MATERIAL SAFETY DATA SHEET

(According to GHS rev. 5)

NORMAL PENTANO

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:** PENTANE NORMAL **Chemical name:** n-pentane.
	Synonyms: n-Pentane. Amyl hydride.
	Emergency Telephone: **Argentina: 0800-222-2933** **Other countries: (+5411) 4613-1100**

2.HAZARD IDENTIFICATION

2.1 LABEL ELEMENTS

Pictograms			
Warning word	Peligro		
Hazard statement	H225 Highly flammable liquid and vapour.	H304 May be fatal if swallowed and enters airways. H336 May cause drowsiness or dizziness.	H411 Toxic to aquatic life with long lasting effects.
Classification criteria	Flammable liquids - Category 2	Aspiration hazard - Category 1 Specific target organ toxicity following single exposure - Category 3	Hazardous to aquatic environment, long-term - Category 2
Other regulations	-		

OTHER HAZARDS

Extremely flammable.

3.COMPOSITION/INFORMATION ON INGREDIENTS

General composition: Pentane.

Main components	Range %	Classification	S Phrases
n-Pentane	100	F+; R12 Xn; R65 R66 R67 N; R51/53	S9-16-29-33-61-62

4. FIRST-AID MEASURES

Inhalation: Move the affected person to fresh air. If breathing is difficult, administer oxygen; in case of respiratory arrest, apply artificial respiration. Call for medical attention.

Ingestion/Aspiration: DO NOT INDUCE VOMITING to avoid aspiration into lungs. Call for medical attention urgently.

Contact skin/eyes: Remove contaminated clothing. Wash the affected area thoroughly with soap and water. Call for medical attention . Flush with copious amounts of water for up to 15 minutes. Call for medical attention.

General measures: Call for medical attention.

5. FIRE-FIGHTING MEASURES

Extinguishing agents: CO_2, foams, water spray and dry chemicals.

Non suitable extinguishing agents: WATER SHOULD NEVER BE USED DIRECTLY.

Combustion products: CO_2 and H_2O; CO and toxic/irritant vapours, in case of incomplete combustion.

Special measures: Move container from fire area if it can be done without risk. Apply cooling water to the containers sides exposed to flames until well after fire is out. Stay away from tank. In case of massive fire in cargo area, use unmanned hose holder or monitor nozzles; if fire goes out of control, withdraw from area and let fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank wall due to fire. Consult and follow existing emergency standard procedures.

Special hazards: Extremely flammable/combustible liquid. Vapours may form explosive mixtures with air. May be ignited by heat, sparks, static electricity or flames. Vapour may travel to remote ignition sources and flash back. Empty containers may explode in heat of fire. Vapour explosion hazard indoors, outdoors or in sewers. Runoff to drains or sewers may create fire and explosion hazard.

Protective equipment: Firefighters' protective clothing. At high concentration of vapours and/or fumes, self-contained breathing apparatus will be needed.

6. ACCIDENTAL RELEASE MEASURES

Environmental precautions: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Spillages form a film over water surface, which avoid oxygen transfer.	**Personal precations:** Isolate the area. Avoid vapour inhalation and skin and eye contact with the product. Eliminate all ignition sources. Do not smoke in the area.
Cleanup methods: Small spillages: Take up with non-combustible absorbent materials. Transfer to containers for later disposal. Large spillages: Avoid product dispersion with mechanical barriers. Aspirate liquid into containers for later reuse or disposal.	**Personal protection:** Self-contained breathing apparatus, suitable protective clothing, safety goggles and gloves to prevent contact with the product.

7. HANDLING AND STORAGE

Handling:

General precautions: Wear suitable protective clothing, gloves and safety goggles to prevent skin and eyes contact with the product and use respiratory protection to prevent exposure by inhalation. In the areas where the product is stored, handled or used, keep all ignition sources away and do not smoke. Product transfer must be done in earthed, airtight conducts. Electrically ground all equipment when handling this product and use only non-sparking tools.

Specific conditions: Good antisparkling ventilation system. Special procedures during bulk loading, cleaning and maintaining the tanks to avoid vapour exposure. Make sure that tanks have been thoroughly purged before performing any cleaning or maintaining procedure

Specific Use: Solvent. Production of pesticides, expandable polystyrene, etc.

Storage:

Temperature and decomposition products: When the product decomposes, it may emit toxic/irritant vapours.

Dangerous reactions: Extremely flammable/combustible liquid.

Storage conditions: Keep the product in properly sealed and labelled containers in cool and well-ventilated place. Keep them away from ignition sources and incompatible materials.

Incompatible materials: Strong oxidants.

8.EXPOSURE CONTROLS/PERSONAL PROTECTION

Personal protection:

Eye protection: Safety goggles or face-shield to prevent eyes contact with the product.

Respiratory protection: At high vapours concentration, self-contained breathing apparatus will be needed.

Skin protection: Gloves, suitable protective clothing and appropriate footwear are recommended.

Other protective equipment: Showers and eye-washers in working area.

General precautions: Good local exhaust ventilation. Avoid direct contact with the product and vapour inhalation.

Specific hygiene measures: Contaminated clothing should be changed immediately. Good work practices and the adoption of good personal hygiene measures reduce unnecessary exposures. Care should be taken to ensure proper skin cleaning by washing thoroughly with soap and water, followed by the application of a skin re-conditioning cream. Use skin reconditioning cream after work.

Exposure controls: TLV/TWA (ACGIH): 600 ppm
PEL/TWA (OSHA): 600 ppm
VLA (INSHT): 1000 ppm
MAK: 1000 ppm
IDLH (Immediately Dangerous for Life & Health): 1500 ppm

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Liquid.	**pH:** NP
Colour: Colourless.	**Odour:** Gasoline like.
Boiling point: 36°C (96.8ºF)	**Melting/Freezing point:** -130°C (-202ºF)
Flash point: -49°C (-56.2ºF) C/C	**Autoignition temperature:** 309°C (588ºF)
Explosive properties: Lower Explosive Limit: 1.5% Upper Explosive Limit: 7.8%	**Oxidizing properties:** NP
Vapour pressure: 426 mm Hg a 20ºC	**Density:** 0.626 g/cm^3 at 20ºC
Surface tension: NP	**Viscosity:**
Vapour density: 2.49 (Air: 1)	**Partition coefficient (n-octanol/water):** log $K_{o/w}$: 3.4
Water solubility: Insoluble.	**Solubility:** Alcohol.
Other data: Molecular weight: 72.15 g/mol	

10. STABILITY AND REACTIVITY

Stability: Extremely flammable and combustible liquid at room temperature.	**Conditions to avoid:** Sparks, flames and ignition sources.
Materials to avoid: Strong oxidants.	
Hazardous decomposition/combustion products: When the product decomposes, it may emit toxic/irritant vapours.	
Polymerizations risk: NP	**Conditions to avoid:** NP

11. TOXICOLOGICAL INFORMATION

Routes of exposure: Inhalation, ingestion and skin and eyes contact.
Acute and chronic effects: Harmful: may cause lung damage if swallowed. Skin, eyes and respiratory system irritation. Vapours may cause drowsiness and dizziness.
Carcinogenicity: NP
Reproductive toxicity: No data available.
Medical conditions wich increase hazard to exposure: Respiratory deficiencies and dermatological problems.

12. ECOLOGICAL INFORMATION

Pollatant potential:

Persistence and degradability: n-Pentane is expected to suffer rapid volatilisation from soil and water surfaces. Biodegradation of n-pentane may occur in soil and water; however, volatilisation and to some extent adsorption are expected to be far more important fate processes. Released to the atmosphere, it reacts with photoquimically produced hydroxyl radicals, having an estimated half-life of 4.1 days.

Mobility/bioaccumulative potential: n-Pentane has low mobility in soil. The calculated bioconcentration factor (log BCF) for n-pentane is not indicative of important bioconcentration in aquatic systems organisms.

Ecotoxicological effects: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

Disposal methods (surplus): Incineration or recycling when possible.

Waste: Liquids and solid from industrial processes or other uses.

Disposal: Consult with authorized environmental regulatory agencies for guidance on acceptable disposal practices.

Handling: Contaminated materials have the same risk and need the same precautions as the product. Do not run off the product to sewers.

Provisions: Companies that recover, dispose, store, transport or handle waste should comply with local and/or national provisions in force on waste management.

14. TRANSPORT INFORMATION

Special precautions: Labelled as flammable liquid.

Additional Information:

LAND TRANSPORT:	
Proper shipping name :	PENTANES, LIQUID
UN Number :	1265
Hazard class :	Class 3
Hazard identification number :	33
Packing group :	II
Exempt amount :	333Kg
AIR TRANSPORT (ICAO/IATA) :	
Proper shipping name :	PENTANES, LIQUID
UN Number :	1265
Hazard class :	Class 3
Packing group :	II
CRE :	3H
Passenger and cargo aircraft :	Y341/353
Cargo aircraft only :	364
MARITIME TRANSPORT (IMDG/IMO) :	
Proper shipping name :	PENTANES, LIQUID
UN Number :	1265
Hazard class :	Class 3
Packing group :	II
Marine pollutant :	YES
Stowage and segregation :	Category 3
Ems :	F-E; S-D

15.REGULATORY INFORMATION

CLASIFICATION:	LABELLING
F+; R12 Xn; R65 R66 R67 N; R51/53	**Symbols: F+, Xn, N** **Phrases R:** R12: Extremely Flammable. R65: Harmful: may cause lung damage if swallowed. R66: Repeated exposure may cause skin dryness or cracking. R67: Vapours may cause drowsiness and dizziness. R50/53: Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. **Phrases S:** S9: Keep container in a well-ventilated place. S16: Keep away from sources of ignition - No smoking. S29: Do not empty into drains. S33: Take precautionary measures against static discharges. S61: Avoid release to the environment. Refer to special instructions/Safety data sheets. S62: If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Other regulations: n-Pentane is listed in TSCA Inventory (EPA).

16. OTHER INFORMATION

Data Bases consulted

EINECS: European Inventory of Existing Commercial Substances.
TSCA: Toxic Substances Control Act, US Environmental Protection Agency
HSDB: US National Library of Medicine.
RTECS: US Dept. of Health & Human Services

R phrases show in the document:

Legislation consulted:

Regulation (EC) No 1907/2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH).
Dir. 67/548/EEC about classification, labelling and packaging of dangerous substances (including amendments and adaptations in force).
Dir. 1999/45/EC about classification, labelling and packaging of dangerous preparations (including amendments and adaptations in force).
Dir. 91/689/EEC dangerous waste; Dir. 91/156/EEC waste management.
Royal Decree 363/95: Regulation about notification of new substances and classification, packaging and labelling of dangerous substances.
Royal Decree 255/2003: Regulation about classification, packaging and labelling of dangerous preparations.
European Agreement concerning the international carriage of dangerous goods by road (ADR).
Regulation on the international transport of dangerous goods on the railway. (RID)
International maritime code of dangerous goods. (IMDG)
International Air Transport Association (IATA) regulation pertaining to air shipment.

Glossary:

CAS: Chemical Abstract Service
IARC: International Agency for Research on Cancer
ACGIH: American Conference of Governmental Industrial Hygienists.
TLV: Threshold Limit Value
TWA: Time Weighted Average
STEL: Short-term Exposure Level
REL: Recommendable Exposure Limit
PEL: Permissible Exposure Limit
INSHT: Instituto Nal. de Seguridad e Higiene en el Trabajo

VLA-ED: Valor Límite Ambiental – Exposición Diaria
VLA-EC: Valor Límite Ambiental – Exposición Corta
LD_{50}: Lethal Dose Medium
LC_{50}: Lethal Concentration Medium
EC_{50}: Effective Concentration Medium
IC_{50}: Inhibitory Concentration Medium
BOD: Biological Oxygen Demand.
NP: Not Pertinent
| : Changes from the last revision

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.