

SAFETY DATA SHEET

FULMELEC RETARDO (DELAY FULMELEC)

Section 1: Product Identification

Product Trade Name:	DELAY FULMELEC AN; DELAY FULMELEC ASA
Generic Name by SUCAMEC:	ELECTRIC - ELECTRONIC DETONATOR
Recommended Use and Restrictions:	<p>The DELAY FULMELEC consists of an aluminum capsule containing the fluxing charge, the sensitive charge, the delay element and the electrical droplet that is attached to the energy conducting wires.</p> <p>The DELAY FULMELEC allows users to have a wide range of delays that are generally used in replacement of the traditional Safety Fuse and Plain Detonator. These types of FULMELEC are used for the initiation of explosive charges in mesh designs, obtaining advantages in precision, economy, shot optimization, fragmentation of the blasted material and minimization of the surrounding terrain. The handling temperature range of the DELAY FULMELEC is from 0°C to 35°C.</p>

Provider Information

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Section 2: Hazards Identification**Substance or Mixture GHS Classification**

Electric detonators for blasting

UN Number: 0030

Class or Division 1.1B

Description	Hazard Identification
Physical Hazards } Explosives 1.1	H201 Explosive: mass explosion hazard
Health Hazards } Acute Ingestion Toxicity, Cat. 5 Reproductive Toxicity, Cat. 1A	H303 May be harmful if swallowed. H360 May damage fertility or the unborn child.
Environmental Risks } Short-term (acute) hazard to the aquatic environment, Cat. 2	H401 Harmful to aquatic life.

Signal Word: Danger, Caution.

GHS Label Element

Cautionary Advice
In terms of prevention

P203	Be sure to read and follow all safety instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Do not smoke.
P234	Keep only in original packaging.
P240	Grounding and equipotential bonding of the vessel and the receiving equipment.
P250	Do not subject to shock and/or friction.
P273	Avoid release to the environment.
P280	Wear protective gloves and eye protection.

In the event of interference

P318	IN CASE OF PROVEN or SUSPECTED EXPOSURE: Get medical advice/attention.
P301 + P317	IF SWALLOWED: Get medical attention.
P370 + P372 + P380 + P373	IN CASE OF FIRE: Risk of explosion. Evacuate area. DO NOT fight fire when fire reaches explosives.

For storage

P401	Store according to local regulations.
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For disposal

P501	Dispose of contents in accordance with local regulations.
P503	Ask the manufacturer for information on disposal.

Other hazards

No information is available.

Section 3: Composition / Information of components

Chemical Identity	Common Name	CAS Number	Concentration
Lead Azide	Not Applicable	13424-46-9	< 20%
Pentaerythritol Tetranitrate	Penthrite	78-11-5	< 40%
Potassium perchlorate	Not Applicable	7778-74-7	< 10%
Lead Picrate	Not Applicable	25721-38-4	< 10%
Zirconium	Not Applicable	7440-67-7	< 10%
Plastic, metallic and other non-hazardous components.	Not Applicable	Not Applicable	< 60%

Section 4: First Aid Measures

Inhalation: Move exposed person to a place where he/she can breathe uncontaminated air. Get medical attention.

Skin Contact: Wash immediately with soap and water. If irritation, redness or burning sensation exists and persists, seek medical attention.

Eye Contact: Wash immediately with plenty of water for at least 15 minutes holding eyelids up. If irritation occurs, repeat rinsing and seek medical attention.

Ingestion: Do not induce vomiting. Rinse mouth and give water to drink. Never give liquids to an unconscious person. Seek medical attention immediately.

Most important symptoms / effects: No information is available.

Most acute symptoms / effects: Irritating to eyes.

Delayed symptoms / effects: No information is available.

Immediate indications and special treatment: No information is available.

Section 5: Fire-fighting measures

Suitable extinguishing media: Do not fight fire. Evacuate area immediately, prevent access, do not breathe fumes from fire.

Specific hazards of the chemical: Heat under confined and/or special conditions may cause violent reaction or explosion. May detonate when subjected to fire or under severe impact. Burning material may explode and produce toxic fumes.

Special protective equipment and special precautions for fire-fighting equipment: Evacuate area in all directions 1.6 km or more. Allow fire to burn out. Do not allow personnel to pass. Clear area.

Section 6: Measures to be taken in case of accidental release

Personal Precautions: Only trained and authorized personnel must take actions in emergency situations.

Personal Protective Equipment: Gloves, safety glasses with side protection, work clothes, safety shoes.

Emergency Procedures:

- Restrict access to the spill area.
- Remove sources of heat and ignition.
- Do not allow access to unauthorized personnel.
- Minimize the number of people in the risk area.
- All equipment used in handling the spill should be grounded.
- Use non-sparking equipment and tools when handling the material.
- Do not touch or walk over spilled material.

Environmental precautions: Take precautions to prevent contamination of streams and drains.

Methods and materials for isolation and cleaning up: Scattered detonators should be carefully collected and placed in properly identified containers. Do not use metallic objects or any tool that may produce sparks. Place the product in marked containers. Decontaminate the spill area. Dispose of the material under supervision of qualified personnel.

Section 7: Handling and Storage

Precautions for Safe Handling

Operational and Technical Measures to avoid exposure: This product should be handled by qualified and authorized personnel in the use of the explosive. Handle with extreme care, bearing in mind that the detonator of the FULMELEC is sensitive under certain conditions of shock, friction, spark and fire. Its handling temperature range is from 0°C to 35°C.

Other precautions: Do not expose the detonators to temperatures higher than 65°C for any reason, nor attempt to disassemble, section or extract the contents of the product.

Storage Conditions

Conditions for Safe Storage: It will be stored only with compatible products. The ammunition dump designed for storage shall comply with all the requirements established by current regulation. The warehouse must be a dry, fresh, clean, and ventilated area with electrical connection to the earth. Must be stored in powder magazines at temperatures between 5 °C and 30 °C.

Incompatible Substances and Mixtures: Do not store with corrosive, volatile, combustible, acid and base chemical substances, or metallic elements.

Section 8: Exposure control / personal protection

Control parameters

No values are recorded for this specific material; however, exposure limits are described, according to international standards, for some of its components:

Product Name	Permissible exposure limit (OHSA PEL-TWA)	Tolerable limit value (ACGIH TLV-TWA)
Lead Azide	0.05 mg (Pb)/m ³	0.05 mg (Pb)/m ³
Pentaerythritol Tetranitrate	Not established	Not established
Electrical Droplet	Not established	Not established
Silicon	15 mg (Pb)/m ³	15 mg/m ³
Lead Tetroxide	0.05 mg (Pb)/m ³	0.05 mg (Pb)/m ³

Appropriate engineering controls

Apply engineering measures to comply with occupational exposure limits. Eye drop stations. Ventilation system.

If safe exposure levels could be exceeded in the handling and application of this material, engineering controls such as local exhaust ventilation should be considered. If safe exposure levels are achieved, engineering controls are not required, following a detailed and documented risk assessment using personnel.

Personal Protective Equipment (PPE)

Eye Protection: Safety glasses fitted to the contour of the face that meet ANSI/ISEA Z87.1-2015 requirement.

Skin and Body Protection: Safety clothing and footwear should be appropriate according to current regulations, e.g. cotton uniform to avoid static charge build-up.

Respiratory Protection: Not required during handling.

Thermal Hazards: Not applicable.

Hand Protection: The use of protective gloves made of impermeable material with chemical resistance is recommended. They may be made of nitrile or better, complying with the UNE-EN-420:2004 standard.

Section 9: Physical and chemical properties

Physical State: Solid explosive substance. Cylindrical aluminum capsule closed at one end that houses the secondary and primary explosive charge and the delay train; the latter is in contact with the electrical droplet, which in turn is hermetically fixed to the energy conductors.

Color: Not applicable.

Odor: Odorless.

Melting Point / Freezing Point: Not applicable.

Boiling point or initial boiling point and boiling range: Not applicable.

Flammability: Not applicable.

Lower and upper explosion limit / flammability limit: No information is available.

Flash Point: Not applicable.

Autoignition Temperature: No information is available.

Decomposition Temperature: No information is available.

PH: Not applicable.

Kinematic Viscosity: Not applicable.

Solubility: Insoluble in water.

Partition coefficient n-octanol/water (logarithmic value): No information is available.

Vapor Pressure: Not applicable.

Relative density: Not applicable.

Vapor relative density (air=1): Not applicable.

Particle Characteristics: Not applicable.

Section 10: Stability and Reactivity

Reactivity: Explosive

Chemical Stability: Product is stable at normal recommended environmental conditions of storage and handling. Risk of explosion due to energy, shock, fire or other sources of ignition. Capable of explosive detonation, decomposition or reaction, but requires a strong initiation source or must be heated in confinement.

Possibility of Hazardous Reactions: A major fire may involve an explosion hazard. An adjacent detonation may also involve an explosion hazard. A massive explosion can occur due to shock, friction, fire or other ignition sources. Explosion creates the projection of shrapnel.

Conditions to Avoid: Do not expose to high temperatures (above 65°C), fire, impact, friction, electric current and electrostatic discharge.

Incompatible Materials: Incompatible with oxidizing agents, acids and alkalis.

Hazardous Decomposition Products: Detonation produces oxides of nitrogen, lead and oxides of carbon.

Section 11: Toxicological Information

Acute Toxicity (DL50, CL50): Lead Azide (500mg/kg body weight, No information).

Pentaerythrite tetranitrate (1660 mg/kg, No information).

Corrosion / Irritation: None under normal handling conditions. In some cases, prolonged contact with the explosive mass may cause mild skin irritation.

Serious Eye Damage/Eye Irritation: Fumes from the product may cause eye irritation.

Respiratory or skin sensitization: Product fumes may cause respiratory sensitization.

Germ Cell Mutagenicity: No information is available

Carcinogenicity: No information is available.

Reproductive Toxicity: No information is available.

Specific Target Organ Systemic Toxicity – Single Exposure: No information is available.

Specific Target Organ Systemic Toxicity – Repeated Exposures: No information is available.

Aspiration Hazard: No information is available.

Section 12: Ecotoxicological Information

Ecotoxicity: Avoid contact with waterways and soils.

Persistence and Degradability: No information is available.

Bioaccumulative Potential: No information is available.

Soil Mobility: No information is available.

Other adverse effects: No information is available.



Section 13: Information regarding the disposal of products

Recommended and approved methods for safe disposal: All waste must be handled according to national regulations. Small quantities or deteriorated explosives can be destroyed by placing them in an auger containing a good explosive. For large quantities of damaged or deteriorated explosives, please notify Famesa Explosivos S.A.C.

Recommended and approved methods for disposal of contaminated containers/packaging: Burn under controlled conditions while strictly following national procedures.

Section 14: Transport Information

Mode of transport applied	Road	Sea	Air
National and international regulations	SUCAMEC / Law 28256	IMO / IMDG	IATA / DGR

UN Number	0030	0030	Forbidden
Proper UN Shipping Name	Electric detonators for blasting	Electric detonators for blasting	Not Applicable
Transport classification	1.1B	1.1B	Not Applicable
Label			Not Applicable
Packaging group	II	II	Not Applicable
Environmental hazards	No information is available	No information is available	No information is available
Bulk transport according with IMO instruments	Not Applicable	Not Applicable	Not Applicable

Section 15: Regulatory Information

National Regulations

- Regulation on the Control of Explosives for Civil Use – Peru (SUCAMEC)
- Law No. 28256: “Law regulating the Land Transportation of Hazardous Materials and Hazardous Wastes”.

International Regulations

- Globally Harmonized System of Classification and Labeling of Chemicals (GHS), United Nations, 8th version.
- International Maritime Dangerous Goods Code (IMDG Code), IMO, 2018 edition.
- Dangerous Goods Regulations (DGR), IATA, Issue 62.

Section 16: Other Information

This safety data sheet has been prepared by professionals from the areas of Industrial Safety, Environment, Quality Control, Research and Development and the Occupational Physician of Famesa Explosivos.

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Abbreviations and Acronyms

DL50 – Lethal dose for 50% of the population tested.

CL50 – Lethal concentration for 50% of the population tested.

UN - United Nations Organization.

TWA - Time Weighted Average Concentration.

CAS - Chemical Abstracts Service.

OSHA - Occupational Safety and Health Administration.

ACGIH - American Conference of Governmental Industrial Hygienists.

PEL - Permissible Exposure Limits.

TLV - Threshold Limit Value.

Disclaimer of Liability

Famesa Explosivos S.A.C., hereinafter Famesa, has prepared this safety data sheet based on our extensive knowledge at the date of issue, on chemical health hazards, material safety and general guidance on how to handle the material safely in the workplace. Since Famesa cannot anticipate or control the conditions of use of the product, each user must, prior to handling, evaluate and control the risks of the product.

If you need clarification and/or further information, please contact FAMESA EXPLOSIVOS S.A.C. through our telephone and/or mail indicated in section 1 of this document.