TOLUENE

SAFETY DATA SHEET

Revision: April, 2022

SECTION 1 - IDENTIFICATION

1.1 Product identifier

Product name: TOLUENE

CAS #: 108-88-3; EC#: 203-625-9; Index #: 601-021-00-3

Synonyms: Methylbenzene; Toluol; Phenylmethane.

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses: Hydrocarbon solvent for industrial use.

1.3 Details of the supplier of the Safety Data Sheet

ECOPETROL S.A.

Edificio Principal Cr 13 No. 36 - 24, Bogotá D.C., Colombia.

T: +57 (601) 234 5000

+57 (018000918418)

1.4 Emergency telephone number

Emergency phone (24 hours): CISPROQUIM: +57 (601) 9191919

+57 (601) 2886012

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SECTION 2 – HAZARD IDENTIFICATION

2.1 Classification of the substance or mixture according to the Globally Harmonized System

Flammable liquids (Category 2)

Skin irritation (Category 2) - Eye irritation (Category 2A)

Reproductive toxicity (Category 2)

Specific target organ toxicity – single exposure (Category 3)

Specific target organ toxicity – repeated exposure (Category 2)

Aspiration hazard (Category 1)

Short-term (acute) aquatic hazard (Category 2)

Long-term (chronic) aquatic hazard (Category 2)

2.2 Label elements

Pictogram:

Signal word: DANGER

Hazard statements:

H225 - Highly flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H319 - Causes serious eye irritation.
H336 - May cause drowsiness or dizziness.
H361 - Suspected of damaging fertility or the unborn child.
H373 - May cause damage to organs through prolonged or repeated exposure.
H401 + H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements:

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 - Do not breathe fume, mist, vapours or spray.
P264 - Wash thoroughly after handling.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves.
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P304 + P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P362 + P364 - Take off contaminated clothing and wash it before reuse.
P370 + P378 - IN CASE OF FIRE: Use water spray, foam, dry chemical or carbon dioxide to extinguish.
P391 - Collect spillage.
P403 + P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents and/or container in accordance with national and international regulations.

2.3 Other hazards

Static accumulator: this material is a static accumulator. Liquid temperature, the presence of contaminants, the addition of antistatic additives and/or filtration can change this property.

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

3.1 Substance

Toluene (CAS 108-88-3): ≥ 99,9%

3.2 Mixtures

Does not apply.

SECTION 4 – FIRST-AID MEASURES

4.1 Description of first aid measures

General advice:	Avoid exposure to the product, taking appropriate protective measures. Get medical advice.
Inhalation:	For those providing assistance, avoid exposure. Use proper protection if necessary. Move victim and get fresh air. Keep calm. If not breathing, give artificial respiration. Get medical advice.
Skin contact:	Wash immediately after contact with soap and water for at least 15 minutes. Remove contaminated clothing and wash before reuse.
Eye contact:	Immediately flush with water for at least 15 minutes, holding eyelids apart to ensure that all eye and lid tissues rinsed. Washing eyes within several seconds is essential to achieve maximum effectiveness. If you have contact lenses, remove them after the first 5 minutes, then continue rinsing eye. Get medical advice.
Ingestion:	DO NOT INDUCE VOMITING. Rinse mouth with water. Never give anything by mouth to an unconscious person. Get medical advice. If vomiting occurs spontaneously, place victim on side to reduce the risk of aspiration.

4.2 Most important symptoms and effects, both acute and delayed

Inhalation: May cause dizziness, drowsiness, and central nervous system depression.
Skin contact: May cause irritation and dermatitis on prolonged skin contact
Eye contact: May cause eye irritation.
Ingestion: May cause nausea, vomiting, and stomach upset.

4.3 Indication of any immediate medical attention and special treatment needed

Medical advice: If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately. For more information, contact a Poison Control Center.

SECTION 5 – FIRE-FIGHTING MEASURES

5.1 Extinguishing media

Use dry chemical, foam (may be required AR-foam), water spray or CO_2. DO NOT USE water jets.

5.2 Special hazards arising from the substance or mixture

HIGHLY FLAMMABLE. The material can accumulate static charges that can produce an electrical discharge that can cause fire.
Container and/or tank subjected to heat may unexpectedly explode and project dangerous fragments. Vapors are heavier than air and may spread along floors.

5.3 Advice for firefighters

5.3.1 Firefighting instructions

Spray containers and/or tanks with water to keep them cool.
Continue cooling with water after fire is out.
Prevent water used for fire control from entering watercourses, drains or springs.
Hot material can cause violent boiling when in contact with water, being able to project and cause serious burns.

5.3.2 Protective clothing

Use SCBA and structural protection clothing for firefighters.

5.3.3 Hazardous combustion products

In case of fire, it may release irritating and/or toxic fumes and gases, such as carbon monoxide, and other substances derived from incomplete combustion.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

6.1.1 For non-emergency personnel

Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Evacuate people to a ventilated area.

6.1.2 For emergency responders

For large spills wear protective clothing against chemicals, which is specifically recommended by the manufacturer. It may provide little or no thermal protection.

6.2 Environmental precautions

Contain spilled liquid with a dam or barrier. Prevent entry into navigable waterways, sewers, basements or uncontrolled confined areas.

6.3 Methods and material for containment and cleaning up

Eliminate all ignition sources (no smoking, do not use flares, sparks or flames in immediate area). Stop leak if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Foam can be used to reduce vapours. Do not allow reuse of spilled product.
Contain and recover the liquid when possible. Collect the liquid product with sand, vermiculite, earth, or inert absorbent material and then completely clean the affected area. Dispose of the waste properly. Dispose of the water and collected waste in marked containers for disposal as waste.

6.4 Reference to other sections

See Section 8 - Exposure Controls and Personal Protection, and Section 13 – Disposal considerations.

SECTION 7 – HANDLING AND STORAGE

7.1 Precautions for safe handling

Do not eat, drink or smoke during handling. Avoid contact with eyes, skin and clothing. Wash arms, hands, and nails after handling. Facilitate access to safety showers and eyewash emergency.
Use equipment and clothing that prevents the accumulation of electrostatic charges. Monitor and avoid explosive atmosfere formation.
This material can accumulate static electric charges that can cause an electrical spark (source of ignition). When the material is handled in bulk, an electrical spark can ignite vapors of flammable liquids or debris that may be present (for example, during cargo transfer operations). Use proper procedures for grounding. However, ground connections may not eliminate the danger of static accumulation. Place the container to earth during filling and maintain contact with it. Do not use electronic equipment (including, but not limited to, cell phones, computers, calculators, pagers and other devices) in the vicinity of filling areas, unless they are properly certified as safe.
Consult the applicable local regulations for guidance. Additional references include the American Petroleum Institute 2003 (Protection against ignition from static, lightning and parasitic currents) or National Fire Protection Agency 77 (recommended practice in static electricity) or CENELEC CLC / TR 50404 (Electrostatics - Code of conduct to avoid risks due to electricity or static) or IEC TS 60079-32-1: Electrostatic Hazards, Guidelines or ASTM D4865: Standard Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems.
Ensure that all local regulations regarding handling and storage are met.
Product transfer: Avoid splashing when filling. Once the tank is filled, wait 2 minutes before opening the covers or gate (for tanks such as tank trucks). Once the tank is filled, wait 30 minutes before opening the covers or gate (for large capacity tanks). Keep containers closed when not in use. The contamination derived from the transfer of the product can cause the ignition of the hydrocarbon vapor at the top of the deposits that previously contained gasoline. This vapor can explode if there is a source of ignition. Partially filled containers present a higher risk than full ones; For this reason, special care is required in handling, transfer and sampling activities. Even with proper connection and grounding, this material can still accumulate an electrostatic charge. If a sufficient amount of charge accumulates, electrostatic discharge and ignition of flammable air-vapor mixtures may occur. Be careful when carrying out handling operations that may cause additional hazards due to the accumulation of static charges. They may include, but are not limited to, pumping (especially turbulent flows), mixing, filtering, jet loading, cleaning and filling tanks and containers, sampling, transshipment, metering, suction truck operations, and mechanical movements. Such activities may result in static discharge, eg, sparking. Restrict the velocity in the pipe during pumping in order to avoid electrostatic discharge generation (≤ 1 m/s until the filler is submerged at twice its diameter, then ≤ 7 m/s). Avoid jet loading. DO NOT use compressed air for filling, unloading or handling operations.

7.2 Conditions for safe storage, including any incompatibilities

Store in a clean, dry, well-ventilated area. Protect from sunlight.
Containers, even those that have been emptied, may contain vapors. Do not cut, drill, grind, weld or perform similar operations on or near empty containers.
The type of container used to store the material can affect the accumulation and dissipation of electrostatic charges.

The stored containers must be grounded and bonded together. The fixed containers, the transfer containers and their associated equipment must be grounded and bonded to prevent the accumulation of electrostatic charge.
Other information: During the pumping, electrostatic charge is generated. Electrostatic discharge can cause a fire. To reduce this hazard, make sure there is electrical continuity by grounding all the equipment. The vapors present in the headspace of the storage container may be at the explosion / flammability limit and, therefore, be flammable.
Specific uses: Refer to additional references that provide safe handling practices for liquids considered to be static accumulators: American Institute of Petroleum 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents, Protection against ignitions caused by stray, static and rays) or NFPA 77 of the American Fire Protection Association (Recommended Practices on Static Electricity) or CENELEC CLC / TR 50404 (Electrostatics - Code of conduct to avoid risks due to electricity or static) or IEC TS 60079-32-1: Electrostatic Hazards, Guidelines or ASTM D4865 Standard Guide for Generation and Dissipation of Static Electricity in Petroleum Fuel Systems.
Ensure that all local regulations regarding handling and storage are met. The recommended maximum storage temperature is 40°C.

Packaging materials:	Bulk product. Not suitable: rubber.
Incompatibilities:	Keep away from Oxidizing mineral acids, strong oxidizing agents.

7.3 Specific end use(s)

Hydrocarbon solvent for industrial use.

SECTION 8 – EXPOSURE CONTROLS / PERSONAL PROTECTION

8.1 Control parameters

TLV-TWA (ACGIH):	20 ppm [TLV2022]; Toluene
TLV-STEL (ACGIH):	N/D
PEL (OSHA):	200 ppm; Toluene
PEL-STEL:	300 ppm; Toluene
REL:	100ppm; toluene
REL-STEL:	150ppm; toluene
IDLH (NIOSH):	500 ppm; Tolueno

8.2 Engineering controls

Keep workplace ventilated. The routine ventilation is usually adequate. Local hoods should be used for operations that produce or release large amounts of product. In low or confined areas should be provided mechanical ventilation. Provide showers and eyewash stations.

8.3 Personal protective equipment

In case of emergency, use the PPE indicated in sections 5.3 (for fires) or 6.1 (for spills).

Eye and face protection:	When necessary, wear chemical safety glasses (complying with EN 166).
Skin protection:	When necessary, wear impermeable protective PVC, nitrile or butyl gloves (complying with standards EN 374), clothes and safety footwear.
Respiratory protection:	When necessary, wear an organic gas or steam (A) respirator. Pay special attention to oxygen levels in the air. If large releases occur, wear self-contained breathing apparatus (SCBA).

8.4 General hygiene considerations

Wash after handling the product. Do not use organic solvents. Have means for eye washing, and safety showers.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Appearance:	Liquid.
Colour:	Colourless.
Odour:	Aromatic.
Odour threshold:	2,14 ppm (8 mg/m³) [bibl.]
pH:	N/A
Melting point:	-95°C (-139°F)
Boiling point:	109,9°C to 110,6°C (229,8°F to 231,1°F) [ASTM D 850]
Evaporation rate:	N/D
Flammability:	The product is flammable.
Flash point:	4,4°C (39,9°F)
Explosive limits:	1,1 % - 7,8 %
Auto-ignition temperature:	480°C (896°F)
Decomposition temperature:	N/D
Vapour pressure (20°C):	30,9 - 41,3 hPa
Vapour density (air=1):	3,14
Relative density (15,6°C):	0,8690 - 0,8730 g/cm³ [ASTM D 4052]

Solubility (25°C):	573 - 589 mg/l
Partition coefficient (logKo/w):	2,73
Viscosity (20°C):	0,56 mm²/s
Henry constant (25°C):	0,00664 atm.m³/mol [bibl.]
Explosive properties:	Not explosive. According to column 2 of Annex VII of REACH, this study is not required because in the molecule no chemical groups are associated with explosive properties.
Oxidizing properties:	According to column 2 of Annex XVII of REACH, this study is not necessary because the substances present in the product, due to their chemical structures, are incapable of reacting exothermically with combustible materials.

9.2 Other information

Other properties: None.

SECTION 10 – STABILITY AND REACTIVITY

10.1. Reactivity

It is not expected that product reactions or decomposition may occur under normal storage conditions. It does not contain organic peroxides. It is not corrosive to metals. It does not react with water.

10.2. Chemical stability

The product is chemically stable and it does not require stabilizers.

10.3. Possibility of hazardous reactions

No hazardous polymerization is expected.

10.4. Conditions to avoid

Avoid high temperatures, open flames, sparks and other sources of ignition.

10.5. Incompatible materials

Keep away from Oxidizing mineral acids, strong oxidizing agents.

10.6. Hazardous decomposition products

When heated, it may release toxic and irritating vapors. In case of fire, see section 5.

SECTION 11 – TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity:
Bibliographic data are presented for reference.

LD50 oral (rat, IUCLID): 636 mg/kg
LD50 oral (rat, EU Method B.1): 5580 mg/kg
LD50 der (rabbit, IUCLID): 12124 mg/kg
LC50 inh. (rat, 4hs., IUCLID): 28,1 mg/l
Skin irr. (rabbit, OECD 404): irritant
Eye irr. (rabbit, OECD 405): irritant
Skin sens. (Guinea pig, OECD 406): not sensitising
Resp. sens (Guinea pig, OECD 403): not sensitizing

Carcinogenicity, mutagenicity, and reproductive toxicity:

Carcinogenicity: Toluene (CAS 108-88-3) is classified as a human carcinogen not verified by IARC according to monograph 47, 71 of the year 1999.
Mutagenicity: Not classified as mutagenic according to the GHS.
Repr. Tox.: This product is classified as toxic for reproduction category 2 by the GHS with effects on sexual function and fertility.
Teratogenicity: This product is classified as toxic for reproduction category 2 by the GHS with effects on the development of offspring.
STOT-SE: May cause narcotic effects, with drowsiness, dizziness, and vertigo.
STOT-RE: May cause damage to organs through prolonged or repeated exposure. Target organ: central nervous system
Aspiration: The product is toxic by aspiration and its viscosity makes it possible to incorporate it by this route, which is why it is classified as dangerous by aspiration.

Acute and delayed effects:

Routes of exposure: Inhalation, skin and eye contact.
Inhalation: May cause dizziness, drowsiness, and central nervous system depression.
Skin contact: May cause irritation and dermatitis on prolonged skin contact
Eye contact: May cause eye irritation.
Ingestion: May cause nausea, vomiting, and stomach upset.

SECTION 12 – ECOLOGICAL INFORMATION

12.1. Toxicity

Bibliographic data of its component are presented for reference.
LC50 (O. gorbuscha, QSAR, 24 h): 5,4 mg/l - bibl
LC50 (C. dubia, US EPA 600/4-91-003, 48 h): 3,8 mg/l - bibl
EC50 (C. vulgaris, 72 h): 134 mg/l - bibl
EC50 (Nitrosomonas sp., 24 h): 84 mg/l - bibl
NOEC (O. kisutch, , 40 d): 1,4 mg/l - bibl
EC50 (D. magna, US EPA 600/4, 7 d): 3,2 mg/l

12.2. Persistence and degradability

BIODEGRADABILITY (APHA 219): 86% in 20 days - easily biodegradable.

12.3. Bioaccumulative potential

Log $K_{o/w}$: 2,73
BIOCONCENTRATION FACTOR (OCDE 305): 90 - Suggests that the potential for bioconcentration in aquatic organisms is low to moderate.

12.4. Mobility in soil

HENRY CONSTANT (25°C): 0,00664 atm.m³/mol [bibl.]
Log Koc: 37 to 178 - the product is highly to moderately mobile.
Distribution (%): AIR: 99.47 - WATER: 0.49 - SOIL: 0.02 - SEDIMENT: 0.02 - BIOTA: 0.

12.5. Results of PBT and vPvB assessment

There is no test data to determine compliance with Annex XIII of the REACH regulation on its classification as persistent (P) or bioaccumulative (B), but it may be classified as toxic (T).

12.6. Other adverse effects

Organic halogens and metal containing: Does not contain organic halogens nor metals.

SECTION 13 – DISPOSAL CONSIDERATIONS

Dispose of excess product and empty containers according to current legislation for the protection of the environment and hazardous waste. Disposal procedure: incineration.

SECTION 14 – TRANSPORT INFORMATION

14.1 Transport by land

Proper Shipping Name:	TOLUENE
UN/ID Number:	1294
Hazard class:	3
Packing group:	II
Hazard identification number:	33
Excepted and limited quantity:	333 / 1 L
Special provisions:	-

14.2 Air transport (ICAO/IATA)

Proper Shipping Name:	TOLUENE
UN/ID Number:	1294

Hazard class:	3
Packing group:	II
PAX and Cargo Packing instructions:	Y341; 1L / 353; 5L
Cargo Packing instructions:	364; 60L
ERC:	3L
Special provisions:	-

14.3 Sea transport (IMO)

IMDG Code

Proper Shipping Name:	TOLUENE
UN/ID N°:	1294
Hazard class:	3
Packing group:	II
EMS:	F-E, S-D
Stowage and manipulation:	Category B
Segregation:	–
Marine pollutant:	YES

Proper Shipping Name: UN1294; TOLUENE; Class 3; PG II; MARINE POLLUTANT; Flash point 4,4°C (39,9°F) c.c.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Proper Shipping Name:	TOLUENE; Cat. Y; ST 3

SECTION 15 – REGULATORY INFORMATION

Regulation

Law 9 of 1979 or Sanitary Code, by which sanitary measures are dictated. Standards to preserve, conserve and improve the health of individuals in their occupations.

Resolution 2400 of 1979, which establishes some provisions on housing, hygiene, and safety in work establishments.

Decree 283 of 1990, which regulates the storage, handling, transportation, distribution of liquid fuels derived from petroleum and transportation by tanker trucks of crude oil.

Resolution 1705 of August 8, 1991, which regulates the transportation of fuels.

Law 55 of 1993 of the Presidency of the Republic, which approves the "Agreement No. 170 and Recommendation number 177 on Safety in the Use of Chemical Products at work", adopted by the 77th. Meeting of the General Conference of the I.L.O., Geneva, 1990.

Decree 4741 of 2005, which partially regulates the prevention and management of waste or hazardous waste generated within the framework of comprehensive management.

Resolution 1023 of 2005, by which environmental guidelines are adopted as an instrument of self-management and self-regulation.

Law 1252 of 2008, by which prohibitive regulations are issued in environmental matters, referring to residues and hazardous waste and other provisions are issued.
Decree 1072 of 2015. Sole Regulatory Decree of the Labor Sector.
Decree 1076 of 2015. Sole Regulatory Decree of the Environment and Sustainable Development Sector.
Decree 1079 of 2015. Sole Regulatory Decree of the Transport Sector, section 8, which regulates the Automotive Land Transport of dangerous goods by road.
Resolution 0001 of January 8, 2015, by which the regulations on the control of chemical substances and products are unified and updated.
Decree 1496 of 2018, by which the Globally Harmonized System of Classification and Labeling of Chemical Products is adopted and other provisions on chemical safety are issued.
Resolution 0312 of 2019, by which the Minimum standards of the Management System are defined. Safety and Health at Work SG-SST
Resolution 0773 of 2021, which defines the actions that employers must develop for the application of the Globally Harmonized System (GHS) of Classification and Labeling of Chemical Products in the workplace and other safety provisions are issued chemistry.

Globally Harmonized System of Classification and Labeling of Chemicals, sixth revised edition, 2015 (ST/SG/AC 10/30/Rev. 6).
European Agreement on International Carriage of Dangerous Goods by Road (ADR 2021) and amendments.
Regulation on the International Carriage of Dangerous Goods by Rail (RID 2021) and amendments.
International Maritime Dangerous Goods Code (IMDG 2020 - Amendment 40-20), International Maritime Organization (IMO).
International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk (IBC/IBC Code), resolution MEPC.318(74), IMO.
Regulations of the International Air Transport Association (IATA 63 ed., 2022) relating to the transport of dangerous goods by air.

SECTION 16 – OTHER INFORMATION

16.1 Abbreviations and acronyms

ACGIH: American Conference of Governmental Industrial Hygienists.
ATE: Acute toxicity estimate.
CAS: Chemical Abstracts Service.
CMP: maximum concentration allowed.
CMP-C: maximum concentration allowed, ceiling concentration.
CMP-CPT: maximum concentration allowed, short time period.
EC: effect concentration.
EC50: Average Effective Concentration.
EMS: Emergency management sheet.
ERC: Emergency response card.
GHS: Globally Harmonized System of Classification and Labelling of Chemicals.
IARC: International Agency for Research on Cancer.
IATA: International Air Transport Association.
ICAO: International Civil Aviation Organization.
IDLH: Immediately dangerous to life or health
IMDG: International Maritime Dangerous Goods.
IMO: International Maritime Organization.
LC: Lethal concentration.
LD: Lethal dose.
Log Ko/w: octanol-water partition coefficient.

Log Koc: organic carbon to water partition coefficient.
MTESS: Ministry of Labor, Employment and Social Security, Argentina.
N/A: not applicable.
N/D: no data available.
NFPA: National Fire Protection Association.
NOEC: No observed effect concentration.
OECD: Organisation for Economic Co-operation and Development.
OSHA: Occupational Safety and Health Administration.
PAX: Passengers.
PEL: Permissible Exposure Limit.
PNEC: Predicted No Effect Concentration
PNEC-STP: Predicted No Effect Concentration – sewage treatment plant.
PPE: Personal protection equipment.
REL: Recommended Exposure Limit.
SRT: Superintendence of Labor Risks, Argentina.
STEL: Short Term Exposure.
TLV: Threshold Limit Value.
UN: United Nations.

DENOMINATION OF GHS CLASSES

Aer.: aerosols
Oxid. Gas: oxidizing gas
Compressed gas: compressed gas
Dissolved gas: dissolved gas
Flam. Gas: flammable gas
Liquefied Refr. Gas: refrigerated liquefied gas
Liquefied gas: liquefied gas
Oxid. Liquid: oxidizing liquid
Flam. Liquid: flammable liquid
Pyr. Liq.: pyrophoric liquid
Met. Corr.: corrosive for metals
Org. Perox.: organic peroxide
Water React. Flam. Gas: substance reactive with water, which emits flammable gases
Oxid. Solid: oxidizing solid
Flam. Solid: flammable solid
Asp Tox.: aspiration toxicity
Carc.: carcinogenicity
Skin Corr. / Irrit.: Corrosion / skin irritation
Eye Damage / Irrit .: Serious eye damage / eye irritation.
Lac.: toxic for reproduction - lactation
Muta.: mutagenicity
Repr.: toxic for reproduction
Skin Sens.: skin sensitizer
Resp. Sens.: respiratory sensitizer
STOT Rep. Exp.: Specific target organ toxicity - repeated exposure
STOT Single Exp.: Specific target organ toxicity - single exposure
Acute Tox.: Acute toxicity
Aquatic Acute: Hazardous to the aquatic environment - acute danger
Aquatic Chronic: Dangerous for the aquatic environment - chronic danger
Ozo.: Dangerous for the ozone layer.

16.2 Key literature references and sources for data

International Agency for Research on Cancer (IARC), classification of carcinogens.
Hazard Classification and Labeling of Petroleum Substances in the European Economic Area – 2020, CONCAWE, Brussels, October 2020
European Chemicals Agency – ECHA
GESTIS-Stoffdatenbank, IFA, DGUV, Germany
Annex VI of Regulation (EC) No. 1272/2008, on classification, labeling and packaging of substances and mixtures (CLP Regulation)
US National Library of Medicine - PUBCHEM

16.3 Classification and procedure used to derive the classification for mixtures

Not dangerous for the ozone layer.

Volatile organic compounds (VOC' s): N/D
NFPA: 2 3 0 - EPP: G
The classification was performed based on chemical analogues and product information compiled by CIQUIME.
SECTION 2: classification by analogy with other products, and based on product data in CIQUIME database.
SECTION 9: product data.
SECTION 11 and 12: calculation of acute toxicity estimation according to GHS, product data and bibliographic data.
Change's control: v.1 - Adaptation to the GHS.

16.4 Disclaimer

The information in this document refers to the product, and not to another product or process that involves it. This document provides health and safety information. The information is correct and complete according to our knowledge. It is provided in good faith, but without guarantee. Use the product according to the recommendations for use. If you use this product, you should be informed of the recommended safety precautions and should have access to this information. For any other use, evaluate exposure and implement appropriate handling measures and training programs to ensure safe operations in the workplace.
It remains your responsibility that this information is appropriate and complete for the use of the product.

Revision:	1	Emission date:	April, 2022
Elaborated:	CIQUIME	Approved:	ECOPETROL S.A.