



FEM

CONTACTS

MAPUTO - Headquarters

Maputo | Av. Abel Baptista,
Parcela 10
1007 Matola
T.: +258 217 458 46
F.: +258 217 458 02
E.: info@fem.co.mz

MAPUTO - Office

Av. Elias Lucas Kumato,
n283 | 1102 -Sommerschield
T.: +258 217 458 46
F.: +258 217 458 02
E.: info@fem.co.mz

DELEGATIONS

MOAMBA

Bairro Muhavire Expansão
T.: + 258 262 184 76
E.: info@fem.co.mz

TETE

Estrada nacional nº7
Km396
Povoado de Inhangoma
Distrito de Moatize
T.:+258 252 421 24
E.: info@fem.co.mz

DONDO

Bairro Mafarinha
2104 DONDO
T.: +258 233 221 93
E.: info@fem.co.mz

FEM INTERNACIONAL

ZAMBEZI

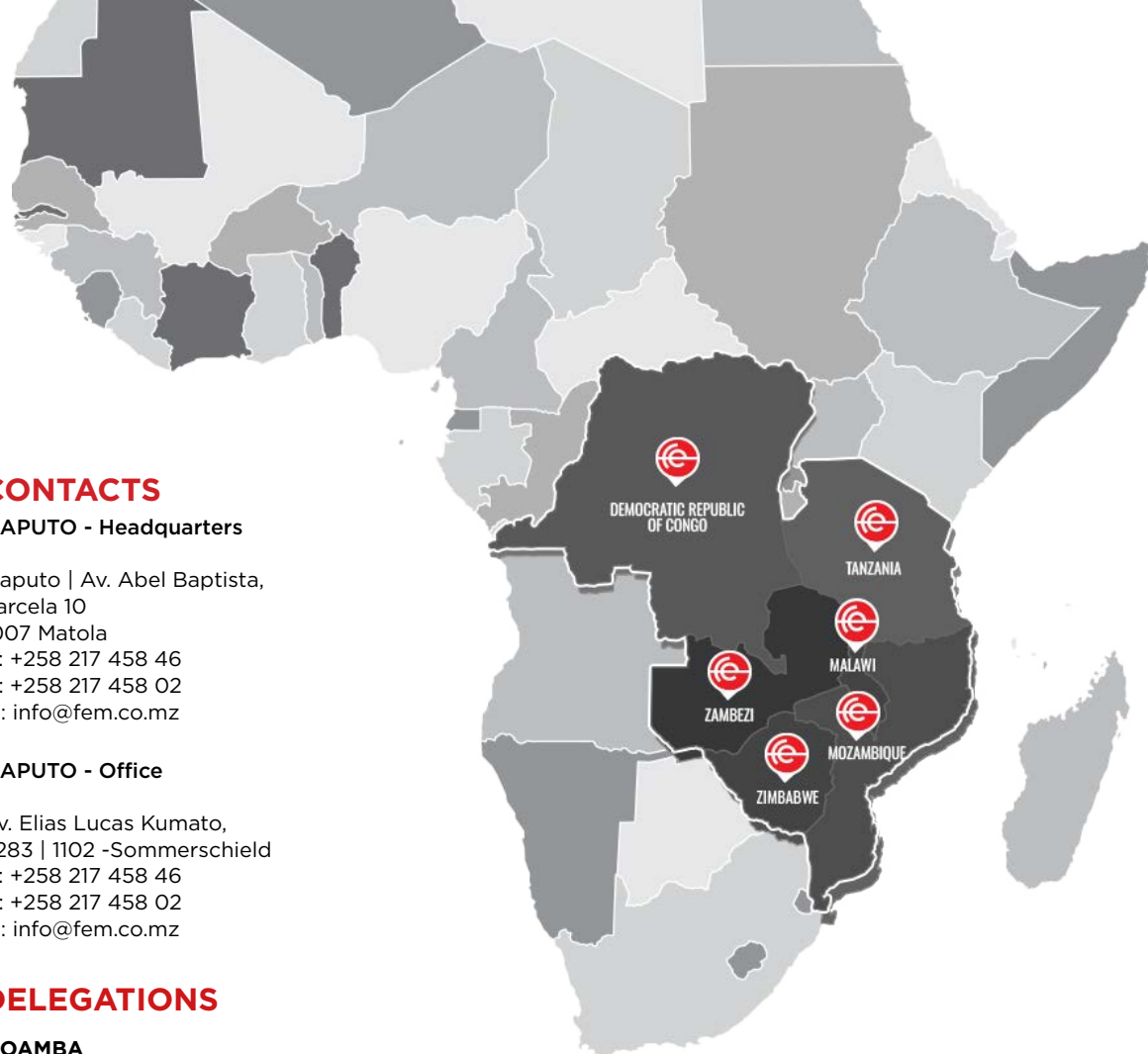
P.O. BOX 31405 Lusaka,
Zambia Plot# 1282/42
Off Palm Drive Chelstone
Lusaka
E.: info@fem.co.mz

RD. CONGO

Av. Lukusa, 32 bis,
1 A Gombe Kinshasa
R D Congo
E.: info@fem.co.mz

ZIMBABWE

Kudenga House
3 Baines Avenue
PO BOX 334 - Harare
E.: info@fem.co.mz



MANUFACTURE, SALE AND APPLICATION OF EXPLOSIVES.

The Fábrica de Explosivos de Moçambique was founded in 1955 and is directed towards the production of sensitized and non-sensitized emulsions. Since the beginning of its activity, it has been involved in the country's landmark works, including dams, mining extraction projects, and the construction of road and rail networks. FEM has thus become the leading reference in Mozambique for the manufacturing and application of explosives for the construction and mineral extraction industries.

GOALS

Provide products and services that meet the needs and expectations of our customers. This is the main objective of Fábrica de Explosivos de Moçambique, guided by a doctrine of excellence, innovation, and precision.

- Technological recycling;
- Diversifying offers;
- Increasing production capacity;
- Prioritising skilled labor;
- Better range of products.



ENVIRONMENT

Respect for life, the environment, and the need to preserve the planet's natural balance are core values for Fábrica de Explosivos de Moçambique. Our manufacturing processes are designed to optimize resource use, minimize waste, and reduce unnecessary consumption of raw materials.

The rationalization of energy consumption, the preservation of resources such as water and air, and respect for local communities are central to our analysis and daily reflection. Regarding the waste produced and its disposal, our concern is constant. Therefore, with a solid environmental foundation, we have implemented the 3R's sustainability policy: Reduce, Reuse, and Recycle.

- >> Selecting raw materials;
- >> Reducing, reusing and recycling;
- >> Optimizing resource consumption.



SAFETY

Aware that the manufacture of explosives is an activity that requires high standards of control, we have directed our strategy towards progressively improving our processes and defining the skills of our employees, consistently investing in their training and qualification.

Maximizing resources using the most up-to-date technology and always prioritizing safe operating conditions is a key point throughout the entire production process. To achieve this goal, our manufacturing lines have undergone significant upgrades in terms of operational safety, electrical equipment, mechanical equipment, and fire protection.

Over the years, leading companies in various fields have found in our products the confidence they need to carry out high-risk jobs.

We fully comply with all the safety requirements established for handling explosives and have a large fleet of vehicles prepared for this activity.

- >> Use of advanced technologies;
- >> Safety as a core value;
- >> Trustworthy company.



QUALITY

Fábrica de Explosivos Moçambique is aware of the need to orient its human resources in order to achieve better productivity.

That is why we have been committed to change and evolution, focusing on retraining in new techniques, methods and practices, measures that have always been part of our development policy.

The training is given to all professionals or organizations that directly or indirectly deal with explosive material. In this way, we aim to guarantee better safety and greater productivity in our processes.

Our priority objective is the permanent progress and satisfaction of our clients. To this end, we rely on an efficient organization with rigorous quality control processes, carried out by duly qualified and accredited technicians.

- >> Raw materials control;
- >> Production control;
- >> Final product product.



50 A.C

THE CHINESE INVENTED THE FIRST EXPLOSIVE: **GUNPOWDER**.



1950

DURING THE 1950S **ANFOS** AND **HYDROGELS** WERE INVENTED.



1969

FIRST GENERATION **EMULSIONS** APPEAR. THESE PROVIDE THE MINING INDUSTRY WITH A SAFE AND CONTROLLED WAY OF BREAKING UP ROCKS AND MINERALS DURING BLASTING OPERATIONS.

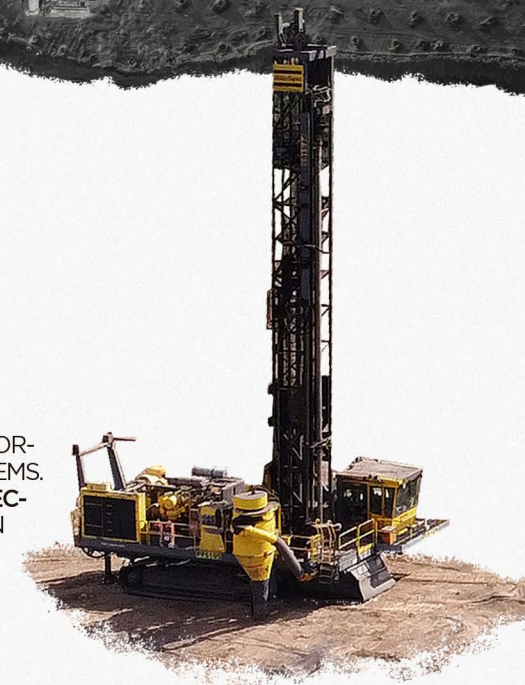
1867

ALFREDO NOBEL INVENTS **DYNAMITE**.



1967

BETWEEN 1967 AND 1973 WERE 5 IMPORTANT YEARS FOR DETONATION SYSTEMS. IN 1967 THE **NONEL SYSTEM (NON-ELECTRIC DETONATOR)** APPEARED AND IN 1973 THE **ELECTRONIC DETONATOR**.



1980

AT THE END OF THE 1980S, **EMULSIONS** APPEARED. STATE-OF-THE-ART **BULK EMULSIONS** SENSITIZED ON SITE.

EXPLOSIVE PRODUCTS.

The Mozambique Explosives Factory offers a wide range of explosive products and services, providing the best solutions for each client.

EXPLOSIVES MANUFACTURED WITH AMMONIUM NITRATE.

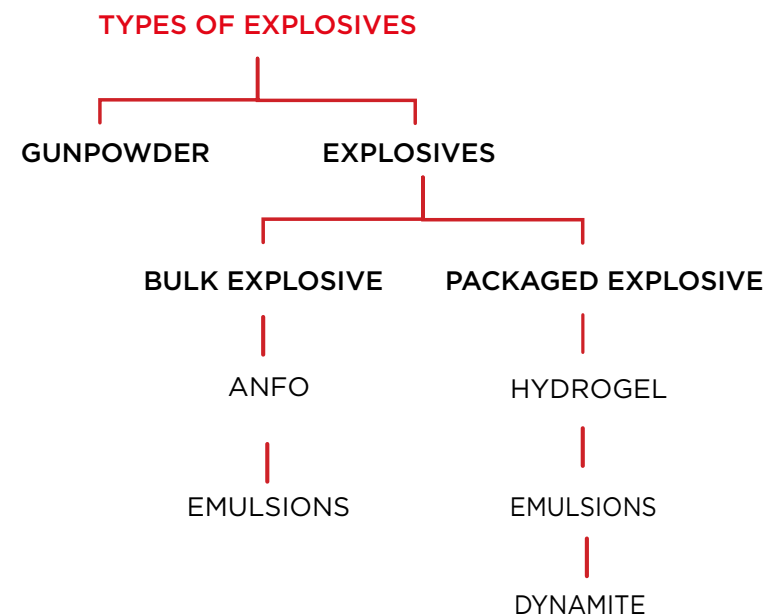
DYNAMITE - AMMONIUM NITRATE + NITROGLYCERIN

ANFO - AMMONIUM NITRATE + OIL

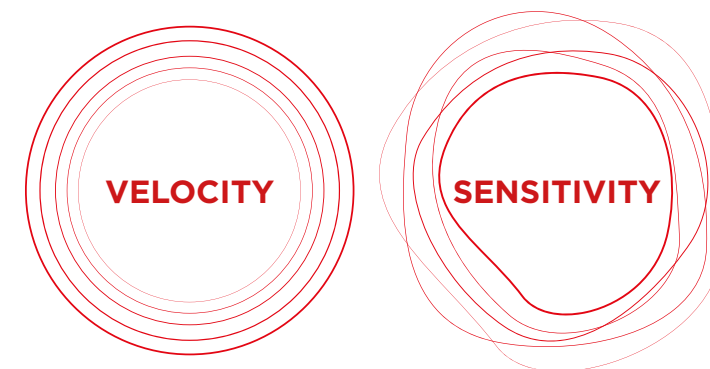
HYDROGEL OR SLURRY - AMMONIUM NITRATE + OIL + WATER + EMULSIFIER

EMULSION - NITRATES + WATER + OIL + EMULSIFIER

HEAVY ANFO - AMMONIUM NITRATE + EMULSION



CHARACTERISTICS OF EXPLOSIVES



SLOW OR PROPELLANTS
(Vd<1000M/S)

FAST
(Vd>1000m/s e <5000m/s)

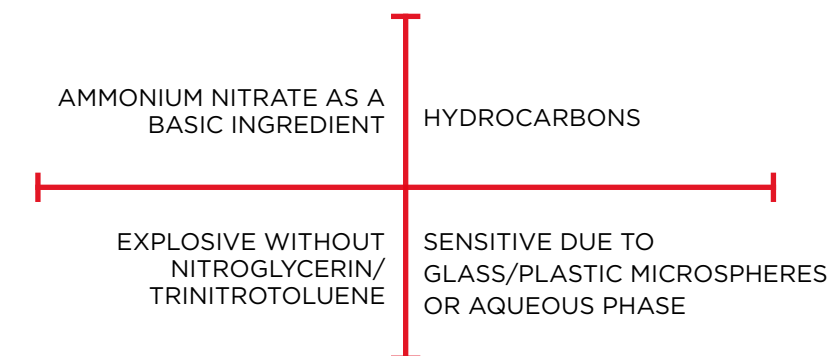
VERY FAST
(>5000m/s)

VERY SENSITIVE
THE EXPLOSIVE IS
ACTIVATED BY SHOCK OR
MODERATE HEAT.

SENSITIVE
WHEN INITIATION IS
ONLY POSSIBLE WITH A
DETONATOR.

INSENSÍVEIS
INICIAÇÃO SÓ COM UM
BOOSTER.

MAIN CHARACTERISTICS OF EMULSIONS



GEMUGRANEL

An emulsion insensitive to detonators with high fragmentation power, which is why it requires a booster. Its use is compatible in water holes and its transport conditions are safe.

It is pumped in bulk, with the particularity of being sensitized as an explosive on site, in the desired quantities. It fills the entire hole, allowing for lower efficiency losses and a higher degree of high yield: quarries; open-pit mines or tunnels.



APPLICATION METHODS

Gemugranel is presented in the form of liquid with high viscosity, and is recommended for operations that require a large volume of explosives, particularly open-pit mines and large quarries. Gemugranel is water resistant and can be used in dry or water-filled holes. It is recommended for all types of rock (hard, semi-hard and soft). After loading the holes with Gemugranel, the product can remain in the hole for up to 10 days before detonation.

CHARACTERISTICS

- Takes advantage of the entire drilling area, allowing for cost reduction;
- High safety in handling and transportation;
- Does not release odors;
- Insensitive to detonators.

USAGE SITUATIONS

Gemugranel is presented in the form of liquid with high viscosity, and is recommended for operations that require a large volume of explosives, particularly open-pit mines and large quarries. Gemugranel is water resistant and can be used in dry or water-filled holes. It is recommended for all types of rock (hard, semi-hard and soft). After loading the holes with Gemugranel, the product can remain in the hole for up to 10 days before detonation.

SCAN TO DOWNLOAD THE
BROCHURES



GEMULEX SUPER 100

It is a high-velocity explosive with water resistance. It is a detonator-sensitive cartridge emulsion with high fragmentation power, impact, stability, and heat production capacity. Its shelf life allows for a long storage period. It is a highly safe product when stored or transported.



APPLICATION METHODS

Gemulex Super 100 is supplied in cartridges of different calibers, and its application is carried out manually only by qualified personnel. Due to its water resistant characteristics, it can be applied in dry or in the presence of water.

CHARACTERISTICS

- High safety in handling; Does not release odors;
- Lower production of harmful gases;
- Advantageous in tunnels - reduced ventilation waiting time.

USAGE SITUATIONS

Gemulex Super 100 is the ideal explosive for use as a bottom or column charge due to its high energy power. It is excellent for use in hard and very hard rock masses, offering outstanding performance when used as a bottom charge in quarries, open-pit mining, tunnels, or trenching.

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BROCHURES



GEMULEX EXTRA ROUGE

Notable explosive for its high velocity of detonation, brisance, and excellent water resistance. It is sensitive to the detonator and has great stability, offering a long shelf life. It is a highly secure product when stored or transported. Typically used as a bottom charge, it is an excellent initiator for other explosives, making it the ideal product for specific applications.



APPLICATION METHODS

Gemulex Extra Rouge is supplied in cartridges of different calibers, and its application is carried out manually only by qualified personnel. Due to its water resistant characteristics, it can be applied in dry or in the presence of water.

CHARACTERISTICS

- Highly safe to handle;
- Does not release odors;
- Lower production of harmful gases;
- Advantageous in tunnels - reduced ventilation waiting time

USAGE SITUATIONS

Gemulex Extra Rouge is the ideal explosive for use as a bottom or column charge due to its high energy power. It is excellent for use in hard and very hard rock masses, offering outstanding performance when used as a bottom charge in quarries, open-pit mining, tunnels, or trenching.

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ANCO

Anco is a low-density granular explosive based on porous ammonium nitrate and fuel.



APPLICATION METHODS

ANCO is supplied in 25kg properly identified bags. It is in granular form. Its use is manual and must be performed exclusively by qualified personnel.

CARACTERÍSTICAS

- Develops a high quantity of gases;
- Recommended for highly fractured rock masses;
- More reliable and effective initiation when used with a Gemulex booster.

USAGE SITUATIONS

For use in soft or semi-hard rock masses, it offers excellent performance when used as a column charge due to the volume of gases generated. Recommended for use in quarries and open-pit mines, or civil construction works, and its use is exclusively in dry holes.

SCAN TO DOWNLOAD THE
BROCHURES



GEMUBLEND

An emulsion insensitive to detonators with high fragmentation power, which is why it requires a booster. Its use is compatible in water holes and its transport conditions are safe. It is pumped in bulk, with the particularity of being sensitized as an explosive on site, in the desired quantities.



APPLICATION METHODS

Gemublend is applied using specially designed mechanized mobile units for its application. These units, equipped with several compartments, mix various components (Gemugranel, Porous Ammonium Nitrate, and a sensitizing agent) to achieve optimal sensitization of Gemublend. The material fills the entire cross section of the hole, allowing for optimization of the existing drilling.

CHARACTERISTICS

- Utilizes the entire drilling area, allowing cost reduction;
- High safety in handling and transport;
- Does not release odors;
- Insensitive to detonators.

USAGE SITUATIONS

Gemublend is presented in the form of liquid with high viscosity, and is recommended for operations that require a large volume of explosives, particularly open-pit mines and large quarries.

Gemublend is composed of a mixture of Gemugranel with Porous Ammonium Nitrate (technical degree). Gemublend is water resistant and can be used in dry or water-filled holes. It is recommended for all types of rock (hard, semi-hard and soft). After loading the holes with Gemublend, the product can remain in the hole for up to 10 days before detonation.

SCAN TO DOWNLOAD THE BROCHURES



STARTER ACCESSORIES

FEM offers its customers the following initiation systems:

- Non-Electric - NonEl:
- Open-cast
 - Underground
- Electronic:
- Open-cast
 - Underground

SHOOTING ACCESSORIES

FEM offers its customers the following start-up systems:

- >> IEDs
- >> Detonating cord (available in various weights, indicate range: 3g to 20g)
- >> Relays for detonating cord
- >> Boosters (100-150-400-500g)
- >> Fuses>> Gasbags, Plastic sleeves and others on request





APPLICATION OF BULK EXPLOSIVE

As a complement to the production of bulk explosives, FEM has teams specialized in the application of this type of explosive. These teams are made up of engineers, technicians and assistants who are able to offer solutions to customers' needs, using the most advanced mechanical means and technology. Whether it's emulsions or bulk blends, we use mobile pumping units (UMBs) with different capacities.



STUDIES AND ANALYSIS

Each case is different, which is why we carry out studies and analyses of projects, developing solutions and optimizing resources with a view to customer satisfaction. We have high-tech equipment, such as high-speed cameras, seismic and sound wave recording equipment, detonation velocity recording, software for analyzing rock blasts, among others, which allow us to analyze each blast and introduce improvements after analyzing the elements collected.



FLEET OF VEHICLES

Our fleet consists of a variety of vehicles and equipment, which we make available to our clients to meet their needs. From the transport of shooting accessories to mobile bulk explosive pumping units (of various capacities), as well as tanks and containerized trucks, our fleet allows us to adapt to our clients' needs, both in terms of the products to be transported and the quantities required.



SUPPORT AND LICENSING

The acquisition and use of explosives in Mozambique is only permitted with a license from the competent authorities. With in-depth knowledge of the legislation in force, FEM makes its expertise available to clients, advising them on how to obtain the desired license. This service consists of drawing up and permanently monitoring the legal process with the competent authorities, with a view to our clients obtaining a license to purchase, use, transport and store explosives.



APPLICATION OF CARTRIDGE EXPLOSIVES

FEM also has teams for loading cartridge explosives. These teams, specialized in the use and handling of explosives, put their know-how and technical skills at the customer's service in order to maximize the capabilities of the material to be used.



TRAINING

At FEM, training is one of the most important values. To this end, training is frequently given to our employees, but also to external elements, especially professionals and future professionals linked to the mining and construction industries.

EMULSIONS

PROPERTIES OF EMULSIONS



TRAINING



TOXICITY OF GASES RELEASED IN BURSTS

In the detonation of explosives, toxic gases are produced. Depending on the composition of the explosive and the amount of oxygen, can be harmful to the human body.

The emulsions we produce, due to their composition, produce a smaller volume of toxic gases, which is why we recommend their use in underground or open-pit blasting. Different types of explosives can be used, but it is necessary to increase ventilation capacity, both in terms of time and the flow of fresh air required.

The application of bulk emulsion, normally in high production operations/exploitations, involves mechanized discharge into the blasting holes to be executed, using a pump designed specifically for the consistency and viscosity of our products.

This operation uses modern mechanized unloading units (UMB's), with various capacities mounted on truck chassis. This activity can only be carried out mechanically due to the characteristics of our products, which make them safe to handle and unload directly into the boreholes, even after they have been sensitized.



WATER RESISTANCE

Water resistance is an intrinsic characteristic of each explosive, a parameter that limits its application in each activity. Pulverulent explosives, due to their consistency and vulnerability to water (ANF .3+O), cannot be applied in water-filled holes.

The increasing awareness of using environmentally friendly products increasingly discourages the use of this type of product, as it produces harmful gases that permanently contaminate soils and aquifers.

EXPLOSIVES SAFETY

There are explosives on the market with different sensitivities. The way they are handled, how they are used and their resistance to shock can all play a role in their selection and application. Gelatines/dynamites, because they contain nitroglycerine/nitroglycol, are more sensitive to friction and shock. Emulsions, because they do not contain active substances, are less sensitive to friction, shock and impact.

TRAINING

Training and enhancing the skills of our employees are essential components on the road to success for organizations. We are firmly committed to the technical and professional development, as well as the personal growth, of our staff.

To this end, and in an effort to maximize our capacities and skills, we provide our employees with continuous and comprehensive training.

As a result of these actions, we are moving towards a significant increase in productivity, a better response to our customers' needs, and a visible improvement in our ability to respond to the market.

To ensure reliability to our operational process in the application of explosives, our fire operators (Blasters), are certified by FEM, after frequency m of appropriate training action and validated by approval in a specific exam.

To stay updated with the latest technology and new products in the civil explosives market, our technicians regularly attend training and technical conferences, both in Portugal and abroad, particularly in Sweden, Canada and the United States.

- >> Training in new products and technologies;
- >> Preparation for the operator's license exam;
- >> On-site training in explosives safety;
- >> Advanced training for engineers.





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      **FEM_EXPLOSIVOS**