



SAFETY DATA SHEET (SDS) **THERMAL CRACKED GASOLINE**

1. Identification

SDS Record Number	:	PCS 96002
Date of SDS	:	15 January 2015
Product Description	:	Thermal Cracked Gasoline (TCG),
Other names/synonyms	:	Pyrolysis Gasoline
Name of the supplier	:	Petrochemical Corporation of Singapore (Private) Limited
Recommended uses	:	Chemical feedstock
Contact detail of the supplier	:	100 Ayer Merbau Road, Singapore 628277 +65 68672102
24-Hour Emergency contact	:	Asia Pacific +65 3158 1074 (Singapore) China +86 10 5100 3039 (Beijing) Europe, Israel & Americas +44 (0) 1235 239 670 (UK) Middle East & Africa +44 (0) 1235 239 671 (UK)

2. Hazard Identification

GHS Classification

<u>Hazard Class</u>	<u>Hazard Category</u>
• Flammable Liquid	2
• Acute Toxicity (Oral)	5
• Acute Toxicity (Inhalation)	4
• Skin Corrosion/Irritation	2
• Serious Eye Damage/ Irritation	2A
• Toxic to reproduction	1A
• Carcinogenicity	1A
• STOST (Single exposure)	1 (respiratory organs, central nervous system) 2 (liver, kidneys) 3 (respiratory tract irritation, narcotic effects)
• STOST (repeated exposure)	1 (central nervous system, hematopoietic organs, kidneys, liver) 2 (blood system, respiratory organs)
• Aspiration hazard	1
• Acute hazards to the aquatic environment	2 (crustacea, algae) 3 (fish)
• Germ cell mutagenicity	2

Pictograms



Signal Word: Danger

Hazard Statements

- Highly flammable liquid and vapour
- May be harmful if swallowed
- Harmful if inhaled Causes skin irritation
- Causes serious eye irritation
- May cause cancer



- May damage fertility or the unborn child
- Causes damage to Organs
- May cause drowsiness or dizziness
- May be fatal if swallowed and enters airways
- Toxic to aquatic life
- Suspected of causing genetic defects.

Precautionary Statements

Prevention

- Keep container tightly closed.
- Keep away from ignition sources such as heat/sparks/open flames/hot surfaces. – No smoking.
- Wear protective gloves/protective clothing/eye protection/face protection
- Ground/Bond container and receiving equipment
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Use only outdoor or in a well-ventilated area.
- Wash thoroughly after handling.
- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Avoid release to the environment
- Do not eat, drink or smoke when using this product.

Response

- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/ shower.
- In case of fire: use appropriate media for extinction.
- IF exposed or you feel unwell: Call a POISON CENTER/doctor/physician IF ON SKIN: Wash with plenty of soap and water.
- Take off contaminated clothing and wash before re-use.
- If skin irritation occurs: Get medical advice/attention.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists, get medical advice/attention.
- IF exposed or concerned: Get medical attention/advice.
- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- Do NOT induce vomiting.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

Storage

- Store in a well-ventilated place. Keep cool. Keep container tightly closed.
- Store locked up.

Disposal

- Dispose of the contents in accordance to the local mandatory rules and regulations



3. Composition/Information On Ingredients

Chemical Identification	Concentration
C4	< 1 wt%
C5	15 - 25 wt%
Benzene	28 - 34 wt%
Toluene	11 - 16 wt%
Ethyl Benzene + Meta Para-Xylene	3 - 5 wt%
Orth-xylene	0.5 - 2 wt%
Styrene	3 - 5 wt%
C9+	10 - 19 wt%
C6-C8 Non-aromatics	11 - 19 wt%

4. First-Aid Measures

Eye:

Irrigate with flowing water immediately and continuously for 15 minutes. Consult medical personnel.

Skin:

Wash off in flowing water or shower.

Ingestion: Do not induce vomiting. Call a physician and/or transport to emergency facility immediately.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult oxygen should be administered by qualified personnel. Call a physician or transport to a medical facility.

Note To Physician:

The decision of whether to induce vomiting or not should be made by an attending physician. If lavage is performed, suggest endotracheal and/or esophageal control. Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach. If burn is present, treat as any thermal burn, after decontamination. Exposure may increase "myocardial irritability." Do not administer sympathomimetic drugs unless absolutely necessary. No specific antidote. Supportive treatment based on judgment of the physician in response to reactions of the patient.

5. Fire-Fighting Measures

Extinguishing media

Water fog, carbon dioxide, dry chemical, foam. For large scale fires, straight or direct water streams may be ineffective to extinguish fire, but copious fine water spray will help control situation by its cooling action. For large scale fires, general purpose synthetic foams or protein foams are preferred if available. Alcohol resistant foams may function also.

Specific hazards arising from the chemical:

Keep unnecessary people away; isolate hazard area and deny unnecessary entry. Dense smoke emitted when burned without sufficient oxygen. Vapours can form flammable mixtures at ordinary temperatures. Static electricity may accumulate and create a fire ignition hazard. See also 'Storage and Handling' Section of this SDS. Vapours are heavier than air and may travel a considerable distance where they may linger and/or find an ignition source and flash back. Stay upwind. Keep out of low areas. Water may not be effective in extinguishing a fire and may spread it, but a water spray can be used to cool exposed containers. Avoid accumulation of water because this product will float on water



and may reignite on the surface of the water. Container may vent and/or rupture due to fire. Containers exposed to intense heat from fires should be kept cool with water to prevent container weakening or rupture. Move container from fire area if possible. Stay away from storage tank ends because if tank ruptures, ends may become projectiles. Withdraw from area immediately in case of rising sound from venting safety device or any discolouration of storage tank due to fire. Surfaces that are sufficiently hot may ignite liquid product in the absence of sparks or flame.

Special protective equipment and precautions for fire fighters

Wear positive pressure, self-contained breathing apparatus and full protective equipment.

6. Accidental Release Measures

Personal precautions, protective equipment and emergency procedures:

Keep unnecessary people away; isolate hazard area and deny unnecessary entry. Keep out of sewers, storm drains, surface waters and soil. Vapour explosion hazard indoors, outdoors or in sewers. In case of large spills, warn public of downwind explosion hazard. Remove all possible ignition sources; like cigarettes, flames, pilot lights, electrical sources, etc.

Environmental precautions: Product has limited solubility in water and will float on the surface.

Methods and materials for containment and cleaning up:

Pump up (with appropriate explosion proof equipment) or soak up with sand or other absorbent. Application of vapor suppression foams may be appropriate. Check area with approved explosion meter before re-entering area. Ground and bond all containers and handling equipment. Under some conditions of use, application of clay or cellulose based absorbents on spills of this material may result in the generation of flammable vapours since there is a heat of absorption and a high surface area. If temperature is above flash point, cover with vapor suppression foam until it can be cleaned up.

7. Handling And Storage

Precautions for safe handling

Flammable liquid. Above flash point vapour-air mixtures will burn within flammable limits noted above. Keep away from heat and flame and other ignition sources. Keep containers closed. Never use air pressure for transferring product. Use of non-sparking or explosion proof equipment may be necessary, depending upon type of operation. Containers should be bonded and grounded during transfer.

Conditions for safe storage, including any incompatibilities

Mixtures within the vapour space of opened bottles (drums) may be within the flammable range at normal room temperatures. Containers, even those that have been emptied, can contain vapours. Do not cut, drill, grind, weld or perform similar operations on or near empty containers. Product may accumulate static electricity. Bond and ground fixed equipment and transfer containers to prevent static charge build up.

8. Exposure Controls/Personal Protection

Control parameters**Exposure Guideline(S):**

PELs are in accord with those recommended by OSHA, as in the 1989 revision of PELs.

Benzene: ACGIH TLV is 10 ppm TWA.

Ethylbenzene: ACGIH TLV and OSHA PEL are 100 ppm TWA; 125 ppm STEL.

Toluene: ACGIH TLV is 50 ppm TWA, skin. OSHA PEL is 100 ppm TWA, 150 ppm STEL.

Styrene, monomer: ACGIH TLV and OSHA PEL are 50 ppm TWA, 100 ppm STEL.

Appropriate engineering controls

Use only with adequate ventilation. Provide general and/or local exhaust ventilation to control airborne levels below the exposure guidelines.

**Personal Protective Equipment (PPE)****Eye/Face Protection:**

Use chemical goggles. If vapor exposure causes eye discomfort, use a full-face respirator.

Skin Protection:

Use protective clothing impervious to this material. Selection of specific items such as gloves, boots, apron, or full-body suit will depend on operation. Remove contaminated clothing no later than the end of the work period and clean before reuse. Contaminated leather items, such as shoes, belts, and watchbands, should be removed and destroyed.

Respiratory Protection:

Atmospheric levels should be maintained below the exposure guideline. When respiratory protection is required for certain operations, use an approved air-purifying respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive-pressure self-contained self breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. In confined or poorly ventilated areas, use an approved positive-pressure supplied-air respirator.

9. Physical And Chemical Properties

Property	Value, Description
Appearance (physical state, colour etc);	Clear, slightly yellow to dark amber liquid.
Odour;	Pungent aromatic highly irritating
Specific gravity or density;	0.82-0.84
Initial boiling point and boiling range;	47-230 °C (ASTM)
Flash point;	<-20°C (PMCC.)
Upper/lower flammability or explosive limits;	LFL 1 vol % (estimated) to UFL 8 vol % (estimated)
Vapour pressure;	235.4-323.7 mmHG @ 35.0°C
Vapour density;	>1 (AIR=1)
Solubility(ies);	negligible
Auto-ignition temperature;	Not determined

10. Stability And Reactivity

Reactivity/Chemical Stability: Material similar to gasoline.

Possibility of hazardous reactions:

Conditions To Avoid: Avoid high temperatures which may cause decomposition and large pressure increases.

Incompatible Materials: Oxidizing material. Keep away from heat, flames, and spark-producing equipment.

Hazardous Decomposition Products: Combustion may produce carbon dioxide, toxic carbon monoxide. Unidentified organic compounds may be formed during combustion. Dimers may decompose to monomers if sufficient heat is present, thus lending to an increase in vapor pressure.



Hazardous Polymerization:
Will not occur.

11. Toxicological Information

Harmful if inhaled. Harmful if swallowed. Causes eye irritation. Prolonged exposure may cause skin burns.

Potential Health Effects

Eye:

Vapors may irritate eyes. May cause moderate irritation with corneal injury. Vapors may cause lacrimation (tears).

Skin:

Short single exposure may cause skin irritation. Prolonged or repeated exposure may cause skin burns. Repeated contact may cause drying or flaking of skin. May cause more severe response if confined to skin. A single prolonged exposure is not likely to result in the material being absorbed through skin in harmful amounts. Repeated skin exposure may result in absorption of harmful amounts.

Ingestion:

Small amounts swallowed incidental to normal handling operations are not likely to cause injury; however, swallowing amounts larger than that may cause serious injury, even death. Ingestion may cause irritation of the mouth, throat, and gastrointestinal tract. If aspirated (liquid enters the lung), may cause lung damage or even death due to chemical pneumonia, a condition caused by petroleum and petroleum-like solvents. If aspirated (Liquid enters the lung), may be rapidly absorbed through the lungs and result in injury to other body systems.

Inhalation:

A single brief (minutes) inhalation exposure to easily attainable concentrations may cause adverse effects. A single prolonged (hours) excessive inhalation exposure may cause serious adverse effects, even death. Signs and symptoms of excessive exposure may be anesthetic or narcotic effects, central nervous system effects, may cause irritation to upper respiratory tract and lungs, and may increase sensitivity to epinephrine and increase myocardial irritability (irregular heartbeats). Alcohol consumption and exertion may increase adverse effects.

Systemic (Other Target Organ) Effects:

Signs and symptoms of excessive exposure may be central nervous system (CNS) effects, neurologic signs and symptoms, irritation to upper respiratory tract, and may cause hemopoietic injury (damage to blood forming organs). Contains components which may cause lung, CNS, liver and kidney effects and which have caused hearing loss in laboratory animals and/or humans.

Cancer Information:

This mixture contains a component which is listed as a carcinogen for hazard communication purposes under OSHA Standard 29 CFR Part 1910.1200. Component listed by IARC and NTP: benzene. Benzene has been shown to cause cancer in laboratory animals and humans. This mixture contains a component(s) which are listed as potential carcinogens for hazard communication purposes under OSHA Standard 29 CFR 1910.1200. The component(s) is/are butadiene, listed by IARC and NTP. The component(s) is/are styrene and isoprene, listed by IARC. Has been shown to cause cancer in laboratory animals. (butadiene and isoprene). Contains naphthalene which has caused cancer in some laboratory animals. Neither the data from various long-term animal studies nor from epidemiology studies of workers exposed to styrene provide an adequate basis to conclude that styrene is carcinogenic.

Teratology (Birth Defects):

Contains components which have caused toxicity to the fetus or birth defects in mice. 1,3-Butadiene was toxic to the fetus in laboratory animals at doses nontoxic to the mother.

**Reproductive Effects:**

In animal studies, has been shown not to interfere with reproduction. (major components)

Skin:

The dermal LD50 has not been determined.

Ingestion:

Single dose oral LD50 has not been determined. Single dose oral toxicity is considered to be low.

Mutagenicity (Effects On Genetic Material):

Contains a few components which have caused some mutagenic activity in vitro (test tube) tests and in animals. Results of isoprene in vitro ('test tube') mutagenicity tests have been negative. Isoprene has been shown to have mutagenic activity in animals.

12. Ecological Information

Movement & Partitioning:

Based largely or completely on data for major component(s). Bioconcentration potential is low (BCF less than 100 or Log Kow less than 3).

Degradation & Persistence:

Based on information for dicyclopentadiene. Biodegradation under aerobic static laboratory conditions is below detectable limits (i.e. BOD less than 2.5% of theoretical) in 20 days. Based on information for benzene, styrene and toluene. Biodegradation under aerobic static laboratory conditions is high (BOD20 or BOD28/ThOD greater than 40%).

Ecotoxicity:

Based on information for benzene and toluene. Material is moderately toxic to aquatic organisms on an acute basis (LC50 between 1 and 10 mg/L in most sensitive species). Based on information for styrene and dicyclopentadiene. Material is slightly toxic to aquatic organisms on an acute basis (LC50 between 10 and 100 mg/L in most sensitive species).

13. Disposal Considerations

Disposal:

Any disposal practice must be in compliance with all federal, state/provincial, and local laws and regulations. State/provincial and local requirements for waste disposal may be more restrictive or otherwise different from federal laws and regulations. Regulations may also vary in different locations. Chemical additions, processing, storage, or otherwise alter in this material may make the waste management information presented in this SDS incomplete, inaccurate, or otherwise inappropriate. Waste characterization and disposal compliance are the responsibility solely of the party generating the waste or deciding to discard or dispose of the material. None of these waste management options should be considered 'arranging for disposal'.

Toxic to aquatic life. Do not allow into any sewers, on the ground, or into any body of water. The preferred waste management option is to: send to a properly licensed or permitted recycler, reclaimer, or incinerator.

14. Transport Information

UN Number: 3295

UN proper shipping name: HYDROCARBONS, LIQUID, N.O.S

Hazard Class: 3

Packing group: II

Environmental hazards: Yes

Transport in bulk: MARPOL 73/78 Category Y and IBC Code Type 2 ship.



15. Regulatory Information

Notice:

The information herein is presented in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied is given. Regulatory requirements are subject to change and may differ from one location to another; it is the buyer's responsibility to ensure that its activities comply with federal, state or provincial, and local laws. The following specific information is made for the purpose of complying with numerous federal, state or provincial, and local laws and regulations.

See other sections for health and safety information.

Canadian Regulations

WHMIS Information: The Canadian Workplace Hazardous Materials Information System (WHMIS) Classification for this product is:

B2 - flammable liquid with a flash point less than 37.8C

D2A - untested mixture containing a material qualifying as D2A

D2B - eye or skin irritant

Refer elsewhere in the SDS for specific warnings and safe handling information. Refer to the employer's workplace education program.

CPR Statement:

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR) and the SDS contains all the information required by the CPR.

Hazardous Products Act Information:

This product contains the following ingredients which are Controlled Products and/or on the Ingredient Disclosure List (Canadian HPA section 13 and 14):

U.S. Regulations

Sara 313 Information:

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

<u>CHEMICAL NAME</u>	<u>CAS NUMBER</u>	<u>CONCENTRATION</u>
BENZENE	000071-43-2	28 ~ 34 %
ETHYL BENZENE	000100-41-4	0.4 ~ 2.4 %
STYRENE	000100-42-5	3 ~ 5 %
1,3-BUTADIENE	000106-99-0	0.1 ~ 0.7 %
TOLUENE	000108-88-3	11 ~ 16 %

Sara Hazard Category:

This product has been reviewed according to the EPA "Hazard Categories" promulgated under Sections 311 and 312 of the Superfund Amendment and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

An immediate health hazard

A delayed health hazard

A fire hazard

Toxic Substances Control Act (TSCa):

All ingredients are on the TSCA inventory or are not required to be listed on the TSCA inventory.

State Right-To-Know:

The following product components are cited on certain state lists as mentioned. Non-listed components may be shown in the composition section of the SDS.



<u>Chemical Name</u>	<u>Cas Number</u>	<u>List</u>
BENZENE	000071-43-2	NJ3 NJ1 NJ2 PA1 PA2 PA3
Butane, 2-Methyl-	000078-78-4	Nj1 Nj3 Pa1
1,3-Butadiene, 2-Methyl-	00078-79-5	Nj1 Nj3 Pa1 Pa3
Benzene, Propyl-	00103-65-1	Nj1
1,3-Butadiene	000106-99-0	Nj1 Nj2 Nj3 Pa1 Pa2 Pa3
Toluene	000108-88-3	Nj1 Nj2 Nj3 Pa1 Pa3
Benzene, Ethenylmethyl-	025013-15-4	Nj3 Pa1

Osha Hazard Communication Standard:

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Comprehensive Environmental Response Compensation And Liability Act (CERCLA, Or Superfund):

This product contains the following substance(s) listed as "Hazardous Substances" under CERCLA which may require reporting of releases:

<u>Chemical Name</u>	<u>CAS#</u>	<u>RQ</u>	<u>% in Product</u>
1,3 Butadiene	000106-99-0	1 lbs	0.7
Benzene	000071-43-2	10 lbs	34
Cyclohexane	000110-82-7	1000 lbs	0.1
Toluene	000108-88-3	1000 lbs	16
Ethyl benzene	000100-41-4	1000 lbs	2.4
Xylenes	001330-20-7	1000 lbs	2.6
Styrene	000100-42-5	1000 lbs	5
Naphthalene	000091-20-3	100 lbs	1.3
Biphenyl	000092-52-4	1 lbs	0.9
1,3 Pentadiene	000504-60-9	100 lbs	3.0

16. Other Information

Prepared By: Material Safety Committee

SDS Prepared on: 1/3/2011

Reviewed 1 on: 1/3/2014

Revised 2 on: 15/1/2015

Revision (2) Notes	
1	Sect. 2: Added Category 1 hazard for STOST (repeated exposure) for Liver, Kidneys
2	Sect. 15: Updated Concentration of Ingredients; and corrected CAS number for Toluene

CAUTION: The information given above ("the Information") relates only to the substance or mixture listed herein. The Information may not be valid when used in combination with any other substance or mixture or in any process. If the substance or mixture is to be used for a purpose other than that stated herein or under conditions other than specified herein, the Information cannot be relied upon as being complete or accurate, and the user is advised to consult the supplier before using the substance or mixture for such other purpose or under such other conditions. The Information is given based on information available at the indicated date of preparation and no representation or warranty is given that it will be correct as of any time after the indicated date of preparation.