SAFETY DATA SHEET

1. IDENTIFICATION

Product identifier	:	Benzene
Other means of identification	:	-
Recommended use of the chemical and restrictions on use	:	This product is used as raw material for production of maleic anhydride, styrene monomer, and alkyl benzene that will be used for detergent basic material.
Manufacturer	:	PT Pertamina (Persero) Jl. Medan Merdeka Timur 1A Jakarta Pusat ZIP Code 10110 Telepon: 1500-000 Email: pcc@pertamina.com
Emergency phone number	:	1500-000

2. HAZARD IDENTIFICATION

Classification :

Flammable liquid, category 2
Skin irritation, category 2
Serious eye damage, category 2
Germ cell mutagenicity, category 1B
Carcinogenicity, category 1A
Specific target organ toxicity - repeated exposure, category 1
Aspiration hazard, category 1

Signal word : Danger

Hazard statement :

Physical Hazard
H225 - Highly flammable liquid and vapour.
Health Hazard
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.

Precautionary statement :

Prevention
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 - Keep container tightly closed.
P240 - Ground and bond container and receiving equipment.
P241 - Use explosion-proof electrical/ventilating/lighting equipment.
P242 - Use non-sparking tools.
P243 - Take action to prevent static discharges.

2. HAZARD IDENTIFICATION

P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Response

P314 - Get medical advice/attention if you feel unwell.
P321 - Specific treatment (see Section 4).
P331 - Do NOT induce vomiting.
P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P302 + P352 - IF ON SKIN: Wash with plenty of water.
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water (or shower).
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 - If exposed or concerned: Get medical advice/attention.
P332 + P313 - If skin irritation occurs: Get medical advice/attention.
P337 + P313 - If eye irritation persists: Get medical advice/attention.
P362 + P364 - Take off contaminated clothing and wash it before reuse.
P370 + P378 - In case of fire: Use carbon dioxide, dry chemical and foam to extinguish.

Storage

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

Disposal

P501 - Dispose of contents/container according to valid disposal regulations.

Pictogram :

Other hazards which do not result in classification : No data available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	Concentration (%)
Benzene	71-43-2	Min. 99.90
Non aromatic	-	Max. 0.1

4. FIRST AID MEASURES

Necessary description

- **In case of eye contact** : Rinse immediately with copious amounts of water for at least 15 minutes. Seek medical advice if pain or redness continues.
- **In case of skin contact** : Immediately rinse skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Wash exposed area thoroughly with soap and water. Remove contaminated clothing promptly and launder before reuse. Contaminated leather goods should be discarded. If irritation seek medical attention.
- **If inhaled** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give aritficial respiration. Get medical attention.
- **If swallowed** : If potentially dangerous quantities of this material have been swallowed, call a physician immediately. Do not include vomiting unless directed to do so by medical personal.

Most important symptoms/effects : Causes serious eye damage.
Serious skin irritation.
Toxic if swallowed. Causes irritation to mouth, throat, and stomach.

Indication of Immediate medical attention and special treatment needed, if necessary : No special treatment needed.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Carbon dioxide, dry chemical and foam.

Unsuitable extinguishing media : High volume water jet.

Specific hazards

- **Other explosion and fire hazards** : No data available.

Flash point °C : $<4^{o}$ C

Flammability value : LEL 1.2%; UEL 7.8%

Hazardous chemical decomposition : Carbon monoxides.

Special protective actions for fire fighters

a. Carbon dioxide (CO_2) : Spray it to the base of fire from upwind.

b. Dry chemical powder : Spray it to the base of fire from upwind.

c. Foam : When the fire is in a container, spray the foam into the inner wall of the container, not to the burning liquid, and from upwind. When the fire is caused by spill of liquid, spray it to the front fire until the spill is covered

5. FIRE-FIGHTING MEASURES

thoroughly, and from upwind.

Special protective equipment for fire-fighter : For fires in relatively closed areas, the fire fighters must be equipped with Self Contained Breathing Apparatus (SCBA).

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment, and emergency procedures : Put away all conditions that can enable the occurrence of ignition. Suggested to use explosion-proof electrical equipments.
Keep away from contact with spillage.
Keep away from direct contact with product.
For large spillage, immediately isolate area and keep away unnecessary person from area of spillage. Use proper personal protective equipment, including respiratory protection.

Environmental precautions : Prevent spill into drainage, sewage system, or its seepage into soil.
Use water to minimize environmental contamination and disposal consideration.

Procedures : Report spill according to the valid system and procedures. If spill can go into drainage or streams, do immediate report to the authority.

Methods and materials for containment and cleaning up : Adsorb the spill by using sorbent, sawdust mixed with clay and other fire inhibitor materials. Clean and dispose it at the determined place of disposal according to the local regulation.

7. HANDLING AND STORAGE

Precautions for safe handling : Keep container closed. Use only with adequate ventilation. Avoid breathing vapor or mist. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.

Conditions for safe storage (including any incompatibilities) : Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

- **Exposure limit** :
  - ACGIH : TWA 0.5 ppm
  - OSHA : TWA 1 ppm

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

- **Biological exposure indicator** :
  - Permenkes 70 2016 : TWA 0.5 ppm
  - 25 µg/g creatinin with S-Phenylmercapturic Acid & Urine Matrix as determinant.
  - 500µg/g creatinin with t,t-muconic acid in urine as determinant.

Appropriate engineering control

- **Ventilation** : If product is used at closed area, equipped with exhaust fan. Ventilation and equipments must be explosion-proof.

Individual protection measures

- **Eye and face protection** : Use chemical type goggles.
- **Skin protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- **Respiratory protection** : Use breathing apparatus when the polluted concentration in the air is higher than the permissible threshold limit value.
- **Hygiene practices** : Implement good personal hygiene.

9. PHYSICAL AND CHEMICAL PROPERTIES

Characteristic		Test Result
Organoleptic (physical appearance, color, etc)	:	Liquid, clear
Odor	:	Odor
Odor threshold	:	No data available
pH	:	No data available
Melting/freezing point	:	5.49 ^{o}C at 101.3 kPa*
Boiling point/boiling range	:	79.6 – 80.4 ^{o}C
Flammability	:	Highly flammable liquid and vapor
Flash point	:	<4°C
Evaporation rate	:	No data available
Lower/upper flammability limit and explosion limit	:	LEL 1.2%; UEL 7.8%
Vapor pressure	:	10 - 100 kPa at 20 - 79.7 °C*
Vapor density	:	No data available
Relative density	:	879.8 kg/m^3 at 15^{o}C
Solubility		
• **Water solubility**	:	1.88 g/L at 23.5 °C*
• **Other solubility**	:	No data available
Partition coefficient (n-octanol/water)	:	0.66
Auto-ignition temperature	:	498 ^{o}C at 101.35 kPa*
Decomposition temperature	:	No data available

9. PHYSICAL AND CHEMICAL PROPERTIES

Characteristic		Test Result
Viscosity	:	0.762 cSt at 23^{o} C

*Data refers to ECHA Europe

10. STABILITY AND REACTIVITY

Reactivity	:	Hazardous substance polymerization does not occur.
Chemical stability	:	Stable under normal conditions.
Posibility of hazardous reactions	:	No hazardous reaction in normal condition, but may react with oxygen or strong oxidator.
Conditions to avoid	:	Heat, flame, ignition or conditions that can cause static electricity.
Incompatible materials	:	Oxygen or strong oxidator.
Hazardous decomposition products	:	No hazardous decomposition products formed.

11. TOXICOLOGICAL INFORMATION

Comprehensive toxicological/health information

- **Acute toxicity** : Oral: No adverse effect observed LD50 2000 mg/kg bw.
  Inhalation: No adverse effect observed LC50 43767 mg/m^3.
  Dermal: No adverse effect observed LD50 8 260 mg/kg bw.
- **Skin corrosion/ irritation** : Causes skin irritation.
- **Serious eye damage/irritation** : Causes serious eye irritation.
- **Respiratory or skin sensitization** : No data available. Suspected that it may not cause respiratory or skin sensitization according to compound or product which has similar structure or composition.
- **Germ cell mutagenicity** : May cause genetic defects.
- **Carcinogenicity** : May cause cancer.
  Oral:
  Adverse effect observed LOAEL 25 mg/kg bw/day (chronic, mouse)
  Inhalation:
  Adverse effect observed LOAEC 960 mg/m³ (subchronic, mouse)
- **Reproductive toxicity** : No data available. Suspected that it is not reproductive toxicant according to compound or product which has similar structure or composition.
- **STOT-single exposure** : No data available. Suspected that it is not toxic to specific organ after single exposure according to compound or product which has similar structure or composition.
- **STOT-repeated exposure** : Oral – systemic effects:
  Adverse effect observed LOAEL 25 mg/kg bw/day

11. TOXICOLOGICAL INFORMATION

(chronic, rat).

- **Aspiration hazards** : May be fatal if swallowed and enters airways.

Information on the likely routes exposure : Inhaled, swallowed, skin contact, and eye contact.

Symptoms related to the physical, chemical, and toxicological characteristics : No data available. Further testing has not been done.

Delayed and immediate effects, and also chronic effects from both short or long term exposure : No data available. Further testing has not been done.

Numerical measure of toxicity : No data available. Further testing has not been done.

Interative effects : No data available. Further testing has not been done.

Where specific chemical data are not available : No data available. Further testing has not been done.

Mixture : No data available. Further testing has not been done.

Mixture vs. Ingredient information : No data available. Further testing has not been done.

Other in formation : No data available. Further testing has not been done.

12. ECOLOGICAL INFORMATION

Ecotoxicity :

Short-term toxicity to fish:
LL50 (4 days) 5.3 mg/L
Long-term toxicity to fish:
LOEC (32 days) 1.6 mg/L
Short-term toxicity to aquatic invertebrates:
LC50 (48 h) 10 mg/L
Toxicity to algae and cyanobacteria:
LC50 (72 h) 32 - 100 mg/L
Toxicity to microorganism:
LC50 (24 h) 13 mg/L

Persistence and degradability : Long-term benzene degradation in environment is less dangerous than initial form (benzene).

Bioaccumulative potential : No data available. Detailed toxic effects is related to concentration nominal value. Further testing has not been done.

Mobility in soil : No data available. Further testing has not been done.

Other adverse effects : No data available. Further testing has not been done.

13. DISPOSAL CONSIDERATION

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products

13. DISPOSAL CONSIDERATION

should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

14. TRANSPORT INFORMATION

USA DOT

UN Number	:	UN 1114
UN proper shipping name	:	Benzene
Transport hazard class(es)	:	3
Packing group (if available)	:	PG II
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

RID / ADR :

UN Number	:	UN 1114
UN proper shipping name	:	Benzene
Transport hazard class(es)	:	3
Packing group (if available)	:	PG II
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

IMO

UN Number	:	UN 1114
UN proper shipping name	:	Benzene
Transport hazard class(es)	:	3
Packing group (if available)	:	PG II
Environmental hazard	:	-
Special precautions for user	:	-

ICAO / IATA

UN Number	:	UN 1114
UN proper shipping name	:	Benzene
Transport hazard class(es)	:	3
Packing group (if available)	:	PG II
Environmental hazard	:	-
Special precautions for user (UN Model Regulation)	:	-

15. REGULATORY INFORMATION

Safety, health, and environmental regulation (specific for the product in question) :

- Peraturan Menteri Perindustrian Nomor 23/M-IND/PER/4/2013 tentang Perubahan Atas Peraturan Menteri Perindustrian Nomor 87/M-IND/PER/9/2009 Tentang Sistem Harmonisasi Global Klasifikasi dan Label pada Bahan Kimia
- Peraturan Pemerintah Republik Indonesia, Nomor 74

15. REGULATORY INFORMATION

Tahun 2001 Tentang Pengelolaan Bahan Berbahaya dan Beracun Presiden Republik Indonesia

- Keputusan Menteri Tenaga Kerja No Kep-187/Men/1999 tentang Pengendalian Bahan Kimia Berbahaya
- Peraturan Menteri Kesehatan Republik Indonesia Nomor 70 Tahun 2016 tentang Standar dan Persyaratan Kesehatan Lingkungan Kerja Industri
- ACGIH®. 2016. TLVs® and BEIs®

16. OTHER INFORMATION

Revision date : 2017

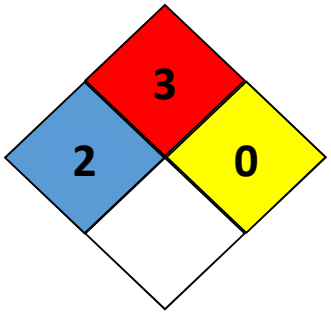
Key/legend or acronym used in the SDS :

ACGIH - American Conference on Governmental Industrial Hygienist
BEI - Biological Exposure Indices
CAS No. - Chemical Abstract Service Number
ECHA - European Chemicals Agency
ICAO/IATA - International Civil Organization Aviation/ International Air Transport Association
IMO - International Maritime Organization
LEL - Lower Explosion Limit
LOAEC - Lowest Observed Adverse Effect Concentration
LOAEL - Lowest Observed Adverse Effect Level
OSHA - Occupational Safety and Health Administration
PG - Packing Group
PVC - Poly Vinyl Chloride
RID/ADR – Regulation concerning the International Carriage of Dangerous Goods by Rail / European Agreement concerning the International Carriage of Dangerous Goods by Road
SCBA - Self Contained Breathing Apparatus
TLV - Threshold Limit Value
TWA - Time-Weighted Average
UEL - Upper Explosion Limit
UN - United Nations
USA DOT - United States Department of Transportation

Key literature references and sources for data used in the SDS : echa.europa.eu

16. OTHER INFORMATION

NFPA :



Degrees	Red	Blue	Yellow
0	Will not burn	Live ordinary material	Normally stable
1	Must be preheated to burn	Slightly hazardous	Unstable if heated – use normal precautions
2	Ignites when moderately heated	Hazardous – use breathing apparatus	Violent chemical change possible – use hose streams from distance
3	Ignites at normal temperatures	Extremely dangerous – use full protective clothing	Strong shock or heat may detonate - use monitors from behind explosion resistant barriers
4	Extremely flammable	Too dangerous to enter vapor or liquid	May detonate – vacate area if materials are exposed to fire

White	
	Radioactive
	Never contact with water

Disclaimer

The information is composed based on current knowledge and intended to describe safety, health, and environment hazard of the product. Therefore, it should not be construed as guarantee any specific property of the product. All risks while using this product is the user's responsibility. It is not allowed to make change of this document, except there is legal consent.