthed equipment. Avoid all ignition sources (heat, open flame, spark, etc.) Do not smoke in areas where the material is stored, handled or used.

*Specific conditions:* Special procedures during bulk loading, cleaning and maintaining the tanks to avoid vapour exposure. Make sure that tanks have been thoroughly purged before performing any cleaning or maintaining procedure.

*Specific Use:*

### Storage:

*Temperature and decomposition products:* NP

*Dangerous reactions:* Highly flammable/combustible liquid. Vapour/air mixtures are explosive. Strong oxidants may react vigorously with the product.

*Storage conditions:* Keep the product in properly sealed and labelled containers in cool and well-ventilated place. Keep them away from heat and sources of ignition. Keep containers earthed. Keep them away from strong oxidants.

*Incompatible materials:* Strong oxidants, ozone, liquid oxygen, perchlorates, nitric acid, sodium peroxide, halogens, molten sulphur.

## 8.EXPOSURE CONTROLS/PERSONAL PROTECTION

### Personal protection:

*Eye protection:* Safety goggles or face-shield to avoid splashes. Eye-wash fountains.

*Respiratory protection:* If concentrations in air may exceed the occupational exposure limits use positive pressure respiratory protective equipment.

*Skin protection:* Impervious gloves resistant to chemical product. Antistatic safety footwear.

*Other protective equipment:* Showers in the work area.

**General precautions:** Avoid product contact with skin or eyes and vapour inhalation.

**Specific hygiene measures:** Soaked clothing should be drenched with water under a shower (because of fire risk) and then removed as soon as possible, keeping away from any source of ignition. Care should be taken to ensure proper skin cleaning by washing thoroughly with soap and water.

**Exposure controls:** TLV/TWA (ACGIH): 0.5 ppm (skin)

A1-Confirmed Human Carcinogen

TLV/STEL (ACGIH): 2.5 ppm, A1 (skin)

PEL/TWA (OSHA): 1 ppm

PEL/STEL (OSHA): 5 ppm

REL/TWA (NIOSH): 0.1 ppm

REL/STEL (NIOSH): 1 ppm

IDLH (immediately dangerous for life and health): 500 ppm

Odour threshold detection: 4.68 ppm

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Appearance:** Transparent liquid.

**pH:** NP

**Colour:** Colourless to yellowish.

**Odour:** Aromatic.

**Boiling point:** 80°C (176°F)

**Melting/Freezing point:** 5.5°C (41.9°F)

**Flash point:** -11°C (11.6°F)

**Autoignition temperature:** 498°C (928.4°F)

**Explosive properties:** Lower explosive limit: 1.5%  
Upper explosive limit: 8%

**Oxidizing properties:** NP

**Vapour pressure:** 0.12 atm at 20°C

**Density:** 0.8765 g/cm<sup>3</sup> at 20 °C

**Surface tension:** 29 dynes/cm at 20 °C

**Viscosity:**

**Vapour density:** 2.77 (air: 1)

**Partition coefficient (n-octanol/water):** 2.13

**Water solubility:** 0.180 g/100 ml at 25°C

**Solubility:** Organic solvents.

**Other data:** Molecular weight: 78.12 g/mol  
Heat of combustion: -40576 KJ/Kg

## 10. STABILITY AND REACTIVITY

**Stability:** Stable at room temperature. Highly flammable and combustible liquid.

**Conditions to avoid:** Exposure to heat, sparks, static electricity or flames.

**Materials to avoid:** Strong oxidants, ozone, liquid oxygen, perchlorates, nitric acid, sodium peroxide, halogens, molten sulphur.

**Hazardous decomposition/combustion products:** CO<sub>2</sub>, H<sub>2</sub>O, CO (in incomplete combustion) and toxic/irritant vapours.

**Polymerizations risk:** NP

**Conditions to avoid:** NP

## 11. TOXICOLOGICAL INFORMATION

**Routes of exposure:** Inhalation (the commonest route of exposure) and contact with skin. Ingestion and aspiration into lungs are not frequent but are very dangerous and may result fatal.

**Acute and chronic effects:** May cause cancer. May cause heritable genetic damage. Toxic, danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed. Harmful: may cause lung damage if swallowed. Irritating to eyes and skin.

LD50: 930 mg/Kg (oral-rat)

LD50: 9.4 g/Kg (rabbit-skin)

**Carcinogenicity:** IARC classification: **Group 1** (The agent is carcinogenic to humans).

**Reproductive toxicity:** NP

**Medical conditions which increase hazard to exposure:** Repeated overexposure may aggravate existing liver or kidney disease. Respiratory deficiencies and dermatological problems. Alcohol should not be ingested because it promotes intestinal absorption.

## 12. ECOLOGICAL INFORMATION

### Pollutant potential:

*Persistence and degradability:* If the product is released to soil it will be subject to rapid volatilization near the surface. Released to water, it will be subject to rapid volatilization. It will not be expected to significantly adsorb to sediment or hydrolyze. Released to the atmosphere, it will exist predominantly in the vapour phase. Gasphase will not be subject to direct photolysis but it will react with hydroxyl radicals with a half-life of 13.4 days. It may be subject to biodegradation based on a biodegradation half-life of 16 days in an aerobic river dieaway test. In a marine ecosystem, biodegradation occurred in 2 days after an acclimation period of 2 days and 2 weeks in the summer and spring, respectively, whereas no degradation occurred in winter.

*Mobility/bioaccumulative potential:* Based on estimated Koc values, the product will be expected to exhibit very high to high mobility in soil and therefore may leach to groundwater. Based on the estimated BCF, the product will not be expected to bioconcentrate in aquatic organisms.

**Ecotoxicological effects:** The product exhibits toxicity to freshwater and marine organisms in low concentrations, although spilled benzene is unlikely to remain in water too long, due to its high volatility.

## 13. DISPOSAL CONSIDERATIONS

**Disposal methods (surplus):** This should be done by combustion or incineration.

### Waste:

*Disposal:* Consult with authorized environmental regulatory agencies for guidance on acceptable disposal practices.

*Handling:* Contaminated materials should be regarded as toxic and dangerous waste and have the same risk and need the same precautions as the product. Do not run off the product to sewers.

*Provisions:* Companies that recover, dispose, store, transport or handle waste should comply with local and/or national provisions in force on waste management.

## 14. TRANSPORT INFORMATION

**Special precautions:** Labelled as flammable liquid. Transfer in cool well ventilated areas. Acceptable modes of transportation are air, rail, road and water.

### Additional Information:

#### LAND TRANSPORT:

Proper shipping name :	BENZENE
UN Number :	1114
Hazard class :	3
Hazard identification number :	33
Packing group :	II
Exempt amount :	333 Kg

#### AIR TRANSPORT (ICAO/IATA) :

Proper shipping name :	BENZENE
UN Number :	1114
Hazard class :	3
Packing group :	II
CRE :	3H
Passenger and cargo aircraft :	Y341/353
Cargo aircraft only :	364

#### MARITIME TRANSPORT (IMDG/IMO) :

Proper shipping name :	BENZENE
UN Number :	1114
Hazard class :	3
Packing group :	II
Marine pollutant :	NO
Stowage and segregation :	Category B
Ems :	F-E; S-D

## 15. REGULATORY INFORMATION

### CLASIFICACION: LABELLING

**Symbols:** F, T

#### Phrases R:

R11: Highly flammable.

R36/38: Irritating to eyes and skin.

R45: May cause cancer.

R46: May cause heritable genetic damage.

R48/23/24/25: Toxic: Danger of serious damage to health by prolonged exposure through inhalation, in contact with skin and if swallowed.

R65: Harmful: may cause lung damage if swallowed.

#### Phrases S:

S45: In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)

S53: Avoid exposure- obtain special instructions before use.

### F; R11

Carc. Cat. 1; R45

Muta. Cat. 2; R 46

### T; R48/23/24/25

### Xn; R65

### Xi; R36/38

**Other regulations:** Benzene is listed in TSCA Inventory (EPA).

## 16. OTHER INFORMATION

### Data Bases consulted

EINECS: European Inventory of Existing Commercial Substances.  
TSCA: Toxic Substances Control Act, US Environmental Protection Agency  
HSDB: US National Library of Medicine.  
RTECS: US Dept. of Health & Human Services

### R phrases show in the document:

### Legislation consulted:

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).  
Dir. 67/548/EEC about classification, labelling and packaging of dangerous substances (including amendments and adaptations in force).  
Dir. 1999/45/EC about classification, labelling and packaging of dangerous preparations (including amendments and adaptations in force).  
Dir. 91/689/EEC dangerous waste; Dir. 91/156/EEC waste management.  
Royal Decree 363/95: Regulation about notification of new substances and classification, packaging and labelling of dangerous substances.  
Royal Decree 255/2003: Regulation about classification, packaging and labelling of dangerous preparations.  
European Agreement concerning the international carriage of dangerous goods by road (ADR).  
Regulation on the international transport of dangerous goods on the railway. (RID)  
International maritime code of dangerous goods. (IMDG)  
International Air Transport Association (IATA) regulation pertaining to air shipment.

### Glossary:

CAS: Chemical Abstract Service	VLA-EC: Valor Límite Ambiental – Exposición Corta
IARC: International Agency for Research on Cancer	LD <sub>50</sub> : Lethal Dose Medium
ACGIH: American Conference of Governmental Industrial Hygienists.	LC <sub>50</sub> : Lethal Concentration Medium
TLV: Threshold Limit Value	EC <sub>50</sub> : Effective Concentration Medium
TWA: Time Weighted Average	IC <sub>50</sub> : Inhibitory Concentration Medium
STEL: Short-term Exposure Level	BOD: Biological Oxygen Demand.
REL: Recommendable Exposure Limit	NP: Not Pertinent
PEL: Permissible Exposure Limit	: Changes from the last revision
INSHT: Instituto Nal. de Seguridad e Higiene en el Trabajo	[1504.039]
VLA-ED: Valor Límite Ambiental – Exposición Diaria	

The information given in this document has been compiled based on the best existing information sources, latest available knowledge and according to the current requirements on classification, packaging and labelling of hazardous substances. It does not imply the information is exhaustive or accurate in all cases. It is the user's responsibility to determine the validity of the information contained in this Material Safety Data Sheet to apply depending on the case.