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GPS Safety Summary - BENZENE

SUBSTANCE NAME

BENZENE

CHEMICAL IDENTITY

Name: BENZENE

Chemical name (IUPAC): BENZENE

CAS number: 71-43-2

EC number: 200-753-7

Molecular formula: C_6H_6



Structure:

USES AND APPLICATIONS

Benzene is mainly used as a synthesis intermediate product by the chemical industry in the manufacture of substances. Benzene is manufactured for industrial use only and is not used directly in consumer products.

PHYSICAL/CHEMICAL PROPERTIES

Phys/Chem Safety Assessment

Property	Value
Physical state (at 20°C)	Liquid
Colour	Colourless
Odour	Aromatic
Density (at 20°C)	872 to 882 kg/m ³
Melting / boiling point	5.5°C / 80°C
Flammability	H225 - Highly flammable liquid and vapour
Explosive properties	Explosion limits (% vol) : upper = 8 ; lower = 1.2
Self-ignition temperature	498°C
Vapor pressure (at 20°C)	100 hPa
Mol weight	78
Water solubility	Insoluble
Flash point	-11 °C (Pensky/Martens closed cup)
Octanol-water partition coefficient (LogKow) (at 20°C)	2,13 at 20°C

HEALTH EFFECTS

Human Health Safety Assessment

Consumer: Consumer exposure is very unlikely as the substance is manufactured and handled under Strictly Controlled Conditions throughout its life cycle. Specifically, the substance is rigorously contained by technical means during its whole lifecycle, procedural and control technologies are used to minimize emissions and any resulting exposures. Only properly trained and authorized personnel handle the substance. In cases of accident and where waste is generated, procedural and/or control technologies are used to minimize emissions and the resulting exposures.

Worker: The substance is handled under Strictly Controlled Conditions throughout its life cycle. Only properly trained and authorized personnel handle the substance. Special procedures such as purging and washing are applied during cleaning and maintenance works. In cases of accident and where waste is generated, procedural and/or control technologies are used to minimize emissions and the resulting exposures. In addition, exposure is controlled by regular ambient monitoring of the substance at the workplace. Workers should follow the recommended safety measures in the Safety Data Sheet (SDS).

Effect Assessment	Result
Acute Toxicity	<u>Inhalation</u> : high levels of exposure may cause headache , drowsiness , nausea , respiratory irritation, tremor, confusion and unconsciousness
	<u>Ingestion</u> : high levels of exposure may cause digestive troubles , diarrhea , vomiting , neurological disorder
	<u>Skin Contact</u> : in case of high levels of exposure through contact with skin, cutaneous penetration may induce toxic effects on : central nervous system , digestive system
Local effect	<u>Irritating to skin</u> : may cause skin irritation and dermatitis due to the defatting properties of the product
	<u>Irritating to eyes</u> : may cause conjunctivitis
Sensitisation	Not regarded as a skin sensitiser
Toxicity after repeated exposure	<u>Inhalation</u> : repeated exposure to high concentrations exposure may cause: neurological disorder , loss of consciousness, coma, haematological system disorder
	<u>Skin Contact</u> : repeated exposure may cause skin irritation and dermatitis due to the defatting properties of the product
Genotoxicity / Mutagenicity	Genotoxic in invivo and invitro assays
Carcinogenicity	Carcinogenic to human (particularly acute myelogenous leukemia (AML))
Reproductive toxicity	No toxic effect on fertility (available data is limited) Toxic effects for foetal development not proven at non-toxic concentrations in mothers (animal)
Aspiration hazard	In case of accidental swallowing, due to its low viscosity, the product may be aspired into the lung and induce a chemical pneumonitis developing over a few hours



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ENVIRONMENTAL EFFECTS

Environment Safety Assessment

Benzene is not acutely toxic to aquatic organisms (such as fish, algae or Daphnia). Benzene is only slightly soluble in water and evaporates rapidly from water solutions and surfaces. It is considered readily biodegradable in sewage treatment plants, waterways, sediments, and soils. In the atmosphere, benzene is degraded quickly by photo-oxidation. The potential bioaccumulation of the product in environment is low. The product is not considered to be either persistent and bioaccumulative, nor very persistent and very bioaccumulative.

EXPOSURE

Human health

Consumer exposure with the product is very unlikely as it is manufactured in a closed process which also minimizes employee exposure potential. Exposure to the product of workers in manufacturing facilities is also considered very low because the process, storage and handling operations are enclosed. Workers who might accidentally come in contact with the product should follow the safety measures recommended into the Safety Data Sheet (SDS)

Benzene is a natural component of petroleum and the public may be exposed to trace amounts from gasoline, which contains some benzene, as well as other environmental sources such as cigarette smoke, city traffic.

Environment

Release of the product into the environment is very unlikely as the substance is manufactured and handled under Strictly Controlled Conditions throughout its life cycle. Nevertheless, if an accidental release occurs, all the emergency procedures are described into the Safety Data Sheet (SDS)

RISK MANAGEMENT RECOMMENDATIONS

Always handle the product in accordance with good industrial hygiene and safety procedures. We recommend before using the product to carefully, read the Safety Data Sheet (SDS). It is recommended that the substance be mainly used in closed systems. During operations where emission may occur, like product transfer operations, product sampling, or maintenance/repair activities on product containing systems exposure should be kept as low as reasonable achievable.



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Workers must use appropriate Personal protective equipment (PPE) such as gloves, goggles, safety shoes, respiratory protective equipment, etc... When using the product, avoid producing or diffusing fumes, vapour or spray into the air, avoid splashes, avoid contact with skin and eyes. Do not eat, drink or smoke. If swallowed, rinse mouth with water, and do not induce vomiting. In case of eye or skin contact, rinse immediately with plenty of water, for at least 15 minutes, and get medical advice.

STATE AGENCY REVIEW

- This substance has been registered under REACH (EC) 1907/2006.
- This substance has been evaluated under OECD HPV program.

REGULATORY INFORMATION / CLASSIFICATION AND LABELLING

Under GHS substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use. Substances registered for REACH are classified according CLP (EC) 1272/2008.

Classification of the substance

EC-GHS (CLP) Classification according to the regulation EC 1272/2008 (EC-GHS) and ATP

Pictogram(s) GHS02, GHS07, GHS08





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H Phrase(s)

H225 - Highly flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
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

P Phrase(s)

P201 - Obtain special instructions before use.
P210 - Keep away from heat/sparks/open flames/hot surfaces. — No smoking.
P243 - Take precautionary measures against static discharge.
P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P273 - Avoid release to the environment.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301/310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P331 - Do NOT induce vomiting.
P303/361/353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P309/311 - IF exposed or if you feel unwell: Call a POISON CENTER or doctor/physician.
P403/235 - Store in a well-ventilated place. Keep cool.

CONCLUSION

- Benzene is mainly used as a synthesis intermediate for the manufacture of substances. It has no supported uses in consumer products.
- Benzene has an acute toxicity by inhalation, ingestion, and skin contact. The repeated exposure may cause cancer and/or genetic effects.
- Exposure to humans and the environment is considered low if properly handled.

CONTACT INFORMATION WITHIN COMPANY

For further information on this substance or product safety summaries in general, please contact: pch.reach@total.com

Or visit the ICCA portal on: <http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/>

GLOSSARY

Acute Toxicity	Harmful effect resulting from a single or short term exposure to a substance
Biodegradation	Decomposition or breakdown of a substance under natural conditions (actions of micro organisms etc)
Bioaccumulation	Progressive accumulation in living organisms of a chemical substance present in the environment
Carcinogenicity	Substance effects causing cancer
Genotoxicity	Substance effect that causes damage to genes, including Mutagenicity and clastogenicity
GHS	Global Harmonized System of chemicals classification
Hazard	Inherent substance property bearing a threat to health or environment
Mutagenicity	Substance effect that cause mutation on genes
Persistence	Refers to the length of time a compound stays in the environment, once introduced
Reprotoxicity	Including teratogenicity, embryotoxicity and harmful effects on fertility
Sensitising	Allergenic

DISCLAIMER

The information contained in this paper is intended as basic advice and general information to this designated specific product (substance) only and whilst this information is provided in utmost good faith and has been based on the best information to our belief and to our knowledge currently available, it is to be relied upon at the user's own risk. The information in this paper is not intended to provide medical or medical emergency response information, nor treatment information; all detailed safety and health information is to be found in the Safety Data Sheets (SDS) for the product (substance) concerned and to be consulted before use of this product (substance). The information in this Safety Summary is not replacing the SDS and is not automatically applicable if this product (substance) is used with other products (substances) or in other processes.



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