



Material Safety Data Sheet

Creation 2009.09.29

Revision 2022.04.01

Benzene

Rev. No. 4

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1. Chemical Product & Company Identification

A. Product Name : **Benzene**

B. Intended Use : Polymers, detergents, pesticides, dyes, plastics, resins etc
Manufacture of industrial chemicals

C. Manufacturer/Supplier :

1) Manufacturer :

Hanwha TotalEnergies Petrochemicals Co.,Ltd			
103, Dokgot2-Ro, Daesan-Eup, Seosan-Si, Chungnam, 31900, Korea			
T e l e p h o n e	82-41-660-6415	F a x	82-41-660-6637

2) Supplier : (Product information: 041-660-6180)

Hanwha TotalEnergies Petrochemicals Co.,Ltd			
17~20F Hanwha Finance Plaza, 92, Sejong-daero, Jung-gu, Seoul 04525, Korea			
T e l e p h o n e	82-2-3415-9363	F a x	82-2-3415-9370

2. Hazard Identification

A. Hazard Category :


- 1) Physicochemical Hazards - Flammable Liquid : Category 2
- 2) Health Hazards - Acute toxicity (oral) : Category 4
Skin corrosion/irritation : Category 2
Serious eye damage/irritation : Category 2
Carcinogenicity : Category 1A
Germ cell mutagenicity : Category 1B
Specific target organ toxicity(Repeated exposure) : Category 1
Aspiration hazard : Category 1
- 3) Environmental Hazards - Chronic aquatic toxicity : Category 3

B. Precautionary Statement(s) & Warning Label

1) Symbol :



2) Signal Word : Danger

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3) Hazard Statement(s) :

H225 Highly flammable liquid and vapour
 H302 Harmful if swallowed
 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 (Refer Section SDS 11)
 H412 Harmful to aquatic life with long lasting effects

4) Precautionary Statement(s) :

■ 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/sparks/open flames/hot surfaces. No smoking.
 P233 Keep container tightly closed.
 P240 Ground/bond container and receiving equipment.
 P241 Use explosion-proof electrical/ventilating/lighting/equipment.
 P242 Use only non-sparking tools. Flammable liquids (chapter 2.6) 1, 2, 3
 P243 Take precautionary measures against static discharge.
 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.
 P273 Avoid release to the environment.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.
 P281 Use personal protective equipment as required.

■ Response

P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 P301+P312 IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
 P302+P352 IF ON SKIN: Wash with plenty of soap and water.
 P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/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.



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P314 Get medical advice/attention if you feel unwell.

P321 Specific treatment

P330 Rinse mouth.

P331 Do NOT induce vomiting.

P332+P313 If skin irritation occurs: Get medical advice/attention.

P337+P313 If eye irritation persists: Get medical advice/attention.

P362 Take off contaminated clothing and wash before reuse.

P370+P378 In case of fire: Use Suitable extinguishing media for extinction(Refer Section MSDS 5).

■ Storage

P403+P235 : Store in a well-ventilated place. Keep cool.

P405 : Store locked up.

■ Disposal

P501 Dispose of contents/container in accordance with local/regional/national/international regulation

C. Other hazards

NFPA ratings : Health=2, Fire=3, Reactivity=0

3. Composition / Information on ingredients

Chemical Name	Other Name	CAS No. or EU No.	(%)
Benzene	Benzol,Benzole	71-43-2 (EU No.200-753-7)	99~100%

4. First Aid Measures

A. Eye Contact : Flush thoroughly with water at least 15minutes.

Get medical assistance.

Do not rub your eyes.

Go to the hospital immediately if symptoms(flare, irritate) occur.

Remove contact lenses if worn.

B. Skin Contact : Wash contact areas with soap and water.

Remove contaminated clothing and shoes. Get medical aid if irritation develops and persists. Wash clothing before reuse.

Flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.



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Go to the hospital immediately if symptoms(flare, irritate) occur.

Wash thoroughly after handling.

Wear gloves when washing the patient, and please avoid contact with contaminated clothing.

C. Inhalation : If inhaled, remove to fresh air.

If not breathing give artificial respiration.

If breathing is difficult, give oxygen. Get medical aid.

When exposed to large amounts of steam and mist, move to fresh air.

Take specific treatment if needed.

Get medical attention immediately.

D. Ingestion : Potential for aspiration if swallowed. Get medical aid immediately.

Do not induce vomiting unless directed to do so by medical personnel.

Never give anything by mouth to an unconscious person. If vomiting occurs naturally, have victim lean forward.

Rinse your mouth with water immediately.

E. Likely Acute or Delayed Symptoms/Effects :

1) Inhalation

- Short term exposure : respiratory tract irritation, drowsiness, unconsciousness, central nervous system depression

- Long term exposure : respiratory tract irritation, drowsiness, unconsciousness, central nervous system depression, aplastic anemia.

2) Skin contact

- Short term exposure : irritation

- Long term exposure : irritation

3) Eye contact

- Short term exposure : irritation

- Long term exposure : irritation

4) Ingestion

- Short term exposure : central nervous system depression, characterized by excitement, headache, dizziness, drowsiness, nausea, unconsciousness

- Long term exposure : coma and possible death due to respiratory failure, cancer

F. Emergency measure / Notes to physician :

- Notify medical personnel of contaminated situations and have them take appropriate protective measures.



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5. Fire Fighting Measures

A. Extinguishing media :

- 1) Suitable extinguishing media
: Use dry chemical powder, carbon dioxide, or appropriate foam.
- 2) Unsuitable extinguishing media : Avoid use of water jet for extinguishing
- 3) Unusual fire(big fire) : Do use extinguishing media with water spray or fog.

B. Unusual fire & Explosion hazard :

- 1) Hazardous combustion product : Carbon oxides
(carbon monoxide (CO), carbon dioxide (CO₂))
- 2) Fire & Explosion hazard : Static electricity will cause to fire or explosion.
Vapor is more heavier than air.
Liquid and vapour are highly flammable.
Vapor may travel a considerable distance to source of ignition.
Heating may cause expansion or decomposition leading to violent rupture of containers.
On combustion, may emit toxic fumes of carbon monoxide (CO).

C. Special fire fighting procedure / protection of firefighters :

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Move containers from fire area, if you can do without the risk.

Keep unauthorized personnel out.

Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

Notify your local firestation and inform the location of the fire and characteristics hazard.

Using a unattended and water devices in case of large fire and leave alone to burn if you do not imperative.

Vapor or gas is burned at distant ignition sources can be spread quickly.

The extremely low flash point made by fire-fighters may be less effective at digesting weeks.

May be violently or explosively reactive.

Fight fire from a safe distance, with adequate cover.

If safe, switch off electrical equipment until vapour fire hazard removed.

DO NOT approach containers suspected to be hot.



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6. Accidental Release Measures

A. Personal precautions :

- Shut off all sources of ignition.
- Wear self-contained breathing apparatus.
- Ventilate closed spaces before entering.
- Move container to safe area from the leak area.
- Handling the damaged containers or spilled material after wearing protective equipment.
- Do not direct water at spill or source of leak.
- Avoid skin contact and inhalation.
- Cleanup and disposal under expert supervision is advised.
- Keep unauthorized people away, isolate hazard area and deny entry.

B. Environmental precautions :

- 1) atmosphere release : water fog for the reduction of vapor generation
- 2) soil release : Use a non-combustible material like sand or earth to soak up the product.
- 3) underwater release : Use the non-inflammability absorbent.
 - Prevent runoff and contact with waterways, drains or sewers.
 - If large amounts have been spilled, inform the relevant authorities.

C. Spill cleanup methods :

- 1) Small liquid spill : Use a non-combustible material like sand(or vermiculite) to soak up the product and place into a container for later disposal.
 - Wipe off the solvent.
 - Do not use plastic containers.
 - Spilled material should be treated as a potential risk of waste collected.
 - Appropriate container for disposal of spilled material collected.
- 2) Large spillages : Flush area with plenty of water. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.
 - Stay upwind and keep out of low areas.
 - Notification to central government, local government. When emissions at least of the standard amount
 - Dispose of waste in accordance with local regulation.



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7. Handling and Storage

- A. Handling : Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material.
Avoid contact with eyes, skin, and clothing. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Keep container tightly closed. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.
Use only with adequate ventilation. Keep away from heat, sparks and flame.
Avoid breathing vapor.
Avoid direct physical contact.
Comply with all applicable laws and regulations for handling
Do not handle until all safety precautions have been read and understood.
Operators should wear antistatic footwear and clothing.
Do not inhale the steam prolonged or repeated.
Contaminated work clothing should not be allowed out of the workplace.
- B. Storage : Keep away from sources of ignition. Store in a tightly closed container.
Keep from contact with oxidizing materials. Store in a cool, dry, well-ventilated area away from incompatible substances.
Do not use damaged containers.
Save applicable laws and regulations.
Keep sealed when not in use.
By specifying a storage area for carcinogenic substances.
Do not eat, drink or smoke when using this product.
Store away from water and sewer.
Spilled material should be treated as a potential risk of waste collected.

8. Exposure Controls / Personal Protection

- A. Exposure limit value :
- 1) ACGIH :
 - TLV-TWA : 0.5ppm
 - TLV-STEL : 2.5ppm
 - 2) OSHA : 1ppm OSHA TWA
5ppm OSHA STEL

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B. Engineering control : Adequate ventilation(localize ventilation) should be provided in workplaces. Use non sparking tools.
Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower.
A system of local and/or general exhaust is recommended to keep employee exposures above the Exposure Limits.

C. Personal protective equipment

1) Respiratory protection : If required to control exposure, use only suitable respirators and components tested and approved under appropriate government standards such as NIOSH.
Under conditions of frequent use or heavy exposure, Respiratory protection may be needed.
Respiratory protection is ranked in order from minimum to maximum.
Consider warning properties before use.
Any chemical cartridge respirator with organic vapor cartridge(s).
Any chemical cartridge respirator with a full facepiece and organic vaporcartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
For Unknown Concentration or Immediately Dangerous to Life or Health : Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. Any self-contained breathing apparatus with a full facepiece.

2) Eye protection - Wear approved chemical safety glasses or goggles where eye exposure is reasonably probable.
Eye wash fountain is recommended.

3) Hand protection - Wear protective gloves. Butyl rubber gloves are recommended.

4) Skin / Body protection - Wear appropriate chemical resistant protective clothing.

9. Physical and Chemical Properties

A. Appearance(physical state, color etc.) : Colorless to yellow liquid

B. Odor : sweetish odor, aromatic odor



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- C. Odor Threshold : 4.68ppm
- D. pH : Not available
- E. Melting point/Freezing point : 5.5°C
- F. Boiling point/range : 80°C
- G. Flash point : -11°C(c.c.)
- H. Evaporation rate : 5.1(Butyl acetate=1)
- I. Flammability (solid, liquid) : Not available
- J. Flammability Limit (lower/upper) : 1.2%~7.8%
- K. Vapor pressure : 75.02mmHg (@20°C), 94.8mmHg(@25°C)
- L. Solubility in water : 0.18%/100mℓ (@25°C)
- M. Vapor density(Air=1) : 2.8
- N. Specific gravity : 0.8845 (H2O=1)
- O. Partition Coefficient(n-Octanol/water) : 2.13 (= log Pow)
- P. Auto-ignition temperature : 498°C
- Q. Thermal decomposition : Not available
- R. Viscosity : 0.6468cP (@20°C)
- S. Molecular weight : 78.11

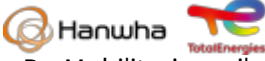
10. Stability and Reactivity

- A. Stability : Stable under normal temperatures and pressures
- B. Possibility of hazardous reaction : Has not been reported
- C. Conditions to avoid : Ignition source, excess heat, sparks, flame, confined spaces
- D. Incompatible material :
Strong oxidizing agents. 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.
- E. Hazardous decomposition products : Hydrocarbon compounds. Carbon oxides(carbon monoxide (CO), carbon dioxide (CO2))

11. Toxicological Information

- A. Route of exposure
 - 1) Inhalation : May be fatal if swallowed and enters airways
 - 2) Ingestion : Harmful if swallowed
 - 3) Skin contact : Causes skin irritation
 - 4) Eye contact : Causes serious eye irritation

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B. Delayed and immediate effects and also chronic effects from short and long term exposure				
<div>1) Acute toxicity :</div> <div><div>- Oral : [Benzene] : rat LD50=810mg/kg</div><div>- Dermal : Not available</div><div>- Inhalation : Not available</div></div> <div>2) Skin corrosion/irritation : Cause skin irritation</div> <div>3) Serious eye damage/irritation : (rabbit) Cause serious eye irritation.</div> <div>4) Respiratory sensitization : Not available</div> <div>5) Skin sensitization :Not available</div> <div>6) Carcinogenicity :</div> <div><div>- OSHA : Not available</div><div>- NTP : Group A</div><div>- IARC(GROUP) : 1</div><div>- ACGIH : A1</div><div>- EU CLP : Carc.1A</div><div>- MOL Notice : Carcinogenicity 1A</div></div> <div>7) Germ cell mutagenicity :</div> <div><div>- Muta. Cat. 2; R46.</div><div>- MOL Notice : Germ cell mutageniity 1B</div></div> <div>8) Reproductive toxicity : Not available</div> <div>9) STOT-single exposure : Not available</div> <div>10) STOT-repeated exposure :</div> <div>Causes laryngitis, bronchitis, bleeding in lung and narcotic effects</div> <div>11) Aspiration hazard : If inhaled directly, induce pulmonary edema and bleeding immediately.</div>				
<div>12. Ecological Information</div> <div>A. Ecotoxicity :</div> <div><div>1) Fishes : Not available</div><div>2) Crustacea : Not available</div><div>3) Seaweeds : Not available</div></div> <div>B. Persistence and Degradability :</div> <div><div>1) Persistence : Not available</div><div>2) Degradabiltiy : Not available</div></div> <div>C. Bio accumulation potential :</div> <div><div>1) Biodegration : Not available</div><div>2) Bioaccumulation : Not available</div></div>				

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	D. Mobility in soil : Not available Benzene		Rev. No.	4
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E. Hazardous to the ozone : Not available

F. Other adverse effects : Disconnection by BOD. : 40%, Chronic aquatic toxicity Category 3 in according to Poisonous substances Announcement on The Toxic Chemical Control Act in Korea(TCCA)

13. Disposal Consideration

A. Disposal method : Dispose in accordance with all applicable regulations.

Since more than two kinds of designaed waste is mixed, it is difficult to treat seperatly, then can be reduction or stabilization by incineration or similar process.

If water separation is possible, pre-process with Water separation process. Dispose by incineration.

Do disposal as neutralization, hydrolysis and oxidation-reduction.

High temperature incinerating, high-temperature melt processing will be landfilled

Solidification processing.

B. Disposal instruction : The user of this product must disposal by oneself or entrust to waste disposer or person who other's waste recycle and dispose, person who establish and operate waste disposal facilities.

Dispose of waste in accordance with all applicable laws and regulations.

C. Waste code : Not available

14. Transportation Information

A. UN classification : UN1114

B. Proper shipping name : Benzene

C. Class/division : 3


D. Packing group : II

E. Marine pollutant -

F. Special precautions for user related to transport or transportation measures

☐ Local transport follows in accordance with Dangerous goods Safety Management Law.

☐ Package and transport follow in accordance with Department of Transportation (DOT) and other regulatory agency requirements.

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	Benzene - EmS FIRE SCHEDULE : F-E (Non-water-reactive flammable liquids) - EmS SPILLAGE SCHEDULE : S-D (Flammable liquids)		Rev. No.	4
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15. Regulatory Information

A. Additional national and/or international regulatory information

☐ Information of EU Classification :

- Classification :
 - [Benzene] : F; R11 Carc. Cat. 1; R45 Muta. Cat. 2; R46 T; R48/23/24/25 Xn; R65 Xi; R36/38
- Risk Phrases :
 - [Benzene] : R45, R46, R11, R36/38, R48/23/24/25, R65
- Safety Phrase :
 - [Benzene] : S53, S45

☐ U.S. Federal regulations :

- OSHA PROCESS SAFETY (29CFR1910.119) : Not available
- CERCLA Section 103 (40CFR302.4) :
 - [Benzene] : 4.53599 kg 10 lb
- EPCRA Section 302 (40CFR355.30) : Not available
- EPCRA Section 304 (40CFR355.40) : Not available
- EPCRA Section 313 (40CFR372.65) :
 - [Benzene] : Applicable

☐ Rotterdam Convention listed ingredients : Not available

☐ Stockholm Convention listed ingredients : Not available

☐ Montreal Protocol listed ingredients : Not available

16. Other Information

This information relates to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty or guarantee is made as to its accuracy, reliability on completeness. It is the user's responsibility to satisfy himself as to the suitability and completeness of such information for his own particular use. We do not accept liability for any loss or damage that may occur from the use of this information nor do we offer warranty against patent infringement.

A. Issue date : 2009.9.29

B. Last revision : 2022.04.01, Rev 4.

- Rev.4 : Change company name and logo