SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1 – Product indentifier

Product name:	FUMARIC ACID
Internal product code:	Not available.
EC No:	203-743-0
CAS No:	110-17-8
Registration number (REACH):	01-2119485492-31-XXXX

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

Relevant identified uses	Used in the production of polyester, alpenids , plasticizers, bactericides, acidulants and flavorings.

1.3- Details of the supplier of the safety data sheet

Manufacturer/Supplier	**PETROM – Petroquímica Mogi das Cruzes S/A**
Street address/P.O.Box	**Rodovia Dom Paulo Rolim Loureiro, km 09, Vila Moraes –Mogi das Cruzes – SP – Brasil.**
Country ID / Postcode /Place:	**Brazil / 08766-500**
Telephone number	**+55 (11) 4798-7500/7600**
Website:	**http://www.petrom.com.br**
Email	**petrom@petrom.com.br**

1.4 - Emergency telephone number

Opening hours	24 hours
Emergency Phone	**+55 (11) 4798-7500**

SECTION 2: HAZARDS IDENTIFICATION

Hazard classification according to Regulation (EC) No. 1272/2008 [CLP]

2.1 Classification of the substance or mixture

Hazard Classification	Category
Serious Eye Damage/Eye Irritation	2

2.2 – Label element

Hazard Pictograms

Signal Word **WARNING**

Hazard Phrases **H318** – Causes serious eye irritation.

Hazard statements

Prevention:

P264 - Wash hands thoroughly after handling.

P280 - Wear protective gloves/protective clothing/eye protection/face protection.

Emergency Response:

P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do - continue rinsing.

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

Supplemental Hazard information (EU): Not applicable.

2.3 - Other hazards

There are no other hazards.

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substance

CAS No	**110-17-8**
EC No	**203-743-0**
Index No	**607-146-00-X**
REACH Registration No	**01-2119485492-31-XXXX**
% [weight]	>90%
Substance name	Acid fumaric
Classification according to Regulation (EC) No 1278/2008 (CLP).	Serious Eye Damage/Eye Irritation – Category 2.
SCL, M-factor, ATE	--
Other ingredients	Does not show impurities that may contribute to danger.

3.2 Mixture

Not applicable

SECTION 4: FIRST AID MEASURES

4.1 - Description of first aid measures

Following inhalation:	Remove the victim to a ventilated area and keep him/her at rest in a position that does not impede breathing. If the victim is not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Seek medical assistance immediately, taking this SDS, the product label and package insert.
Following Skin contact:	Wash immediately with soap and water and rinse thoroughly. Remove contaminated clothing and shoes. Preferably use an emergency shower. Seek medical assistance immediately, taking this SDS, the product label and leaflet.
Following eye contact:	Immediately flush the affected eyes for at least 15 minutes under running water with the eyelids open. Remove contact lenses if present. Preferably use an eye wash device. Seek medical assistance immediately, taking this SDS, the product label and leaflet.
Following ingestion:	Rinse mouth and drink plenty of water. Do not induce vomiting. If vomiting occurs spontaneously, lay the victim on their side to prevent them from inhaling the residue. Never give anything by mouth to an unconscious person. Seek medical assistance immediately, taking this SDS, the product label and instructions.

What actions should be avoided:	Do not induce vomiting and do not administer anything orally if the person is unconscious.
Self-protection of the first aider	Avoid contact with the product while providing aid to the victim.

4.2- Most important symptoms and effects, both acute and delayed

Adverse effects to human health	Causes severe eye irritation with redness, swelling and pain.

4.3- Most important symptoms and effects, both acute and delayed Adverse effects to human health

Notes to physician:	There is no specific antidote. Treatment should be symptomatic, according to the patient's clinical condition. In cases of lung irritation, initial treatment with a dosed aerosol of Dexamethasone .

SECTION 5: FIREFIGHTING MEASURES

5.1 - Extinguishing Media

Suitable extinguishing media	Use dry chemical, carbon dioxide, alcohol-resistant foam, or water spray.
Insuitable extinguishing media	Water jet extinguishers should be avoided in order not to cause spreading of the product to other regions.

5.2 - Special hazards arising from the substance or mixture

Special Procedures	Evacuate an 800-meter-radius area. Fire fight from a safe distance. Use full PPE and respiratory protection of autonomous type (SCBA) with positive pressure. Use levees to contain the water used in combat. Position yourself with your back to the wind. Use water mist to cool down equipment exposed in the vicinity of the fire.
Hazardous combustion products:	Non-flammable product. Burning can generate toxic and irritating gases such as carbon monoxide. Explosive dust/air mixtures may form.

5.3 – Advice for firefighters

Respiratory protective equipment of autonomous type (SCBA) with positive pressure and full protective clothing. Containers and tanks involved in the fire must be cooled with water jets.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1 - Personal precautions, protective equipment and emergency procedures

6.1.1 - For non-emergency personnel	Wear suitable protective clothing, splash goggles, closed shoes, nitrile rubber or PVC gloves or other impermeable material. Respiratory protection should be used depending on the concentrations present in the environment or the extent of the spill/leak. Avoid contact of the product with the skin, eyes and mucous membranes. Do not handle ruptured packaging unless you are properly protected with the use of personal protective equipment. Do not touch or walk on spilled product. Remove all sources of ignition. Do not smoke. Stay away from low areas, with the wind at your back. <u>Personal precautions:</u> <u>Personal precautions:</u> Use complete PPE, with appropriate protective clothing, splash goggles, closed shoes, nitrile rubber or PVC gloves or other waterproof material. The use of respiratory masks with A – P2 filter is recommended.
6.1.2 - For emergency responders	<u>Removal of ignition sources:</u> Interrupt the power supply and disconnect sources of sparks. Remove from the site any material that may start a fire (ex.: diesel oil spill). <u>Dust Control:</u> Cover with plastic sheeting or apply water mist to prevent material from spreading.

	Prevention of inhalation and contact with the skin, mucous membranes and eyes: Use clothes and accessories as described above. Use eye protection.

6.2 – Environmental precautions

Precautions for the environment:	Prevent contamination of watercourses by sealing the entrance to storm drains. Prevent product residues from reaching water collections, and stop human and animal consumption. Build a dike around the spilled product.

6.3- Methods and material for containment and cleaning up

Prevention of secondary hazards	*Paved Floor* : Use water mist or vapor suppression foam to reduce vapor dispersion. Use natural or spill containment barriers. Collect the spilled product with a shovel and place it in appropriate containers and remove them to a safe location. *Soil* : Remove the layers of contaminated soil until reaching the uncontaminated soil, collect this material and place it in a sealed and properly identified container; *Bodies of water* : Immediately stop collection for human or animal consumption, and contact the nearest environmental agency and the company's emergency center, since the measures to be adopted depend on the scale of the accident, the characteristics of the water body in question and the quantity of the product involved. For final disposal, proceed in accordance with Section 13 of this SDS.

6.4- Reference to other sections

Concerning personal protective equipment to use, see section 8. Concerning disposal elimination after cleaning, see section 13.

SECTION 7: HANDLING AND STORAGE

7.1- Precautions for safe handling:

Safe handling guidelines	Use the product as recommended by the manufacturer. Use PPE as described in Item 8. Use vacuum cleaners in case of dust formation. Keep containers hermetically sealed. Empty containers should not be used. Contaminated protective equipment must be cleaned before removing it. Fill only in dedicated and assigned containers. Nitrogen blanketing is necessary for large-scale operations with this compound due to the low minimum ignition energy. Avoid contact with skin, eyes and clothing. Keep people, especially children and pets, away from the work area. Do not come into direct contact with the product. Keep the product in its original container. Keep any leftovers of the product in their original, properly closed packaging. Handle the product with appropriate local exhaust or in a well-ventilated area; in open spaces, handle it downwind. In the event of symptoms of poisoning, stop work immediately and proceed as described in Item 4 of this data sheet.
Exposure prevention for workers	Handle in a ventilated area or with a general ventilation/local exhaust system and in accordance with good industrial hygiene and safety practices. Do not handle the product until you have read and understood all safety precautions. Use personal protective equipment as described in section 8. Do not eat, drink or smoke while handling the product. Wash your hands before eating, drinking, smoking or going to the toilet. When opening the package, do so in a way that avoids spillage. Do not use damaged and/or defective personal protective equipment. Do not unclog nozzles, orifices, pipes and valves with your mouth. Do not handle and/or carry damaged packages. Always keep the workplace clean.

7.2 - Conditions for safe storage, including any incompatibility

Adequate	Store in a tightly sealed container in a dry, cool, well-ventilated place away from incompatible materials. Carefully close opened containers and store in an upright position to prevent leaks. Always store in containers that correspond to the original packaging. Follow the instructions on the label. Protect from direct sunlight. Keep away from sources of ignition. Keep away from heat. It is recommended not to exceed room temperature (max. 25°C) during long-term storage.
To avoid	Heat sources and direct sunlight.
Fire and explosion prevention	Dust may combine with air to form an explosive mixture. Keep product away from heat, sparks, flames and other sources of ignition.
Incompatible product and materials / other information	Do not store food, feed, medicines, drinks intended for human and animal consumption together with incompatible materials.
Safe materials for packaging	Recommended: Product already packaged in appropriate packaging (High density polyethylene. Low density polyethylene. Steel container. Stainless steel. Carbon steel).

7.3 - Specific end use(s)

See the technical information sheet of this product for more information.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Occupational exposure limits	Not established.
Biological indicators:	There are no biological indicators of exposure established (NR-7).

8.2 Exposure controls

8.2.1 - Appropriate engineering controls:	When applicable, use an appropriate exhaust system to ensure adequate ventilation in the workplace. Handle the product in a location with good natural or mechanical ventilation to keep the concentration of vapors/dust below the tolerance limit.

8.2.2 - Personal protection equipment:

Respiratory protection:	Respiratory protection mask with filter A – P2.
Hand protection:	The material used must be waterproof. The following materials are suitable for protective gloves: Natural rubber / Natural latex; Polychloroprene ; Nitrile rubber / Nitrile latex; Carbon fluorinated rubber; Polyvinyl chloride – PVC.
Eye and face protection:	Safety glasses with side splash protection.
Skin protection	Suitable protective clothing and closed shoes. The material used must be waterproof.
Thermal hazards:	Does not present thermal hazards.
Hygiene measures:	Wash contaminated clothing separately, avoiding contact with other utensils for personal use.

8.2.3 Environmental exposure controls:

See SECTION 7 (Handling and storage) and SECTION 13 (Disposal considerations) for measures to avoid excessive environmental exposure during use and waste disposal.

Technical measures to prevent exposure	Keep the PPE properly clean and in proper conditions of use, periodically carrying out inspections and possible maintenance and/or replacement of damaged equipment.
Instruction measures to prevent exposure:	Take a bath and change clothes after using the product. Wash contaminated clothing separately, avoiding contact with other utensils for personal use.
Organizational measures to prevent exposure	Emergency shower and eyewash.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

Physical state:	Solid, powder.
Color:	White.
Odour	Virtually odorless.
pH	2.1 (4.9 g/L aqueous solution – 20 °C).
Melting point/freezing point:	286 – 287°C.
Boiling point or initial boiling point and boiling range:	Not available.
Flash Point	273°C.
Evaporation rate	Not available.
Flammability	Non-flammable.
Lower/upper limit of flammability or explosiveness	Not available.
Vapor density	Not available.
Density	1.635 g/cm ^{3} (water=1).
Steam pressure	0.02 Pa.
Solubility	7 g/L.
Partition coefficient – n-octanol/water	LogP_{ow} : -4.02.

Auto-ignition temperature	339°C.
Decomposition temperature	Not available.
Viscosity	Not available.
Surface tension	Not available.
Corrosivity	Not available.

9.2– Other information

Molecular weight	116.07 g/mol.

SECTION 10:STABILITY AND REACTIVITY

10.1 Reactivity

Stable under normal handling and storage conditions.

10.2 Chemical stability

Stable under normal handling and storage conditions.

10.3 Possibility of hazardous reactions

Possibility of formation of explosive dust/air mixtures. The substance may react dangerously with oxidizing agents, bases, reducing agents and amines.

10.4 Conditions to avoid

High temperatures and contact with incompatible materials.

10.5 Incompatible materials

Incompatible with oxidizing agents, bases, reducing agents and amines.

10.6 Hazardous decomposition products

Upon thermal decomposition it forms irritating and toxic gases such as carbon monoxide, carbon dioxide and maleic anhydride .

SECTION 11: TOXICOLOGICAL INFORMATION

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008

Acute toxicity:	LD50 Oral in rats: 10,700 mg/Kg. LD50 Dermal in rabbits: 20,000 mg/Kg. LC50 Inhalation in rats (4h): > 1,306 mg/L.
Skin corrosion /irritation:	May cause mild skin irritation.
Serious eye damage/irritation	Causes severe eye irritation with redness, swelling and pain.
Respiratory or skin sensitization	Not sensitizing.

Chronic toxicity:	Carcinogenicity: The product is not expected to present carcinogenicity. Mutagenicity: It did not show mutagenic activity in tests performed with *S. typhimurium* strains. Since fumaric acid is negative in vitro genetic toxicity tests, *in vivo testing* is not necessary. Effects on reproduction: The effects of fumaric acid on reproduction have been evaluated in several older published studies. These data, combined with the role of fumaric acid in mammalian metabolism and the lack of reproductive effects in a study with the fumaric acid metabolite, maleic acid , provide sufficient information to determine that fumaric acid has a low toxicity profile and is not considered a reproductive toxicant. Single exposure: The product is not expected to cause organ damage through single exposure.
Systemic toxicity to target organ:	Repeated exposure: Based on the toxicity data available for fumaric acid and the closely related compound malic acid, background levels of exposure to fumaric acid from its role in human respiration and as a food additive, and experience gained from use as a human therapeutic agent, it can be concluded that fumaric acid is of little concern to human health and no further repeated dose testing is necessary.
Aspiration hazard:	The product is not expected to present an aspiration hazard.
Other Information:	Symptoms related to the physical, chemical and toxicological characteristics. Reference to other sections: 4.2.

SECTION 12: ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to aquatic organisms:	CL50 Fish (*Danio rerio*) (96h): >100 mg/L. CE50 Microcustaceae (*Daphnia Magna*) (48h): > 100 mg/L. CE0 Algae (*Desmodesmus subspicatus*) (72h): >100 mg/L.
Toxicity to other organisms:	LC50 Birds: Not available. LC50 Bees: Not available. LC50 Earthworms: Not available.
Main effects:	The product is not classified as dangerous to aquatic organisms.

12.2 Persistence and degradability

Using an unadapted sludge from a domestic source, the observed biodegradation percentage comprised 60.1% after 11 days (i.e. within the 10-day window) and 67.5% after 28 days. The reference substance (sodium benzoate) incubated under the same conditions showed a biodegradation percentage of 60.1% after 11 days. Incubation of the test substance and the reference substance demonstrated that the test substance did not significantly inhibit the microbial activity of the activated sludge.

12.3 Bioaccumulative potential

Pow value of fumaric acid is –4.02. Therefore, it can be expected that fumaric acid have a low potential for bioaccumulation.

12.4 Mobility in soil

Using a structure estimation method based on molecular connectivity indices, the Koc of fumaric acid can be estimated to be 7. According to a classification scheme, this estimated Koc value suggests that fumaric acid is expected to have very high mobility in soil.

12.5 Results of PBT and vPvB assessment

Not available.

12.6 Endocrine disrupting properties

Not available.

12.7 Other adverse effects

No other environmental effects are known for this product.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product/Leftover of Product	It must be disposed of as hazardous waste in accordance with local legislation. Treatment and disposal must be evaluated specifically for each product. Federal, state and municipal legislation should be consulted, including: CONAMA Resolution 005/1993, Law No. 12,305, of August 2, 2010 (National Policy on Solid Waste). Keep product residues in their original packaging and properly closed. Disposal must be carried out as established for the product. Keep product residues in their original and closed packaging, in accordance with local legislation.
Used packaging:	Used packages must be emptied as well as possible and disposed of according to the dangerousness of the contents. Never reuse empty packages, as they may contain product residues and must be kept closed and sent to an appropriate location in accordance with local legislation.

SECTION 14: TRANSPORTATION INFORMATION

National and international regulations

Land Classification (Rail, Road) according to the National Land Transportation Agency (ANTT):

- PRODUCT NOT COMPLIED WITH IN THE CURRENT RESOLUTION ON THE TRANSPORTATION OF DANGEROUS PRODUCTS.

Air Classification as per International Aviation Organization – Technical Instructions (ICAO - TI) and National Civil Aviation Agency (ANAC):

- PRODUCT NOT COMPLIED WITH IN THE CURRENT RESOLUTION ON THE TRANSPORTATION OF DANGEROUS PRODUCTS.

Waterway Classification (Sea, River, Lake) according to International Maritime Dangerous Goods (IMDG) and National Waterway Transportation Agency (ANTAQ):

- PRODUCT NOT COMPLIED WITH IN THE CURRENT RESOLUTION ON THE TRANSPORTATION OF DANGEROUS PRODUCTS.

SECTION 15: REGULATORY INFORMATION

15.1 – Safety, health and environmental regulations/legislation specific for the substance or mixture

REACh Regulation (CE) No. 1907/2006

This product only contains compounds that are on the list of pre-registered, registered or exempt substances from registration or are already considered registered in accordance with
Regulation (EC) No. 1907/2006 (REACH)., The above statements on the status of the registration of The substance is provided in good faith and is assumed to be accurate, as is the effective date shown above.

However, no warranty is offered, either express or implied. It is the buyer / consumer's obligation to ensure that they correctly understand the regulatory status of the product.

Seveso III: Directive 2012/18 / EU of the European Parliament and of the Council on the control of the risks inherent in serious accidents involving dangerous substances.
Listed in the Regulation: Not applicable.

Regulation (EC) No. 649/2012 of the European Parliament and of the Council, of July 4, 2012, relative to the export and import of dangerous chemicals: Not applicable.

15.2 – Chemical Safety Assessment

For the proper and safe use of this product, please refer to the approved conditions stated on the product label.

SECTION 16: OTHER INFORMATION

Revision date: 06/18/2024
Version: 7

Recommended use- Follow all recommendations of use, storage, and disposal indicated by the manufacturer/registrant and described on the packaging, product package insert and cited in Section 1 of this MSDS.

Texts of the sentences covered in section 2:
H319 – Causes serious eye irritation.
No. 1272/2008 [CLP]:
Serious Eye Damage/Eye Irritation – Category 2: H319;

Important Legal Notice Important- The data and information contained herein is provided in good faith and represent the best current knowledge about the matter, and are based from data supplied by the registrant company, manufacturer or importer of this product, available at the moment, however do not completely exhaust the subject. No warranty is given about the result of the application of such data and information, not absolving users/receivers /workers/employers of their responsibilities, at any stage of the handling, storage, processing, packaging and distribution of this material/product. Prevail over the data contained herein the provisions in the legislation, regulations and standards in force. The registrant assumes no liability for any losses, damages, or expenses related to the handling, storage, use or disposal of the product, repair of damages or compensation of any kind.
Be warned that the handling of any chemical substance requires prior knowledge of its dangers by the user. The company using the product should promote the training of its employees and contractors regarding the possible risks coming from the product.

Glossary:

ACGIH – American Conference of Governmental Industrial Higyenists;
GHS – Globally Harmonized System
LC50 – Lethal Concentration
LD50 – Lethal Dose
EC50 - effective concentration
NFPA - National Fire Protection Association
PPE - Personal Protection Equipment;
N/A. - Not applicable**;**
N/A. - Not available;
NR - Not relevant;

UN: The United Nations Organization;
OSHA - Occupational Safety and Health Administration;
PEL -Permissible Exposure Limits;
REL - Recommended Exposure Limits;
TLV - Threshold limit value;
TWA - Time Weighted Average.
NBR - Brazilian Standard
GHS - Globally Harmonized System
ABNT - Brazilian Technical Standards
EPA - Environmental Protection Agency
IARC - International Agency for Research on Cancer