



MATERIAL SAFETY DATA SHEET

(According to GHS rev. 5)




ANHIDRIDO MALEICO

1. IDENTIFICATION

Company: YPF S.A. Address: Av. Macacha Güemes n° 515 CP C1106BKK Buenos Aires - ARGENTINA Tel# (+ 5411) 5441-2000 Fax# (+ 5411) 5441-5796	Commercial name: MALEIC ANHYDRIDE Chemical name: 2,5-Furandione
	Synonyms: Cis-butenedioic anhydride. Maleic acid anhydride. Dihydro-2,5-dioxofuran. Toxilic anhidride.
	Emergency Telephone: Argentina: 0800-222-2933 Other countries: (+5411) 4552 8747

2. HAZARD IDENTIFICATION

2.1 LABEL ELEMENTS

Pictograms			
Warning word	Peligro		
Hazard statement	H314 - Cause severe skin burns and eye damage. H317 - May cause an allergic skin reaction.	H334 - May cause allergy or asthma symptoms or breathing difficulties if inhaled. H372 - Causes damage to organs through prolonged or repeated exposure.	H302 - Harmful if swallowed. H402 - Harmful to aquatic life.
Classification criteria	Skin corrosion (Category 1B) - Serious eye damage (Category 1)	Respiratory sensitization (Category 1A) - Skin sensitization (Category 1A) Specific target organ toxicity - repeated exposure (Category 1)	Acute toxicity, oral (Category 4) Short-term (acute) aquatic hazard (Category 3)
Other regulations	-		

OTHER HAZARDS

Danger of dust explosion. Refer to section 9 for more information.

3. COMPOSITION/INFORMATION ON INGREDIENTS

General composition: Maleic anhydride.

Main components	Range %	Classification	S Phrases
Maleic anhydride CAS # 108-31-6	100	Acute Tox. 4; Skin Corr. 1B; Resp. Sens. 1A; Skin Sens. 1A; STOT Rep. Exp. 1; Aquatic Acute 3	H302; H314; H334; H317; H372; H402

4. FIRST-AID MEASURES

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.

Ingestion/Aspiration:

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.

Contact skin/eyes:

Skin contact: Wash immediately after contact with water for at least 15 minutes. Do not neutralize or use substances other than water. 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. It can cause serious damage to the cornea, conjunctiva or other parts of the eye.

General measures:

Avoid exposure to the product, taking appropriate protective measures. Get medical advice.

Medical advice: Provide symptomatic treatment. For more information, contact a Poison Control Center.

5. FIRE-FIGHTING MEASURES

Extinguishing agents:

Use dry chemical, alcohol-resistant foam, sand or CO₂. Some foams can react with the product.

Non suitable extinguishing agents:

DO NOT USE water jets.

Combustion products:

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

Special measures:

Spray the packaging with water to avoid ignition or to keep them cool if exposed to excessive heat or fire. Remove the packages if they have not yet been reached by the flames, and you can do so without risk. Cool containers with water until the fire is extinguished, removing the remains until the embers are cold. Prevent water used for fire control or dilution from entering watercourses, drains or springs.

Special hazards:

The product and its packaging can burn, but do not ignite easily. Under certain conditions, any dust in the air can be a risk of explosion.

Protective equipment:

Use SCBA and structural protection clothing for firefighters.

6. ACCIDENTAL RELEASE MEASURES

Environmental precautions: Contain solid and cover to prevent dispersion. Prevent the product reaches waterways.	Personal precautions: Avoid sources of ignition. Evacuate personnel to a ventilated area. Use SCBA and skin and eye protection. Wear impervious gloves. Ventilate immediately, especially in low areas where vapours may accumulate. Avoid ignition sources. Evacuate personnel to a ventilated area. Use SCBA and skin and eye protection. Wear impervious gloves. Ventilate immediately, especially in low areas where vapours may accumulate. Do not allow reuse of spilled product.
Cleanup methods: Collect the product with shovel and place it in an appropriate container. Clean the affected area completely. Provide water and waste collected in marked for disposal as chemical waste containers.	Personal protection: In large spills wear protective clothing against chemicals. It may provide no thermal protection.

7. HANDLING AND STORAGE

Handling:

General precautions:

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. Avoid inhalation of the product. Use PPE. Keep container closed. Use with adequate ventilation. Handle containers carefully.

Specific conditions:

During transfer, the use of gloves, visors or goggles are recommended to avoid splashes. No welding or cutting in next to containers filled with product areas. With empty containers follow similar precautions. Before making repairs in a tank, make sure it is properly vented and washing.

Specific Use:

Manufacture of polyester and alkyd coating resins; raw material for the preparation of fumaric and tartaric acids, and maleic hydrazide; as a constituent of pesticides, preservatives for oils and fats, etc.

Storage:

Temperature and decomposition products:

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

Dangerous reactions: It reacts exothermically with water and water steam.

Storage conditions:

Store in a clean, dry, well-ventilated area. Protect from sunlight. Periodically check the containers to warn of losses and breakages. Store at temperatures between 15 and 25 °C, in rooms with a waterproof and resistant to corrosion floor.

Incompatible materials:

Oxidizing mineral acids, alcohols and glycols, aldehydes, amines, azo and diazo compounds, hydrazines, caustics, cyanides, dithiocarbamates, inorganic fluorides, isocyanates, metals, nitrides, nitriles, inorganic sulfides, epoxides, explosives, polymerizable substances, strong oxidizing agents, strong reducing agents.

8.EXPOSURE CONTROLS/PERSONAL PROTECTION

Eye protection:

Personal protection:

Should wear safety glasses, chemical splash-proof (complying with EN 166).

Respiratory protection:

Where necessary, use a dust and particles (P1) respirator. Special attention to oxygen levels in the air should be paid. If large releases occur, wear self-contained breathing apparatus (SCBA).

Skin protection:

When handling this product should wear impermeable protective PVC, nitrile or butyl gloves (complying with standards EN 374), clothes and safety footwear resistant to chemicals.

Other protective equipment:

Provide emergency showers and eyewash in work areas.

General precautions:

Keep workplace ventilated. The normal 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.

Specific hygiene measures:

Good work practices and the adoption of hygienic measures reduce unnecessary exposures. Showers should be available with hot soapy water (non-solvent). Using skin creams after work is recommended.

Exposure controls:

REL: 1 mg/m³

TLV-TWA (ACGIH): 0,1 ppm

TLV-STEL (ACGIH): N/D

PEL (OSHA 29 CFR 1910.1000): 1 mg/m³

IDLH (NIOSH): 10 mg/m³

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Crystalline solid.		pH: 7 (1% water solution)
Colour: Colourless.		Odour: Acre.
Boiling point: 202°C (395.6°F)	Melting/Freezing point: 52.8 °C (127°F)	
Flash point: 103.3 (218°F) C/C	Autoignition temperature: 476.7°C (890°F)	
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. LEL-UEL: 1.4 % - 7.1 %	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.	
Vapour pressure: 0.16 mmHg a 20°C	Density: 1,43 g/cm ³ at 20°C	
Surface tension: N/D	Viscosity: 1,5 cP at 70°C	
Vapour density: 3,38 - bibl.	Partition coefficient (n-octanol/water): 1,62	
Water solubility: Soluble with slowly hydrolysis.	Solubility: Acetone, ether, ethyl acetate, chloroform, benzene, o-xylene, alcohol, toluene, carbon tetrachloride.	
Other data: None.		

10. STABILITY AND REACTIVITY

Stability: It is not expected that product reactions or decomposition may occur under normal storage conditions. It does not contain organic peroxides. May be corrosive to metals. Does not react violently with water. The product is chemically stable and does not require stabilizers.	Conditions to avoid: Ignition sources, static electricity, light sources, humid.
Materials to avoid: Oxidizing mineral acids, alcohols and glycols, aldehydes, amines, azo and diazo compounds, hydrazines, caustics, cyanides, dithiocarbamates, inorganic fluorides, isocyanates, metals, nitrides, nitriles, inorganic sulfides, epoxides, explosives, polymerizable substances, strong oxidizing agents, strong reducing agents.	
Hazardous decomposition/combustion products: When heated, it may release toxic and irritating vapors. In case of fire, see section 5.	
Polymerizations risk: No hazardous polymerization is expected.	Conditions to avoid: N/D

11. TOXICOLOGICAL INFORMATION

Routes of exposure:

Inhalation, skin and eye contact.

Acute and chronic effects:

Inhalation: May cause chronic bronchial irritation (including asthma). It can also cause respiratory sensitization.

Skin contact: This product causes burns on skin contact.

Eye contact: This product causes burns on eye contact.

Ingestion: Ingestion causes corrosion of the mucous membranes.

Animal data:

There is no product data. Bibliographic data of its component are presented as a reference.

LD50 oral (rat, OECD 401): 390 mg/kg

LD50 der (rat, OECD 402): > 2000 mg/kg

LC50 inh. (rat, 4 hs., OECD 403): > 5 mg/l

Skin irr. (rabbit, OECD 431): corrosive

Eye irr. (rabbit, OECD 405): corrosive

Skin sens (Guinea pig, OECD 406): sensitising

Resp. sens (Guinea pig, OECD 429): sensitizing

Carcinogenicity:

No information is available on any component of this product, present at levels greater than or equal to 0.1%, that is classified as probable, possible or confirmed human carcinogen by IARC (International Agency for Research on Cancer).

Mutagenicity: There are no components of this product, present at a concentration greater than or equal to 0.1%, that classify as mutagens according to the GHS.

Reproductive toxicity:

There are no components of this product, present at a concentration greater than or equal to 0.1%, that classify as hazardous for reproduction according to the GHS.

Teratogenicity: There are no components of this product, present at a concentration greater than or equal to 0.1%, that classify as a teratogen.

Medical conditions wich increase hazard to exposure:

STOT-SE: There are no components of this product, present at a concentration greater than or equal to 1%, that they classify as toxic to target organs according to the GHS.

STOT-RE: May cause effects on organs by prolonged or repeated exposure.

Aspiration: The product is a solid, so the hazard criteria for aspiration of the GHS is not applicable.

12. ECOLOGICAL INFORMATION

Pollutant potential:

Persistence and degradability: Maleic anhydride hydrolyses rapidly in water at room temperature to maleic acid (half-life: 0.37 min.). Maleic anhydride released into the atmosphere is degraded by reaction with ozone and photochemically produced hydroxyl radicals (estimated half-life: 1.7 h). In soil, it may be degraded or hydrolysed.

Mobility/bioaccumulative potential:

Log Ko/w: 1,62

FISH BIOACCUMULATION FACTOR – BCF (OCDE 305): N/D - Because the distribution coefficient n-octanol / water (log Pow) is less than 4, an accumulation in organisms is not expected.

LogKoc: N/D

HENRY'S CONSTANT: $3,9 \times 10^{-6}$ atm.m³/mol at 20°C

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 is classified as toxic (T).

Ecotoxicological effects:

There is no product data. Bibliographic data of its component are presented as a reference.

LC50 (L. macrochirus, 96 h): 75 mg/l

EC50 (D. magna, 48 h): 42,8 mg/l

EC50 (P. subcapitata, 72 h): 74,3 mg/l

Scientifically unjustified chronic toxicity data.

13. DISPOSAL CONSIDERATIONS

Disposal methods (surplus): Recycling when possible.

Waste:

Disposal: Controlled combustion.

Handling:

Contaminated materials with product are dangerous and need the same precautions as the product and should be considered a toxic and hazardous waste. Never move the product to drain or sewer.

Provisions:

Both the excess product and empty containers should be disposed of in accordance with current legislation regarding the Protection of Environment and particularly of hazardous waste. Waste should be classified and disposed by an authorized company.

Empty containers may contain residue and thus be dangerous. Do not attempt to refill or clean containers without appropriate instructions.

14. TRANSPORT INFORMATION

Special precautions:

Transported in properly closed and labelled containers.

TRANSHIPMENT: If you cannot continue with transportation of goods in the same vehicle and must be transhipped, this operation should be performed by trained and authorized personnel. It cannot be done with food. Use proper protective equipment (see this SDS) as appropriated gloves, boots and clothing. It must be transhipped in a ventilated place.

Additional Information:

LAND TRANSPORT:

Proper shipping name :	MALEIC ANHYDRIDE
UN Number :	2215
Hazard class :	8
Hazard identification number :	80
Packing group :	III
Exempt amount :	5Kg

AIR TRANSPORT (ICAO/IATA) :

Proper shipping name :	MALEIC ANHYDRIDE
UN Number :	2215
Hazard class :	8
Packing group :	III
CRE :	8L
Passenger and cargo aircraft :	Y845, 5 Kg / 860, 25 Kg
Cargo aircraft only :	864, 100 Kg

MARITIME TRANSPORT (IMDG/IMO) :

Proper shipping name :	MALEIC ANHYDRIDE
UN Number :	2215
Hazard class :	8
Packing group :	III
Marine pollutant :	NO
Stowage and segregation :	Category A
Ems :	F-A; S-B

15.REGULATORY INFORMATION

CLASIFICACION: LABELLING

Symbols:

Phrases R:

Phrases S:

Other regulations:

16. OTHER INFORMATION

Data Bases consulted

R phrases show in the document:

Legislation consulted:

Globally Harmonized System of Classification and Labelling of Chemicals, fifth revised edition, 2013 (GHS 2013 - 'ST / SG / AC 10/30 / Rev.5'). The fifth edition is taken into consideration because it is the one valid for Argentina according to Resolution 801/2015 of the SRT. In any case, the information is contrasted with Revision 7 ('ST / SG / AC 10/30 / Rev.7') and clarification is made if required.

Agreement on Transport of Dangerous Products within the MERCOSUR, MERCOSUR\CMC\DEC N° 2/94.

European Agreement on the International Carriage of Dangerous Goods by Road (ADR 2019) and amendments.

Regulations concerning the International Carriage of Dangerous Goods by Rail (RID 2019) and amendments.

International Maritime Dangerous Goods Code (IMDG 2018 - Amendment 39-18), International Maritime Organization (IMO).

IBC Code 2016, IMO, IMO Resolution MSC.369 (93).

Regulations of the International Air Transport Association (IATA 60 ed., 2019) on the transport of dangerous goods by air.

Glossary:

ACGIH: American Conference of Governmental Industrial Hygienists.

BCF: Bioconcentration Factor

CAS: Chemical Summary Service

EC50: Average Effective Concentration.

LC50: Average Lethal Concentration.

LD50: Mean lethal dose.

ATE: acute toxicity estimation.

IARC: International Agency for Research on Cancer

IDLH: Concentration immediately dangerous to life or health

INSHT: National Institute for Occupational Safety and Health.

N/A: the property is not applicable due to the physical chemical and toxicological characteristics of the product.

N/D: no information available at the time of the SDS.

NIOSH: National Institute for Occupational Safety and Health

OECD: Organization for Economic Cooperation and Development

PEL: Permissible Exposure Limit.

PNEC: Predicted no-effect concentration

REL: Recommended Exposure Limit.

GHS: Globally Harmonized System of Classification and Labeling of Chemicals.

STEL: Short Term Exposure Limit

TLV: Threshold Limit Value

TWA: Time Weighted Average

The information given in this document has been compiled based on the best existing information sources, latest available knowledge and according to the current requirements on classification, packaging and labelling of hazardous substances. It does not imply the information is exhaustive or accurate in all cases. It is the user's responsibility to determine the validity of the information contained in this Material Safety Data Sheet to apply depending on the case.