

# PRODUCT CATALOGUE



THE EUROPEAN LEADER IN ENERGETIC MATERIALS

# INTRODUCTION

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**EURENCO was created in 2004 from the merger between SNPE “Explosifs & Propulseurs” and NEXPLO. EURENCO inherited from these companies a presence in several European countries and a high level of know-how in the field of energetic materials.**

**As the European leader in military explosives**, propellants and fuels, EURENCO also supplies explosives for the civil sector (oil and gas drilling, mining) and has the world’s largest production capacity for 2-EHN (fuel additive).

## OUR PURPOSE

**EURENCO is a key player in the defense sector serving the sovereignty of France and Europe.** We design, produce and supply innovative products and solutions with high added value in the fields of pyrotechnics and chemistry.

## OUR VISION

**To strengthen our position as a leading European player and to become a world leader in all our sectors of activity.**

EURENCO is driven by a spirit of conquest and innovation. By spreading the best local practices from each of our sites, we aim to develop all our talents and strengthen our technological leadership. By thinking globally and acting locally, we accelerate the creation of value for our customers.

## OUR MISSION

**To design, produce and monitor, throughout their life cycle, high performance and safety products and solutions** in the field of energetic materials for Defense and their derivatives for civilian applications

## OUR VALUES

### **Safety first**

Ensuring the safety of our employees, our customers, the end-users of our products, and our facilities.

### **Customer Satisfaction**

Listening carefully to our customers, anticipating their needs and innovating to bring them added value, while strengthening our profitability.

### **Team strength**

Winning as a team, capitalising on our know-how and developing our sense of belonging.

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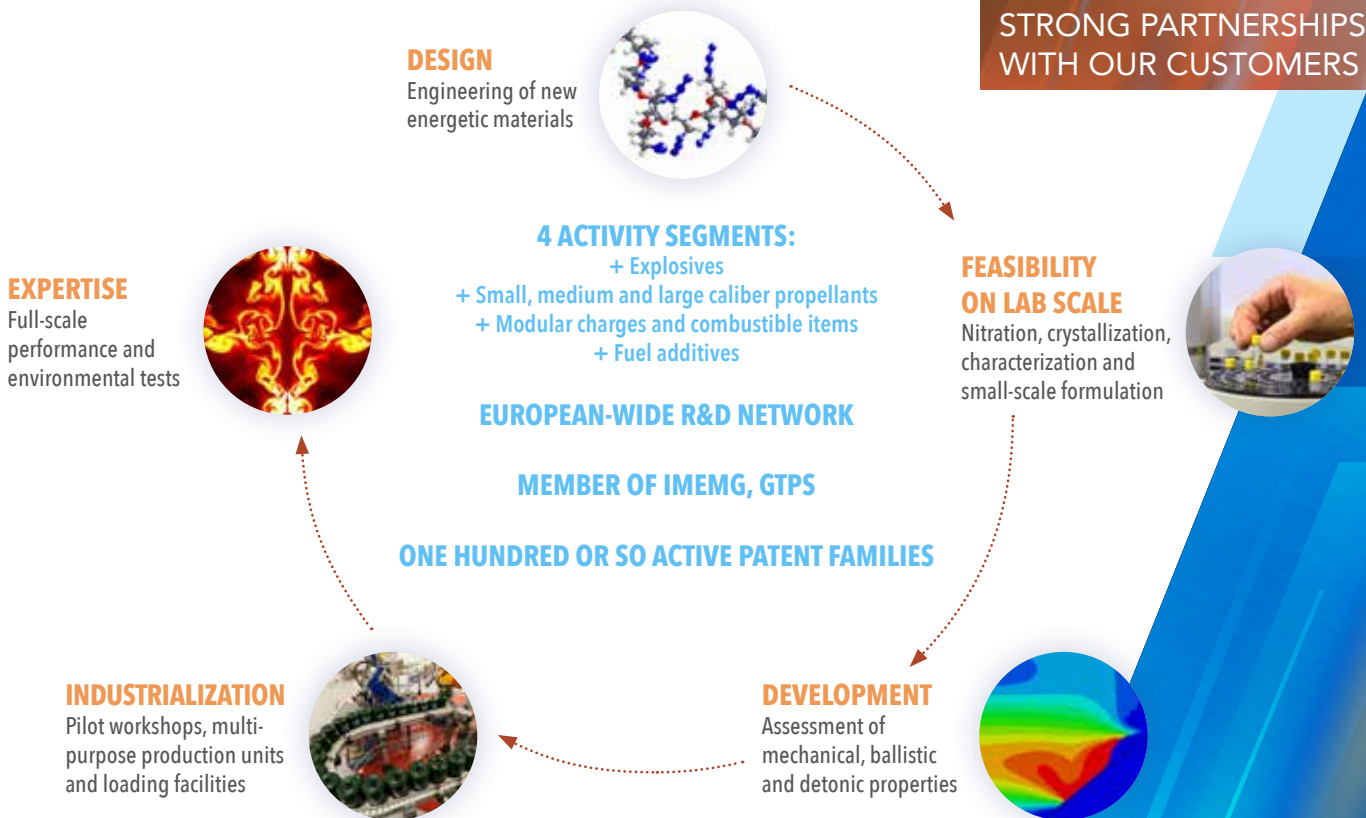
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# RESEARCH & DEVELOPMENT



A row of cylindrical explosive charges, likely for a mortar or artillery, arranged in a line. Each charge is dark grey or black with a prominent yellow band and a smaller green band. The charges are mounted on a metal structure. The entire image is overlaid with a teal-to-green gradient. The word "EXPLOSIVES" is written in white, uppercase, sans-serif font across the center. There are also some faint numbers on the charges, such as "715" and "03".

# EXPLOSIVES

## I. EXPLOSIVES

EURENCO develops, manufactures and provides a unique range of products for the military and civil markets:

- **Single molecules:** EURENCO provides a complete range of high explosives, including, high performance, insensitive and thermostable molecules and also oxidizers and energetic polymers;
- **High explosives (Conventional & Insensitive)** for melt-cast, pressed and cast PBX explosive charges, fuse boosters, pyrotechnics, mining and oil & gas applications;
- **Cast PBX charges for Insensitive Munitions:** missile warheads, bombs and penetrators, torpedoes, shell ammunition, underwater mines and mine neutralizers, fuzes, cutting charges;
- **Plastic explosives** for demolition, breaching and cutting operations. To ensure both flexibility and large-scale capabilities, EURENCO is equipped with modern and innovative facilities, such as multipurpose synthesis units and automated filling workshops for Insensitive Munitions.



### PRODUCTION PLANTS

Karlskoga (Sweden)  
Sorgues (France)



### COMMERCIAL OFFICE

Sorgues (France)  
Washington DC (USA)

# EXPLOSIVES

## SINGLE MOLECULES

EURENCO provides a complete range of high explosives, including, high performance, insensitive and thermostable molecules and also oxidizers and energetic polymers. Laboratories and multi-purpose units also contribute to the development and scale-up of new energetic molecules.



# RDX

Best solution for both performance and cost



## SPECIFICATIONS

MIL-DTL-398 C  
STANAG 4170



## APPLICATION

Main charges for warheads, ammunition and boosters  
Pyrotechnical devices (cap-relay, detonators, cutting cords)  
Oil well perforating charges



## TECHNICAL CHARACTERISTICS

**1,82**  
Density

**8 750 m/s**  
Detonation velocity

RDX type 1 and type 2 available in all standard particles sizes (Class 1 to Class 5)

Specific grades available on request

I-RDX ("insensitive grade") **Increased from 25 to 55 Kbar**  
Threshold for detonation **when used with PBXN109**

# HMX

Best solution for high performance, high thermal stability and low shock sensitivity



## SPECIFICATIONS

MIL-DTL-45444 C  
STANAG 4284



## APPLICATION

Main charges for warheads, ammunition and boosters  
Oil well perforating charges, shock tubes and detonating cords  
Formulations more insensitive to shocks



## TECHNICAL CHARACTERISTICS

**1,91**

Density

**9 100 m/s**

Detonation velocity

**287 °C**

Deflagration point

Threshold for detonation **increased from 28 to 40 Kbar when used in PBX with 85% HMX**

Standard particle sizes **class 1 to class 5**

Specific grades available on request

# HNS

High thermal stability and good initiation reliability

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## SPECIFICATIONS

MIL-WS-5003



## APPLICATION

- Booster charges
- Space and military pyrotechnics
- Perforating and cutting charges for oil & gas industry
- Initiation explosive in slapper detonators



## TECHNICAL CHARACTERISTICS

**1,74**  
Density

**7 000 to 7 100 m/s**  
Detonation velocity

**316 – 318 °C**  
Deflagration point

HNS type 1 to type 4

# TATB

Low sensitivity and high thermal stability

---



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Insensitive compositions for main charges and boosters



## TECHNICAL CHARACTERISTICS

**1,94**  
Density

**7 970 m/s**  
Detonation velocity

**320 °C**  
Self ignition temperature

# NTO

High performance, low sensitivity and enhanced thermal stability

---



## SPECIFICATIONS

STANAG 4170



## APPLICATION

Insensitive compositions for main charges and boosters



## TECHNICAL CHARACTERISTICS

**1,91**  
Density

**8 430 m/s**  
Detonation velocity

**0% at 353 N**  
Friction sensitivity

**class 1 to class 4**  
Standard particle sizes

Specific grades available on request

# PETN

More sensitive to shock and friction than standard explosives



## SPECIFICATIONS

STANAG 4023



## APPLICATION

Detonating cords and cutting charges for mining

Plastic explosive for demolition, demilitarization and main fill for hand grenades

Initiation and booster charges



## TECHNICAL CHARACTERISTICS

**1,76**  
Density

**8 400 m/s (1,7 g/cm<sup>3</sup>)**  
Detonation velocity

**3 J**  
Impact sensitivity

# ADN

Strong oxidizer and high impulse



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Ingredient in composite rocket motor propellants and depth charges for underwater ammunition

Liquid mono propellant for rocket motors used in spacecraft propulsion



## TECHNICAL CHARACTERISTICS

1,81

Density

approx. 7 000 m/s

Detonation velocity

-35,8 kJ/mole

Heat of formation

3 grades **crystalline, prilled and coated, ultra pure**

Green product **no HCL release**

# GAP DIOL

Energetic polymer used as a binder



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

High energetic composite rocket propellant grains  
Insensitive charges and LOVA propellants for ammunition  
Gas generators for automotive safety



## TECHNICAL CHARACTERISTICS

**1,24 - 1,29**  
Density

**488 mm/s**  
Combustion velocity

**≈ 2000**  
Mean molecular weight



# TNC

Ignition and thermostability

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## SPECIFICATIONS

MIL-T-13723



## APPLICATION

Ignition composition for ammunition

Catalyst for airbags' combustion (automotive safety)



## TECHNICAL CHARACTERISTICS

**290 / 295 °C**  
Melting point

**378 °C**  
Self ignition temperature

# EXPLOSIVES

## DEFENSE & SECURITY

For the Defense & Security market, EURENCO develops and produces explosive formulations for melt-cast, pressed and cast-PBX applications in main charges and boosters:

- Conventional compositions for medium caliber, warheads, artillery, tank and mortar ammunition;
- Insensitive compositions for the loading of Insensitive Munitions;
- Demolition explosives for explosive ordnance disposal as well as demolition, cutting and breaching operations

The image shows three soldiers in camouflage uniforms and helmets. They are holding large, green, cylindrical munitions with colorful fuses (orange, yellow, green, red). The soldier in the foreground is holding a munition with a red band. The background is a blurred outdoor setting with trees and a blue sky.

## CONVENTIONAL COMPOSITIONS

EURENCO provides a wide range of conventional formulations to be used for shaped charges, medium caliber ammunition (20 mm, 25 mm, 30 mm, 40 mm), as well as main charges and boosters in warheads, mortar, tank and artillery shells.

# COMP B

RDX / TNT



## SPECIFICATIONS

MIL-C-401



## APPLICATION

Melt-cast or pressed compositions for main charges



## TECHNICAL CHARACTERISTICS

**1,71**  
Density

**7 900 m/s**  
Detonation velocity

**Granular form**  
Grades

**< 7 s**  
Low viscosity

# HEXOTOL

RDX / TNT



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Melt-cast compositions for main charges



## TECHNICAL CHARACTERISTICS

1,65 - 1,71  
Density

7800 - 8000 m/s  
Detonation velocity

**Granular form**  
Grades

Ingredient ratio adapted to required performance

# OCTOL

HMX / TNT



## SPECIFICATIONS

MIL-O-45445B



## APPLICATION

Melt-cast composition for high performance warheads and shaped charges



## TECHNICAL CHARACTERISTICS

**1,805 - 1,81**

Density

**Class 1**

Octol type 1

**Class 1 and 2**

Octol type 2

Ingredient ratio adapted to required performance

# COMP A3 / A4 / A5

RDX / Wax or Binder



## SPECIFICATIONS

A3/A4: MIL-C-440  
A5: MIL-E-14970



## APPLICATION

Pressed composition for boosters and main charges



## TECHNICAL CHARACTERISTICS

**1,61 for Comp A3**  
Density

**8470 m/s for Comp A3**  
Detonation velocity

# CH-6

RDX / Binder



## SPECIFICATIONS

MIL-C-21723



## APPLICATION

Pressed composition for boosters



## TECHNICAL CHARACTERISTICS

**1,64**  
Density

**8070 m/s**  
Detonation velocity



# HEXOWAX

RDX / Wax or Binder

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## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Pressed composition for main charges and boosters



## TECHNICAL CHARACTERISTICS

**1,71 - 1,73**

Density

**8350 - 8450 m/s**

Detonation velocity

Ingredient ratio adapted to required performance

# HEXAL

RDX / Aluminium / Wax or Binder



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Pressed composition for enhanced blast

Medium caliber ammunition



## TECHNICAL CHARACTERISTICS

Hexal 70/30 **1,908**

Hexal 83/17 **1,808**

Density after pressing

Hexal 70/30 **8 073 m/s**

Hexal 83/17 **8 270 m/s**

Detonation velocity

Two references according to performance required

# PBXW-17

RDX / Polyacrylate

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## SPECIFICATIONS

MIL-DTL-32057 (OS)



## APPLICATION

Pressed composition for shaped charges and boosters



## TECHNICAL CHARACTERISTICS

**> 1,66**  
Density

**8100 m/s**  
Detonation velocity

# PBXN-5

HMX / Viton

---



## SPECIFICATIONS

MIL-E-81111



## APPLICATION

Pressed composition for boosters



## TECHNICAL CHARACTERISTICS

**1,86**  
Density

**8800 m/s**  
Detonation velocity

**white granules**  
Grades

# PBXW-11

HMX / Polyacrylate

---



## SPECIFICATIONS

DTL-WS-33500



## APPLICATION

Pressed composition for shaped charges and boosters



## TECHNICAL CHARACTERISTICS

**1,80 - 1,83**

Density

**8820 m/s**

Detonation velocity

# OCTOWAX

HMX / Wax or Viton

---



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Pressed composition for high performance warheads and shaped charges



## TECHNICAL CHARACTERISTICS

**1,78 - 1,86**

Density

**8800 m/s**

Detonation velocity



## INSENSITIVE COMPOSITIONS

EURENCO develops insensitive formulations to be used in boosters and main charges by warheads and ammunition manufacturers. In addition to melt-cast and pressed compositions, EURENCO also provides Cast PBX formulations and filling, ready to use, specifically for the loading of Insensitive Munitions (shell ammunition, missile and torpedo warheads, underwater mines, aircraft bombs...). EURENCO equipped with both high-tech and cost-effective loading facilities, and contributes to the development of new Insensitive Munitions, in partnership with customers.

# PBXN-7

TATB / RDX



## SPECIFICATIONS

MIL-DTL-82744



## APPLICATION

IM pressed composition for boosters



## TECHNICAL CHARACTERISTICS

**1,78**  
Density

**7770 m/s**  
Detonation velocity

**2,5 - 3,8 mm**  
Critical diameter

**20 kbars**  
Shock sensitivity



# V350

TATB / HMX

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## SPECIFICATIONS

STANAG 4170



## APPLICATION

IM pressed composition for boosters and main charges



## TECHNICAL CHARACTERISTICS

**1,887**  
Density

**8170 m/s**  
Detonation velocity

# P16945

NTO / RDX

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## SPECIFICATIONS

STANAG 4170



## APPLICATION

IM pressed composition for boosters and main charges

IM equivalent to comp A3



## TECHNICAL CHARACTERISTICS

**1,84**

Density

**8350 m/s**

Detonation velocity

**5 - 7 mm**

Critical diameter

**> 25 kbars**

Shock sensitivity

# CAST PBX COMPOSITIONS FOR INSENSITIVE MUNITIONS

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EURENCO offers one of the world's widest range of Cast PBX solutions. This extensive know-how is the outcome of continuous research effort and experience acquired over 40 years to render munitions insensitive to accidental or intentional threats (fuel fire, bullet impact, metallic fragment, drop, shock, etc.).

Thanks to these assets, EURENCO has become one of the key players in the field of Cast PBX technology for Insensitive Munitions, and highly contributes to fulfil the new Armed Forces' needs to:

- > Reduce the vulnerability of combat platforms, warehouses and storage plants,
- > Ensure total personnel safety,
- > Increase performance of weapon systems,
- > Lower operating and life cycle costs.

Furthermore, EURENCO is equipped with a complete range of cost-effective high-tech manufacturing processes:

- > Unique and revolutionary "bi-component" process for continuous production of shell ammunition,
- > Batch process for serial production of warheads, bombs and penetrators, torpedoes and underwater mines.

## Qualified according to STANAG 4170

REFERENCE	MAIN CONSTITUENTS	DENSITY	DETONATION VELOCITY (M/S)	MAIN APPLICATIONS
<b>RDX BASED FORMULATIONS</b>				
B 2211	I-RDX®/AP/Al, IB	1.81	5500	Underwater mines and torpedoes / Enhanced blast warheads
B 2238	RDX, IB	1.57	8040	Boosters / Missile warheads / Shells
B 2258	I-RDX®/AP/Al, IB	1.67	7100	Missile warheads
B 2263 (HBU 88)	I-RDX®, IB	1.63	8150	Missile warheads / Shells
B 2265	I-RDX®, IB	1.65	8290	Missile warheads / Shells
B2269	RDX,Add, IB	1.50	7800	Plastic explosive
B 2276	RDX/IB	1.66	8300	Booster explosive
B 2508	RDX/Add/FB	1.78	7750	Reactive Armor
PBXN-109	I-RDX®/Al, IB	1.65	7525	General purposes bombs and penetrators
<b>HMX BASED FORMULATIONS</b>				
B 2188	HMX/PETN, IB	1.62	7900	Booster explosive / Safety device
B 2250	HMX/AP/Al, IB	1.80	6400	Enhanced blast / General purposes bombs and penetrators
B 2273	HMX, IB	1.72	8490	Missile warheads
ORA 86	HMX, IB	1.70	8350	Missile warheads / Shaped charges
PBXN-110	HMX, IB	1.68	8300	Missile warheads / Shaped charges
<b>NTO BASED FORMULATIONS</b>				
B 2214	HMX/NTO, IB	1.63	7450	General purposes bombs and penetrators
B 2267	I-RDX®/NTO, IB	1.65	7570	Shells
B 2268	I-RDX®/NTO/Al, IB	1.76	7200	General purposes bombs and penetrators

A photograph showing several military personnel in camouflage uniforms and blue helmets. They are working with a large quantity of demolition explosives, which are arranged in neat rows on a surface. The scene is outdoors, with reddish-brown soil visible in the background. The personnel are focused on their task, with some kneeling and others standing. The overall atmosphere is one of professional military activity.

## DEMOLITION EXPLOSIVES

A worldwide reference for demolition explosives, EURENCO provides a complete range of plastic explosives for all types of demolition, cutting and breaching operations, all compliant with the new international requirements on the marking of plastic explosives (Montreal Convention), and addressing mainly Armed Forces, Special Forces and Army Combat Engineers.

# C4

Malleable and safe to handle



## SPECIFICATIONS

MIL-C-45010A  
Compliant with Montreal Convention



## APPLICATION

Demilitarization, demolition and breaching operations



## TECHNICAL CHARACTERISTICS

**1,65**  
Density

**8 100 m/s**  
Detonation velocity

**from 0.5 kg up to 2 kg**  
Supplied in bulk or packages

RDX-based formulation

# PE10 X-DOUGH

Easy to ignite and shape even at low temperature ("polar dough")



## SPECIFICATIONS

Compliant with Montreal Convention



## APPLICATION

Demilitarization, demolition and breaching operations



## TECHNICAL CHARACTERISTICS

**1,5**  
Density

**7 600 - 7 900 m/s**  
Detonation velocity

**cap #6 or cord 5 gr/m<sup>2</sup>**  
Ignitability

**5 MJ/kg**  
Explosive heat

PETN-based formulation

# HEXOMAX

Outstanding malleability at all temperatures  
No exsudation, no hardening



## SPECIFICATIONS

Compliant with Montreal Convention



## APPLICATION

Demilitarization, demolition and breaching operations



## TECHNICAL CHARACTERISTICS

1,5  
Density

7 850 m/s  
Detonation velocity

≤ 8  
Plasticity  
(GEMO FE-371-A-1 test)

- 40 °C to + 63 °C  
Temperature of use

RDX-based formulation



# HEXOSHEET

Easy to handle and cut manually



## SPECIFICATIONS

Compliant with Montreal Convention



## APPLICATION

Demolition, breaching and cutting operations



## TECHNICAL CHARACTERISTICS

**1,58**  
Density

**8 000 m/s**  
Detonation velocity

**-40 °C to + 63 °C**  
Temperature of use

**≥ 3 mm**  
Thickness

RDX-based formulation

# FORMEX

Flexible sheet



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Demolition, breaching and cutting operations



## TECHNICAL CHARACTERISTICS

from 1,2 to 1,4  
Density

$\geq 6\ 200$  m/s  
Detonation velocity

from 1 mm to 10 mm  
10 different thicknesses

PETN-based formulation

# EXPLOSIVES

## MINING

EURENCO's explosives also find applications in the Mining & Quarrying industry, as it provides both purified HMX for shock tubes and mini boosters for ignition charges.

They are used to ignite slurries and emulsion to full detonation, by giving the energy impulse necessary to initiate larger charges.

As an explosive manufacturer, EURENCO also provides RDX and PETN as well as newly developed PE-coated explosives family, for all types of initiation devices and detonating cords.

# X-DOUGH

Malleable, easy to ignite and cost-efficient  
PETN-based plastic explosive



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking  
Compliant with Montreal Convention



## APPLICATION

Softer than C4, easier to shape even at low temperature ("polar dough")

Adhesion to vertical surfaces

Civil and law enforcement applications for ignition (booster), mine destruction, demilitarization and demolition work



## TECHNICAL CHARACTERISTICS

**1,5**  
Density

**7 600 - 7 900 m/s**  
Detonation velocity

**cap #6 or cord 5 gr/m<sup>2</sup>**  
Ignitability

**5 MJ/kg**  
Explosive heat

**> 726 mJ**  
Static spark sensibility

**25 J**  
Impact sensitivity

**180 °C**  
Deflagration onset

# X-PIPE

Mini-booster for detonators



## SPECIFICATIONS

UN approved  
 Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
 CE-marking  
 Compliant with Montreal Convention



## APPLICATION

Filled with 12 grams of X-DOUGH  
 Diameter: 11 mm ; Length: 130 mm  
 Gives the energy impulse necessary to initiate larger charges  
 Ignites slurries and emulsions to full detonation



## TECHNICAL CHARACTERISTICS

**1,45**  
Density

**7 600 - 7 900 m/s**  
Detonation velocity

**cap #6**  
Ignitability

**5 MJ/kg**  
Explosive heat

**> 726 mJ**  
Static spark sensibility

**25 J**  
Impact sensitivity

**180 °C**  
Deflagration onset

# HMX

Purified fine crystallized HMX for shock tubes



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

High quality shock tubes for mining and quarrying applications  
Ensures continuous transmission of shock waves and allows non-interrupted conductivity to ignition of charges



## TECHNICAL CHARACTERISTICS

**1,90**  
Density

**9 100 m/s**  
Detonation velocity

**277 °C**  
Melting point

**-2 820 ± 2.8 kJ/mol**  
Heat of combustion

**700 l/kg**  
Volume of detonating gases

# PETN

Pure PETN crystals for high performance



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignitors and detonating cords



## TECHNICAL CHARACTERISTICS

**1,76**  
Density

**7 600 - 7 900 m/s**  
Detonation velocity

**5 MJ/kg**  
Explosive heat

**> 726 mJ**  
Static spark sensibility

**25 J**  
Impact sensitivity

**180 °C**  
Deflagration onset

Wide range of particle sizes distribution

# RDX WAX

Highly purified RDX coated with wax



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignitors and detonating cords  
Optimized for large scale automatic dosing and pressing of charges



## TECHNICAL CHARACTERISTICS

**1,82**  
Density

**8 750 m/s**  
Detonation velocity

**204 °C**  
Melting point

**-2 092 ± 2.1 kJ/mol**  
Heat of combustion

**900 l/kg**  
Volume of detonating gases



# PETN PE-COATED

PETN coated with polyethylene for low sensitivity and high flowability



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Electrical and non-electrical detonators  
Booster charges  
Approximately 100% lower impact sensitivity compared with waxed product  
Latest technology patented by EURENCO



## TECHNICAL CHARACTERISTICS

1,76  
Density

8 400 m/s  
Detonation velocity

140 °C  
Melting point

823 l/kg  
Volume of detonating gases

**-2 572,4 ± 0.8 kJ/mol**  
Heat of combustion

Cost advantage **can be transported dry**

# RDX PE-COATED

RDX coated with polyethylene for increased density and performance



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking  
Compliant with Montreal Convention



## APPLICATION

Electrical and non-electrical detonators  
Booster charges  
Improves electrostatic, loading and pressing properties of the crystals  
Approximately 100% lower impact sensitivity compared with waxed product  
Latest technology patented by EURENCO



## TECHNICAL CHARACTERISTICS

**1,82**  
Density

**8 750 m/s**  
Detonation velocity

**204 °C**  
Melting point

**-2 092 ± 2.1 kJ/mol**  
Heat of combustion

**900 l/kg**  
Volume of detonating gases

# HNS

Small crystals, good flowability



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Detonators



## TECHNICAL CHARACTERISTICS

**1,74**  
Density

**7 000 - 7 100 m/s**  
Detonation velocity

**316 - 318 °C**  
Melting point

**-6 434,2 ± 5.0 kJ/mol**  
Heat of combustion

**700 l/kg**  
Volume of detonating gases

# EXPLOSIVES

## OIL & GAS



Using its thorough experience in high explosives for the military market, EURENCO produces high quality and high thermal stability explosives suited for the Oil & Gas Industry, which are extensively used in shaped charges for perforating guns in well completion.

Heat resistance is an important characteristic of the explosives used for perforating deep oil wells, since the temperature in a drilled hole increases with the depth. The same requirements exist in the gas industry.

For many years, EURENCO has worked in close partnership with shaped charge manufacturers. Today, EURENCO continues to provide high explosives for such perforating charges.

# RDX COMPOSITION

Best solution for both performance and cost



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignition and main explosive for shaped charges for perforating guns in standard well completion

Customized flowability while minimizing dusting properties



## TECHNICAL CHARACTERISTICS

**1,82**  
Density

**8 750 m/s**  
Detonation velocity

**204°C**  
Melting point

**-2 092.0 ± 2.1 kJ/mol**  
Heat of combustion

**900 l/kg**  
Volume of detonating gases

# HMX COMPOSITION

Highly purified HMX for high thermal stability and low shock sensitivity



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignition and main explosive for shaped charges for perforating guns in deep well completion

Designed to meet the highest requirements of the Oil & Gas Industry



## TECHNICAL CHARACTERISTICS

**1,90**  
Density

**9 100 m/s**  
Detonation velocity

**287°C**  
Melting point

**-2 820 ± 2.8 kJ/mol**  
Heat of combustion

**927 l/kg**  
Volume of detonating gases

# HNS COMPOSITION

Very high thermal stability and good initiation reliability



## SPECIFICATIONS

UN and DOT approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignition and main explosive for shaped charges for perforating guns in very deep well completion Can withstand temperatures around 250 - 300 °C for periods of time



## TECHNICAL CHARACTERISTICS

**1,74**  
Density

**7 000 to 7 100 m/s**  
Detonation velocity

**316 - 318 °C**  
Melting point

**-6 434.2 ± 5.0 kJ/mol**  
Heat of combustion

**700 l/kg**  
Volume of detonating gases

# RDX PE-COATED

RDX coated with polyethylene for increased density and performance



## SPECIFICATIONS

UN approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

Ignition and main explosive for shaped charges for perforating guns in standard well completion

Improves electrostatic, loading and pressing properties of the crystals

Approximately 100% lower impact sensitivity compared with waxed product

Latest technology patented by EURENCO



## TECHNICAL CHARACTERISTICS

**1,82**  
Density

**8 750 m/s**  
Detonation velocity

**204 °C**  
Melting point

**-2 092 ± 2.1 kJ/mol**  
Heat of combustion

**900 l/kg**  
Volume of detonating gases



# HMX PE-COATED

Highly purified HMX coated with polyethylene for high thermal stability and significantly reduced shock sensitivity



## SPECIFICATIONS

UN approved  
Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU  
CE-marking



## APPLICATION

High performance leader on the market

Ignition and main explosive for shaped charges for perforating guns in deep well completion

Improves electrostatic, loading and pressing properties of the crystals

Approximately 100% lower impact sensitivity compared with waxed product

Latest technology patented by EURENCO



## TECHNICAL CHARACTERISTICS

**1,90**  
Density

**9 100 m/s**  
Detonation velocity

**287 °C**  
Melting point

**-2 820 ± 2.8 kJ/mol**  
Heat of combustion

**700 l/kg**  
Volume of detonating gases

# EXPLOSIVES

## SPACE



EURENCO manufactures high purity ADN, used as an oxidizer in liquid mono-propellant for rocket engines in space applications that fulfill space propulsion requirements. Compared with hydrazine, it is less toxic and brings higher performance, hence reducing fueling cost and tank volumes, and enabling extended missions.

First tested by ECAPS (Swedish Space Corporate Group) in the PRISMA satellite in 2010

# LMP-103S

Replacement of hydrazine as monopropellant



## SPECIFICATIONS

Demonstrated on the Prisma satellite in 2010  
Patented by ECAPS together with HPGP thrusters  
UN and DOT Class 1.4S



## APPLICATION

Environmental friendly liquid monopropellant fuel for space applications in High Performance Green Propulsion (HPGP)



## TECHNICAL CHARACTERISTICS

**65%**

ADN (ammonium dinitramide)

**35%**

water solution made up of methanol and ammonia

**6%**

higher specific impulse and

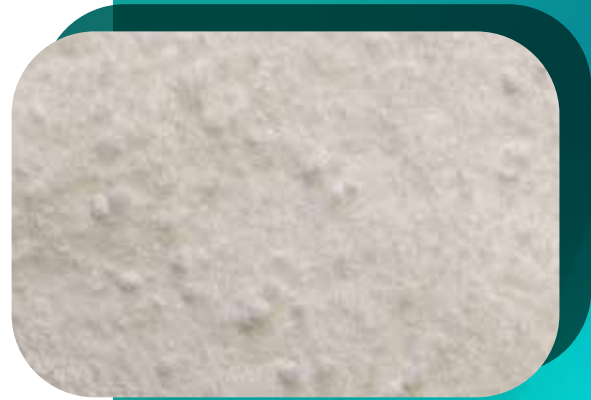
**30%**

higher impulse density than hydrazine monopropellant

# ADN

New energetic oxidizer in solid and liquid propellants

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## SPECIFICATIONS

UN approved  
 Identification and traceability according to EU Directive 2008/43/ EC and 2012/4/EU  
 CE-marking  
 Compliant with Montreal Convention



## APPLICATION

High detonation velocity and increased performance due to higher bubble energy  
 Possible replacement for ammonium perchlorate (AP)  
 Can be supplied as crystals or "prills" (spherical particles)



## TECHNICAL CHARACTERISTICS

**1,81**  
Density

**≈ 7 000 m/s**  
Detonation velocity

**92 °C**  
Melting point

**980 kJ/mol**  
Heat of combustion

**160 °C**  
Auto-ignition



# PROPELLANTS

## II. PROPELLANTS

Drawing on a long skilled experience in propellants, EURENCO manufactures a wide range of single and multi base propellants for both civil and military applications:

- **Single and multi base propellants** for small to large caliber military ammunition, modular charges, mortar increments, recoilless antitank weapons, reloading powders and hunting & sporting cartridges;
- **Low vulnerability (LOVA) propellants** for insensitive propelling charges;
- **Spherical powders** for military small arms ammunition, hunting & sporting cartridges and industrial tools.

EURENCO also produces military grades of nitrocellulose used in the manufacturing process of single and multi base propellants, as well as combustible cases



### PRODUCTION PLANTS

Clermont (Belgium)  
Karlskoga (Sweden)



### COMMERCIAL OFFICE

Sorgues (France)  
Washington DC (USA)

# PROPELLANTS

## SMALL CALIBER

EURENCO manufactures both single base propellants and spherical powders to cover the entire range of small caliber ammunition:

- Single base propellants for .22 inch to 12.7 mm calibers;
- Spherical powders for 4.6 mm to 20 mm small arms.

EURENCO also developed green formulations in regards with Environmental and Reach regulations

# RIFLE POWDER

High performance and high energy  
extruded and spherical propellants



## SPECIFICATIONS

STANAG 4170  
UN and DOT approved  
CE-marking  
Identification and Traceability according to European Directive 2008/43/EC and 2012/4/EU



## APPLICATION

Customized to maximize the performance of the customers' chosen components  
All civil and military rifle calibers, from 0.22 up to 20 mm



## TECHNICAL CHARACTERISTICS

1-perforated propellant grains

Propellant compositions with up to 15% of  
nitroglycerine

Spherical powders of different densities and  
cylindrical grains, all with various burning moderator,  
flash reducer and decoppering agents

Green propellants for green applications



# PISTOL POWDER

Wide range of spherical and porous fast burning propellants



## SPECIFICATIONS

UN and DOT approved  
CE-marking  
Identification and Traceability according to European Directive 2008/43/EC and 2012/4/EU



## APPLICATION

For all types and calibers of pistol ammunition  
Capability to design tailored products



## TECHNICAL CHARACTERISTICS

Stick or 1-perforated grains

Single base or double base propellant compositions

Spherical powders of various densities

# SHOT SHELL POWDER

Huge selection of different types of porous  
propellants and spherical powders



## SPECIFICATIONS

UN and DOT approved  
CE-marking  
Identification and Traceability according to European Directive 2008/43/EC and 2012/4/EU



## APPLICATION

For shot shell ammunition of all calibers  
Performance according to customer request



## TECHNICAL CHARACTERISTICS

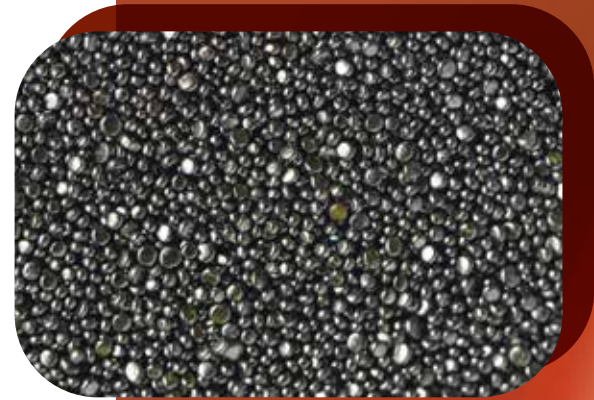
Stick, flake or T-shaped grains

Single base or double base propellant compositions

Low density spherical graphitized propellant

# RELOADING POWDERS

High energy propellants with superior velocity and accuracy



## SPECIFICATIONS

UN and DOT approved  
CE-marking  
Identification and Traceability according to European Directive 2008/43/EC and 2012/4/EU



## APPLICATION

Extruded propellants for all types of reloading powders  
Spherical powders to be found in Ramshot range



## TECHNICAL CHARACTERISTICS

- Spherical and 1-perforated grains
- Single base or double base propellant compositions
- Extreme lot to lot consistency
- Minimal barrel wear and excellent flow-ability for easy reloading

# PROPELLANTS

## MEDIUM CALIBER

EURENCO provides single and multi base propellants for medium caliber ammunition ranging from 30 mm to 57 mm, as well as their igniters, including LOVA propellants



# MEDIUM CALIBER PROPELLANTS

Single and multi base propellants for medium caliber ammunition ranging from 30 mm to 57 mm, and their igniters



## APPLICATION

30 mm

- Single or multi perforated propellant grains
- Single base or double base propellant compositions

40 mm

- 1-perforated propellant grains
- Single base or double base propellant compositions

40 mm LOVA

- 19-perforated LOVA propellant grains
- Based on RDX and CAB compositions

57 mm

- 1-perforated propellant grains
- Single base or double base propellant compositions

57 mm LOVA

- 19-perforated LOVA propellant grains
- Based on RDX and CAB compositions

## TECHNICAL CHARACTERISTICS



## SPECIFICATIONS

UN No. classified

Identification and Traceability according to European Directive 2008/43/EC and 2012/4/EU

# PROPELLANTS

## LARGE CALIBER



With regards to large caliber, EURENCO provides:

- Single and multi base propellants for naval, tank and field artillery ammunition (76 mm, 120mm, 155mm), mortar increments (60 mm, 81 mm and 120 mm), and recoilless antitank weapons;
- Spherical powders for mortar increments (60 mm and 81 mm).

EURENCO is also able to supply double base or multi base propellant paste according to customer request

# ANTI-TANK PROPELLANT

Various recoilless antitank systems



## APPLICATION

For all types of recoilless antitank systems



## TECHNICAL CHARACTERISTICS

Flake or strip

Double base propellant compositions

Dimensions according to customer request



## SPECIFICATIONS

UN and DOT approved

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

CE-marking

# MORTAR PROPELLANT

60 mm, 81 mm and 120 mm



## APPLICATION

For 60 mm and 81 mm mortar ammunition

For 120 mm mortar ammunition



## TECHNICAL CHARACTERISTICS

Flake  
Double base propellant compositions  
Spherical powders used in primary and secondary charges

1-perforated grains  
Single and double base propellant compositions  
Dimensions according to customer request



## SPECIFICATIONS

UN and DOT approved

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

CE-marking



# ARTILLERY PROPELLANT

105 mm and 155 mm



## APPLICATION

For 105 mm artillery guns

For 155 mm artillery guns



## TECHNICAL CHARACTERISTICS

Single or multiperforated grains  
Single, double or multi base propellant compositions  
Dimensions according to customer request

Single or multiperforated grains or sticks  
Single, double or multi base propellant compositions  
Dimensions according to customer request



## SPECIFICATIONS

UN and DOT approved

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

CE-marking

# TANK PROPELLANT

90 mm, 105 mm and 120 mm



## APPLICATION

For 90 mm, 105 mm and 120 mm tank ammunition



## TECHNICAL CHARACTERISTICS

Single or multi perforated grains or sticks  
Single, double or multi base propellant compositions  
Dimensions according to customer request



## SPECIFICATIONS

UN approved

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

CE-marking

# ROCKET PROPELLANT

Rockets and missiles

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## APPLICATION

For different types of rockets and missiles



## TECHNICAL CHARACTERISTICS

Rods or tubes  
Double base or multi base propellant compositions  
Dimensions according to customer request



## SPECIFICATIONS

UN approved

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

CE-marking

# PROPELLANTS

## AUTOMOTIVE SAFETY

EURENCO provides single base and LOVA propellants to industrials specialized in automotive safety.

Propellants are integrated into airbags and belt-restrainer systems, as gas generators, in order to rapidly inflate the bag where airbags are concerned, or retract the belt in the case of seat-belt pretensioners.

The use of one kind of propellant over the other depends on the customer's choice

# AUTOMOTIVE SAFETY PROPELLANTS

For airbags and safety belt restraint systems



## APPLICATION

AIP (auto-ignition pill) for automotive safety systems

LOVA propellant for airbags

Propellant for safety belt restraint system



## TECHNICAL CHARACTERISTICS

GUDN-based composition with very exact auto ignition temperature

Insensitive propellant with 7 or 19 hole perforated grains  
Propellant composition based on RDX and CAB

Single base propellant with 1 or 7 hole perforated grains



## SPECIFICATIONS

UN No. classified

Identification and traceability according to EU Directive 2008/43/EC and 2012/4/EU

# COMBUSTIBLE ITEMS

17-BE-09  
CN 155 52 cal  
MDU F1 VIV MURAT  
EPTT06F 08-Rmm-2091-EVO  
LOT 08-BE-1

### III.COMBUSTIBLE ITEMS

EURENCO manufactures and provides a complete range of combustible items for various applications:

- **Modular Artillery Charge System (MACS)** for artillery ammunition based on own Eurenco design
- **Combustible Cartridge Cases (CCC's)** for tank and artillery munitions;
- **Nitrofilm** for mortar horseshoe containers and automotive safety;
- **Base Bleed grains** for extended range artillery ammunition;

EURENCO is also equipped with up-to-date production capacities, among which a new automated workshop for the manufacturing and filling of artillery modular charges



#### PRODUCTION PLANTS

Bergerac (France)



#### COMMERCIAL OFFICE

Sorgues (France)  
Washington DC (USA)

# COMBUSTIBLE ITEMS

DEFENSE & SECURITY

EURENCO develops a large range of combustible items specifically for Defense & Security applications.

EURENCO developed, industrialized and qualified modular charges for 155 mm artillery guns. EURENCO is equipped with a fully automated and continuous workshop dedicated to the manufacturing of artillery modular charges.

EURENCO also provides combustible cases for 120 mm tank ammunition, as well as Nitrofilm for mortar horseshoe containers and base bleed grains for extended range ammunition.



# MACS: BOTTOM CHARGES

Linkable Bottom Charge Module (BCM-E):  
for zones 1 and 2



## SPECIFICATIONS

Munitions 155 mm Artillery  
NATO 39 to 52 Cal.



## APPLICATION

Provide a complete zoning solution for 155 mm artillery applications:

- Extended range
- Improved logistics
- Higher rates of fire



## TECHNICAL CHARACTERISTICS

Single base propellant for BCM

Low vulnerability: MURAT\* label without packaging

Fully combustible design

Easy and quick handling

Different assembling modes: linkable or unlinkable  
in line with needs

# MACS: TOP CHARGES

Linkable Top Charge Module (TCM-E):  
for zones 3 to 6



## SPECIFICATIONS

Munitions 155 mm Artillery  
NATO 39 to 52 Cal.



## APPLICATION

Provide a complete zoning solution for 155 mm artillery applications:

- Extended range
- Improved logistics
- Higher rates of fire

Uniflex Modular Charge Systems



## TECHNICAL CHARACTERISTICS

Multi base propellant for TCM

Low vulnerability: MURAT\* label without packaging

Fully combustible design

Easy and quick handling

Different assembling modes: linkable or unlinkable  
in line with needs

# COMBUSTIBLE CARTRIDGE CASES

Compatible with automatic loading



## SPECIFICATIONS

Munitions 105 mm and 120 mm Tank  
Additional combustible components are also available to complete the Cartridge Case assembly, such as conic interface parts



## APPLICATION

Provide a number of advantages for 120 mm tank applications:

- Protection of the propellant charge
- Reduction in barrel wear
- Additional energy to the charge
- Increased firing rate



## TECHNICAL CHARACTERISTICS

Increased muzzle velocity: + 5%

Vulnerability levels to Bullet Impact with single base propellant: Type III to Type V

Vulnerability levels to Fire with single base propellant: Type III to Type V

Self ignition temperature: 180 °C to 240 °C

# NITROFILM

Innovative film made up of nitrocellulose



## SPECIFICATIONS

Munitions 51 mm, 60 mm, 81 mm, 120 mm Mortar



## APPLICATION

Can be used as horseshoe containers for mortar ammunition or as pyrotechnical devices for specific applications. Provides many advantages compared with conventional Celluloid:

- Enhanced flexibility, transparency, thermoplasticity, combustibility and inflammability
- Excellent mechanical properties and chemical stability
- Solvent residue < 2%
- Resistant to water and severe weather conditions



## TECHNICAL CHARACTERISTICS

Transparent or colored

Can be reinforced with nylon (Cellunyl®)

Available in rolls or sheets of different sizes and thickness (0,10 mm to 0,30 mm)

Specific shapes on request (containers, disks, increments, pyrotechnical igniters)

# BASE BLEED

For extended range artillery ammunition



## SPECIFICATIONS

STANAG 4170 for composition



## APPLICATION

Enhances projectile range up to 30% without reduction in accuracy

Adaptable to all types of shells and calibers



## TECHNICAL CHARACTERISTICS

Excellent mechanical properties at all temperatures

Low sensitivity to relative humidity

Burning rate easily tunable

Complex shape achievable through thermoplastic technology

# COMBUSTIBLE ITEMS

## CIVIL APPLICATIONS

EURENCO's Nitrofilm can be substituted to Celluloid for a variety of applications, including in the civil sector.

Today, it is essentially found in automotive safety, as thermal fuse or container, but it could also be used tomorrow to meet different needs in other industrial activities.



# NITROFILM

Celluloid product substitution for any pyrotechnical application



## SPECIFICATIONS

According to EURENCO spec.



## APPLICATION

Thermal fuse or container for automotive safety

Continuous transformation in serial conditions possible

Safe, stable and easy to use



## TECHNICAL CHARACTERISTICS

**0,1 mm to 0,3 mm**

Thickness

**560 mm max**

Width

**400 linear meters max**

Length

Transparent or colored

Available in sheets or rolls of different sizes

A close-up photograph of a person's hand in a blue lab coat holding a small glass test tube with a yellow cap. The hand is positioned over a black multi-well plate that contains several other test tubes with yellow and white caps. The background is a blurred laboratory environment. A large, semi-transparent blue 'V' shape is overlaid on the image, with the word 'SERVICES' written in white capital letters across its center. There are also solid blue vertical bars on the left and right sides of the image.

# SERVICES



# THE THERMAL TREATMENT UNIT (UTT)

A thermal desorption unit to destroy pyrotechnic materials and polluted soil while controlling the safety of the activity and environmental discharges.



## SPECIFICATIONS

Terms of reference land supply

Others in the process of consolidation



## APPLICATION

### Input application:

- pyrotechnic waste
- polluted land

### Output application:

- Cement works
- Construction companies
- Public works companies



## TECHNICAL CHARACTERISTICS

**3,5**  
tonnes/hour  
of mix processed

Treatment:  
**18,000**  
tonnes of soil/year  
+ 2,000 tonnes of  
pyrotechnic waste/year

- Rotary thermal desorption furnace
- post combustion
- gas treatment
- Continuous monitoring and measurement of atmospheric emissions

# BAUSSENQ STORAGE PARK & TEST CENTER

One of the largest storage parks in continental Europe for pyrotechnics



Saint-Martin-de-Crau (13)



## MAIN ACTIVITIES

Storage of explosives HD 1.1, 1.2, 1.3, 1.4 & 1.5

Repackaging of explosive materials

Storage of chemical products (AP, HMT, TO...)

Destruction of pyrotechnical waste through burning or fragmentation by blasting

Small scale trials and firing tests on a Ø30m arena:

- Up to 40kg of eq TNT (detonation) depending on the casing
- Or 100kg of eq TNT (combustion)



## TECHNICAL CHARACTERISTICS

**1 300**

hectares overall

**330**

hectares of fenced  
& supervised  
premises

**56**

effective  
warehouses &  
2 underground  
storages

Product classification HD 1.1, 1.2, 1.3, 1.4 & 1.5

- 5000T of overall storage capacity
- 2600T of equ. TNT for class 1.1, 1.2, 1.5 products

Facility owned by the French State & operated by EURENCO  
Compliant ISO 14001 and National Decree dated  
December 13, 2005

# FIRING TABLES CALCULATION WITH BOLT<sup>2</sup>

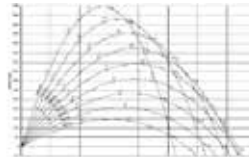
External ballistics modeling tool for firing tables generation.

Balistique des **O**bjets **L**ancés et **T**ables de **T**irs  
(Launched objects ballistics and firing tables)



## SPECIFICATIONS

The BOLT<sup>2</sup> code is an external ballistics tool able to calculate the trajectory of any given gyrostabilized projectile.



## APPLICATION

- 4 degrees of freedom model for trajectory prediction and firing tables calculation following STANAG 4119 and AOP-55
- 6 degrees of freedom modeling for trajectory prediction and firing tables calculation



## TECHNICAL CHARACTERISTICS

Robust

**6**

DOF model (degrees of freedom)

Automated firing tables generation for any configurations (all medium and large calibers with gyrostabilized projectiles)

Compatible with base bleed unit and rocket motor integration for artillery shell

NATO compatible

# LABORATORY SERVICES FOR ENERGETIC MATERIALS

A unique know-how in energetic materials composition and characteristics and dedicated laboratory with experienced workforce and proven equipments



## TECHNICAL CHARACTERIZATIONS

Properties	Product Type	Description
Chemical	Propellants / Combustible Items	Stabilizer tests: DPA, centralite, akardit (gas chromatography)
		Humidity - K. Fischer test
		Infra-red spectroscopy
Chemical	Nitrocellulose	Solvent content diethyl ether - ethanol (gas chromatography)
		Viscosity (European standard)
		Chemical oxygen demand
		Dewarda nitrogen content
Thermal	Propellants, Nitrocellulose	Waste water tests
		Nitrocellulose
		Stability Bergman-Junk
Thermal	Propellants, Nitrocellulose	Heating blocks - Stability tests 134,5°C
		Autoignition temperature / Blast point
Ballistics	Propellants	Calorimetry analysis
		Closed vessel test: Pmax determination, dP/dt, force, (NF T70-714 standard)
Mechanical	Combustible Items	Mechanical tests
		Control sample (uniaxial traction or compression tests)



## SPECIFICATIONS

Following STANAG/GEMO  
SEVESO classified site.  
ISO 9001 / 14001 certified.  
Storage facility for Class 1.3C.



## APPLICATION

- Strong knowledge in combustible cases, propellants and energetics raw materials.
- 2 closed vessels test for ballistics properties (up to 350 MPa)

# THE EUROPEAN LEADER IN ENERGETIC MATERIALS



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