

EXPLOROM SPECIAL SERVICES

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PLASTIC EXPLOSIVE

C4-ESS

TECHNICAL SPECIFICATION

Bucharest
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CHAPTER 1 GENERAL

C4 plastic explosive is a high explosive ESS main hexogen base, labeled with DMDNB (2,3-Dimethyl 2-3 DiNitroButan), manufactured by Explorom Special Services SRL. The acronym C4-ESS is the trademark of the explosive (RDX-based plastic explosive, with GDP-based binder - Explorom Special Services).

1.3.3 Reference

	Basic documentation of explosive with plastic binder
ST-C4-ESS-01-2020	Technical Specification, "Explosive with plastic binder C4-ESS", valid industrial prototype.
PTED-C4-ESS-01-2020	Development Evaluation Test Plan, "C4-ESS Plastic Binder Explosive", valid industrial prototype.
MOPI-PBX-C4-ESS-01-2020	Manual of Operating Procedures for "C4-ESS Plastic Explosive" and "PBX-ESS Plastic Binder Explosive"

2.1.2 The purpose of the product

C4-ESS is a strong, malleable, explosive blasting mixture. being able to take different forms, such as in the form of a parallelepiped block, it can be easily processed by hand and can be applied / adapted on different objectives, in order to make different shock wave demands, generated as a result of the detonation of the explosive charge.

According to the destination, the plastic explosive is classified in the following classes:

- Class 1 and 4 - the explosive composition is intended to be used for demolition missions;
- Class 2 - the C4-ESS composition is used to press parallelepiped demolition blocks / blocks, for example block M5A1;
- Class 3 - C4-ESS composition is used for use in extruded products;

2.2 Caratteristiche**2.2.1 General Specifications**

Characteristic	Information
Name:	Plastic Explosive
operational Abbreviation:	4-ESS
Hazard Class:	1.1 D
transport UN number	0457
Storage temperature range:	-20 °C to +50 °C
Temperature range:	- 20 °C ÷ +50 °C
Detonation initiation mode:	Shock wave from the detonation of a strong detonating staple, the detonation of an explosive priming charge or the impact of a high-velocity projectile.

2.2.2 Physical

characteristics Characteristic		Information
Exterior		Material with a soft plasticine consistency in which RDX is uniformly incorporated by the polyisobutylene binder.
Color		White, gray
Malleability		Plasticized body, slightly malleable, hand-machinable
Plasticity	Class 1	Maximum 0.030 units
	Class 2	Maximum 0.080 units
	Class 3	Minimum 0.018 units
	Class 4	Maximum 0.030 units

2.2.3 Chemical characteristics

Class C4-ESS	Characteristic (Chemical composition)	Information (Mass content of components)
1 and 2	Hexogen (RDX)	89.9 ± 1.0%
	Binder GDP	8.9 ± 1.0%
	DMDNB	1.2 ± 0.25%
3	Hexogen (RDX)	89.4 ± 0.7%
	Binder GDP	9.4 ± 0.7%
	DMDNB	1.2 ± 0.25%
4	Hexogen (RDX)	88.7 ± 0.7%
	Binder GDP	9.9 ± 1.0%
	DMDNB	1.2 ± 0.25%
	Dye	0.2 ± 0.02%
	Chemical composition Dye	
	Lead chromate	90%
	Carbon black	10%
	Humidity and volatility	Max. 0.25%
	Insoluble	particles No solid particles are retained on the US 40 screen and no more than 5 particles will be on the US 60 screen.

2.2.4 Performance, safety and compatibility

<i>characteristics Characteristic</i>	<i>Information</i>
Chemical vacuum stability according to STANAG 4556 (Specific gas volume)	$\leq 1\text{cm}^3/\text{g}$
Temperature sensitivity according to STANAG 4515 (Differential Thermal Analysis)	Auto-ignition temperature higher than $200\text{ }^{\circ}\text{C}$
Friction sensitivity according to STANAG 4487	No reaction at 25 kgf
Impact sensitivity (KAST hammer)	H_{50}^{**} to be greater than 0.25 m (with 5 kg hammer).
Initiation capacity:	Safe initiation at the shock wave of a detonating staple no. 8 according to the Sellier-Bellot classification

2.2.5 Reliability The

C4-ESS plastic explosive can be stored, transported and handled safely throughout the warranty period and life cycle.

2.2.6 Maintainability

Throughout its life cycle, the C4-ESS plastic explosive shall only be stored in airtight containers and in logistical packaging as supplied by the manufacturer. Under these conditions, **the warranty period is 2 years** and they must not be subjected to any other operations. C4-ESS has a **lifespan of at least 5 years**.

When removed from airtight packaging, the warranty period is reduced to one year (from the time of removal from the airtight packaging, but not exceeding the warranty period given by the manufacturer).

2.2.7 Environmental conditions The

C4-ESS plastic explosive may be used for destruction work or in explosive applications for which it is intended in the temperature range $-20 \div +50\text{ }^{\circ}\text{C}$.

During storage, it is recommended to observe the required climatic conditions. by regulations and provisions of all ammunition and explosives provided.

The C4-ESS logistics packaging will be labeled to contain the following information:

- 1) explosive code: C4-ESS (mandatory);
- 2) batch, year of manufacture, manufacturer code: **XXX-YY-ZZZ** (mandatory);
- 3) UN transport number: **UN 0457** (mandatory);
- 4) danger label and ammunition classification code for risk: **1.1 D**; (required)
- 5) number of blocks with a mass of 0.5 kg in the package: **NN PCS**. (required)
- 6) gross mass: kg (required);
- 7) volume (mandatory).

Table 1 Tests performed for the product "Plastic explosive C4-ESS"*If client requires MIL standard tests, ESS will conduct such tests.*

Tests and verifications	Approval	Acceptance	Checks in service / storage.
1) PO-PBX 4-ESS-01 <i>Checking the packaging, labeling and writing</i>	X	X	X
2) PO-PBX 4-ESS-02 <i>ASCERTAINING of the overall dimensions, appearance, color and mass of block</i>	X	X	
3) PO-PBX-C4-ESS-03 <i>Determination of charge density</i>	X	X	
4) PO-PBX-C4-ESS-04 <i>Determination of moisture and volatile substances content</i>	X	X	
5) PO-PBX-C4-ESS-06 <i>Determination of RDX content</i>	X	X	
6) PO-PBX-C4-ESS-07 <i>Determination of the particle size composition of RDX</i>	X	X	
8) PO-PBX-C4-ESS-08 <i>Determination of the binder content based on GDP</i>	X		
9) PO-PBX-C4-ESS-09 <i>Determination of DMDNB marking agent content</i>	X		
10) PO-PBX-C4-ESS-10 <i>Determination of insoluble particles</i>	X		
11) PO-PBX-C4-ESS-11 <i>Determination of plasticity</i>	X	X	
12) PO-PBX-C4-ESS-12 <i>Verification sensitivity to the shock wave generated by the detonating box</i>	X		
13) PO-PBX-C4-ESS-13 <i>Verification of the detonation transmission capacity</i>	X		
14) PO-PBX-C4-ESS-14 <i>Verification of the initiation and transmission of the detonation of the explosive charge under water</i>	X		
15) PO-PBX-C4-ESS-15 <i>Determination of detonation velocity</i>	X		
16) PO-PBX-C4-ESS-16 <i>Determination of explosive bristle (Hess test)</i>	X		
17) PO-PBX-C4-ESS-17 <i>Thermal characterization by Differential Thermal Analysis</i>	X		
18) PO-PBX-C4-ESS-18 <i>Determination of vacuum explosive stability</i>	X		X
19) PO-PBX-C4-ESS-21 <i>Determination of friction sensitivity</i>	X		
20) PO-PBX-C4-ESS-22 <i>Determination of impact sensitivity (Kast method)</i>	X		