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leading international partner for Explosives and Propellants

Tailored Sensitivity plosive Formulations

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IMEMTS, Tucson
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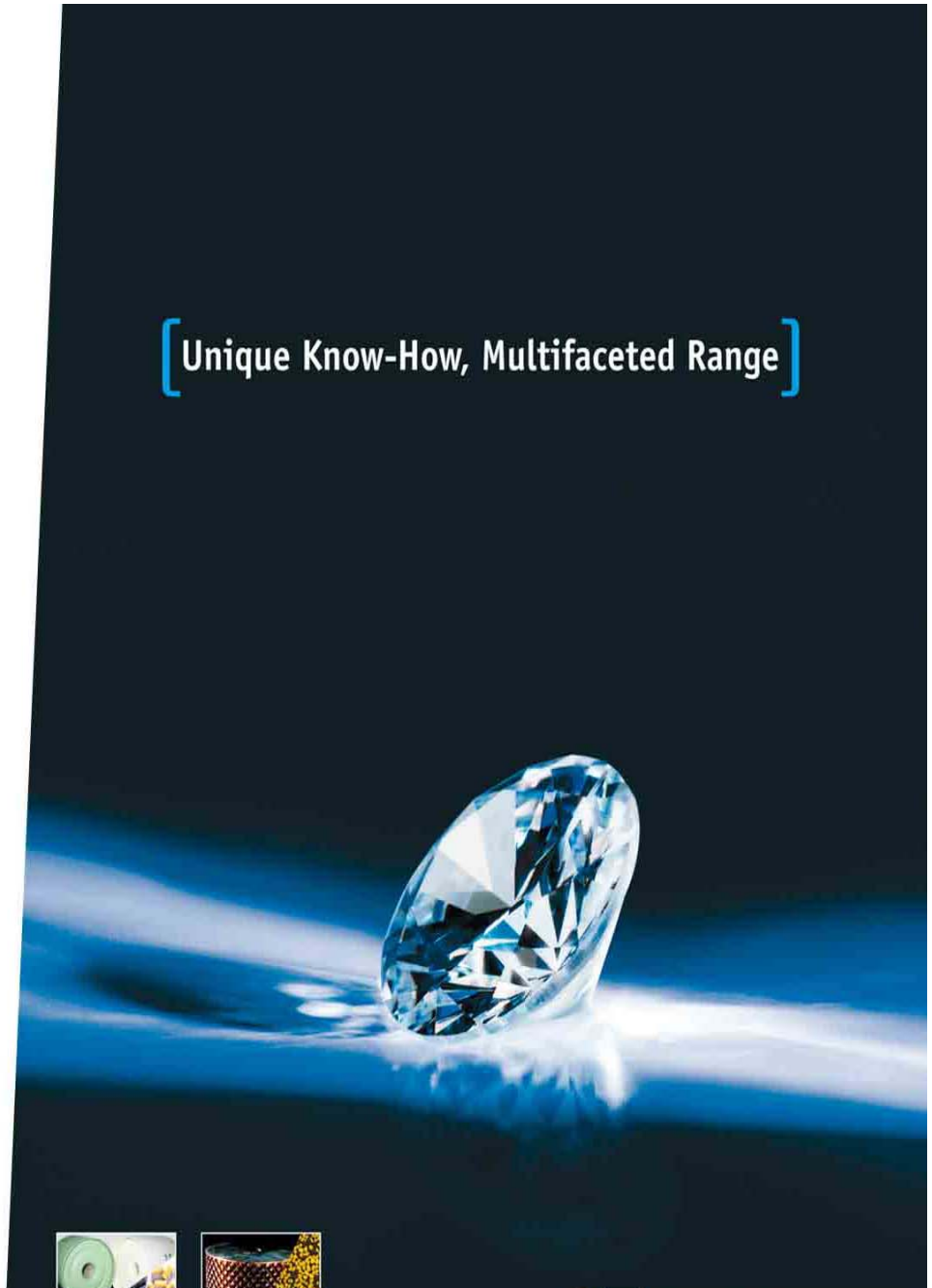

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OUTLINE

- Scope
- Method
- Desirable characteristics
- Formulation phase results
- Assessment against SCj
- Conclusions

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SCOPE

Define Cast PBX formulations for IM large calibre applications (155mm)

- Meeting SD and SCj without shielding/packaging
- Using mature raw materials (RDX, NTO, Al, binder)
- Using batch or proprietary bicomponent process

Method

- Establish target characteristics
- Measure the influence of NTO/RDX ratio against specs
- Finalize 2 formulations (without and with Aluminium)
- Assess against SCj with 155mm shells

Desirable Characteristics

- LSGT ≤ 100 cards (STANAG 4488 annex B)

  79 kbar, end of gap pressure

- ELSGT ≤ 50 mm PMMA (STANAG 4488 annex C)

  62 kbar, end of gap pressure

- Φ_{crit} ≤ 50 mm

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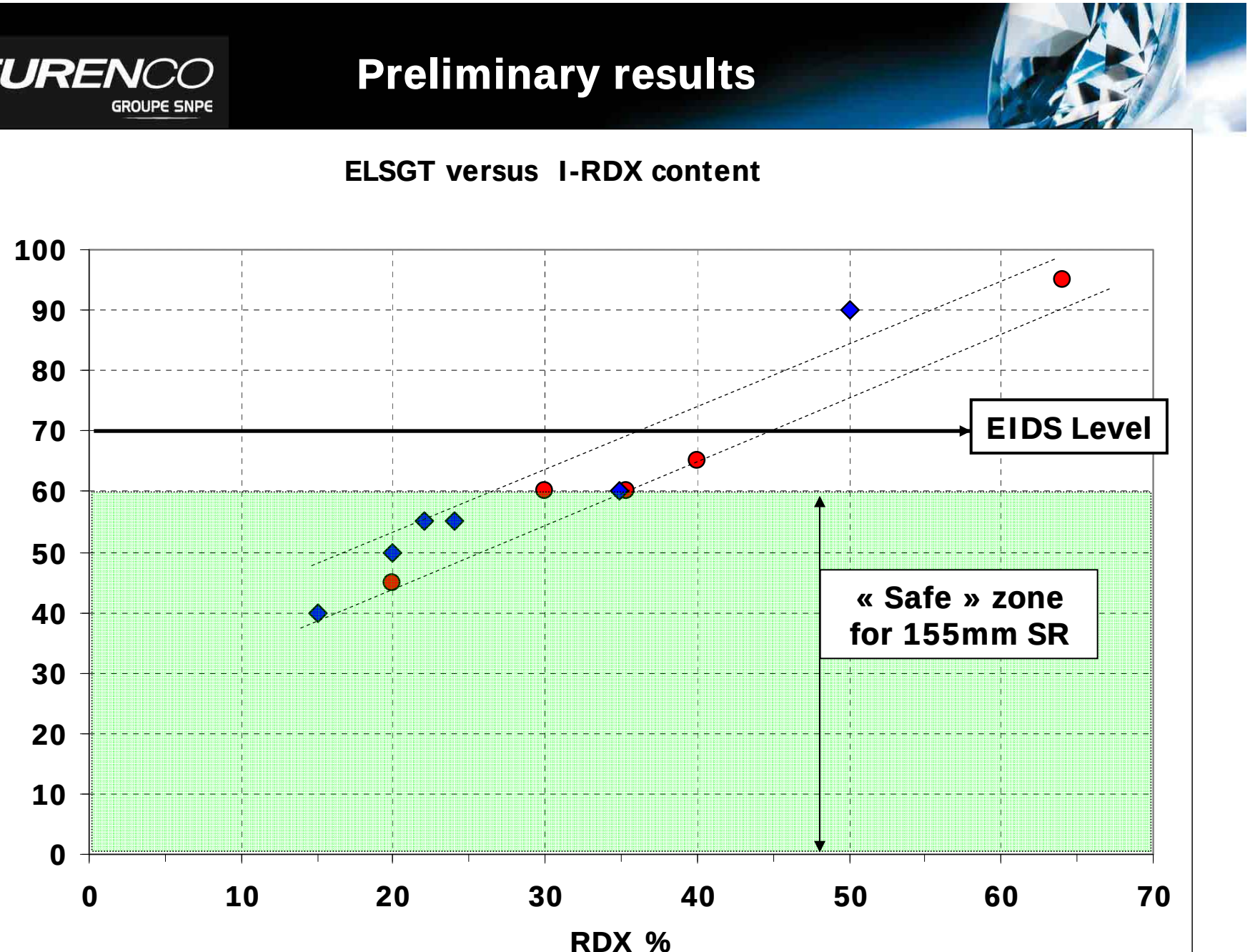
Preliminary results

ing)	NTO (%)	I-RDX® (%)	NTO/RDX	ISGT (cards)	ELSGT (mm PMMA)	Critical Diameter (mm)
	44	40	1.1	100	65	$19 < \Phi_c < 25$
	49	35	1.4	90	60	$25 < \Phi_c < 30$
4	54	30	1.8	80	60	$30 < \Phi_c < 36$
	64	20	3.2	40	45	$50 < \Phi_c$
	51	35	1.5	125	60	$13 < \Phi_c < 19$
6	62	24	2.6	100	55	$25 < \Phi_c < 30$

Preliminary results



Final Formulations

	B2267A	B2268A
ormulation	I-RDX ® / NTO HTPB	I-RDX ® / NTO / Al HTPB
iscosity (Pa.s) at casting time 6 hours after casting	 100 250	 300 600
ensity	1.65	1.76
echanical properties Max tensile stress (MPa) Max tensile strain (%)	 0.72 7.2	 0.72 8.6
ardness (Shore A)	70	71
etonation velocity (m/s) cylinder Ø 50 mm computed	 7570 7680	 / 7440
SGT (cards)	95	< 1
LSGT (mm PMMA)	55	40
nconfined Critical diameter (mm)	$30 < \Phi_c < 36$	$50 < \Phi_c$

Assessment against Shaped Charge Jet - 155mm shells

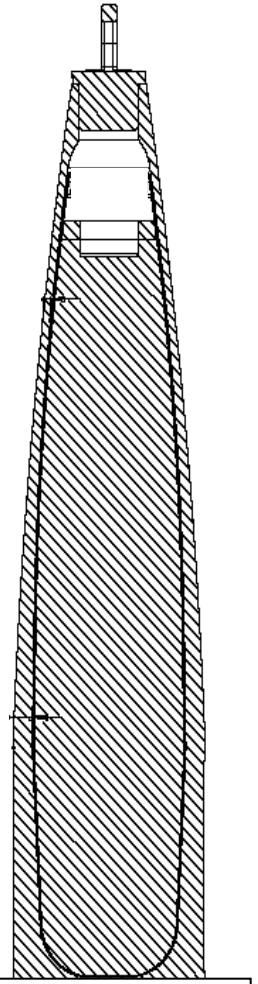
Test reference : **STANAG 4526 ed.2**

Shaped Charges : **Φ 68 mm**
(provided by TDA**)**

Shell bodies : **155mm**
(provided by RWM**)**

Explosive grains :
(≈ 9 Kg**)**

1. **B2267A**
2. **B2268A**



155mm shell

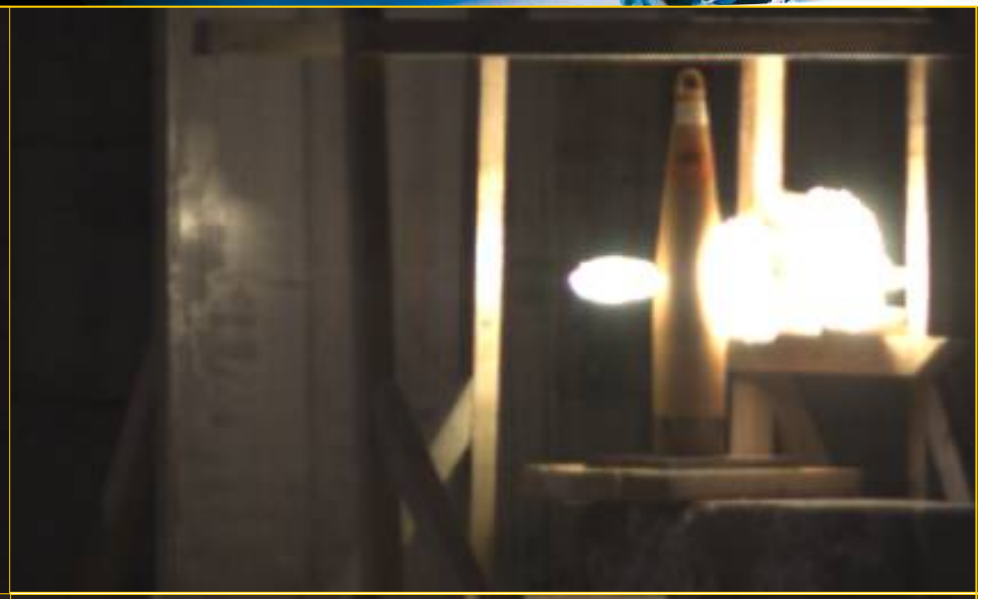
Not to scale

Shaped Charge Jet Tests
155mm shells

Shaped Charge Jet Test
155mm - B2267A

Shaped Charge Jet Test
155mm - B2267A

Shaped Charge Jet Test
155mm - B2268A



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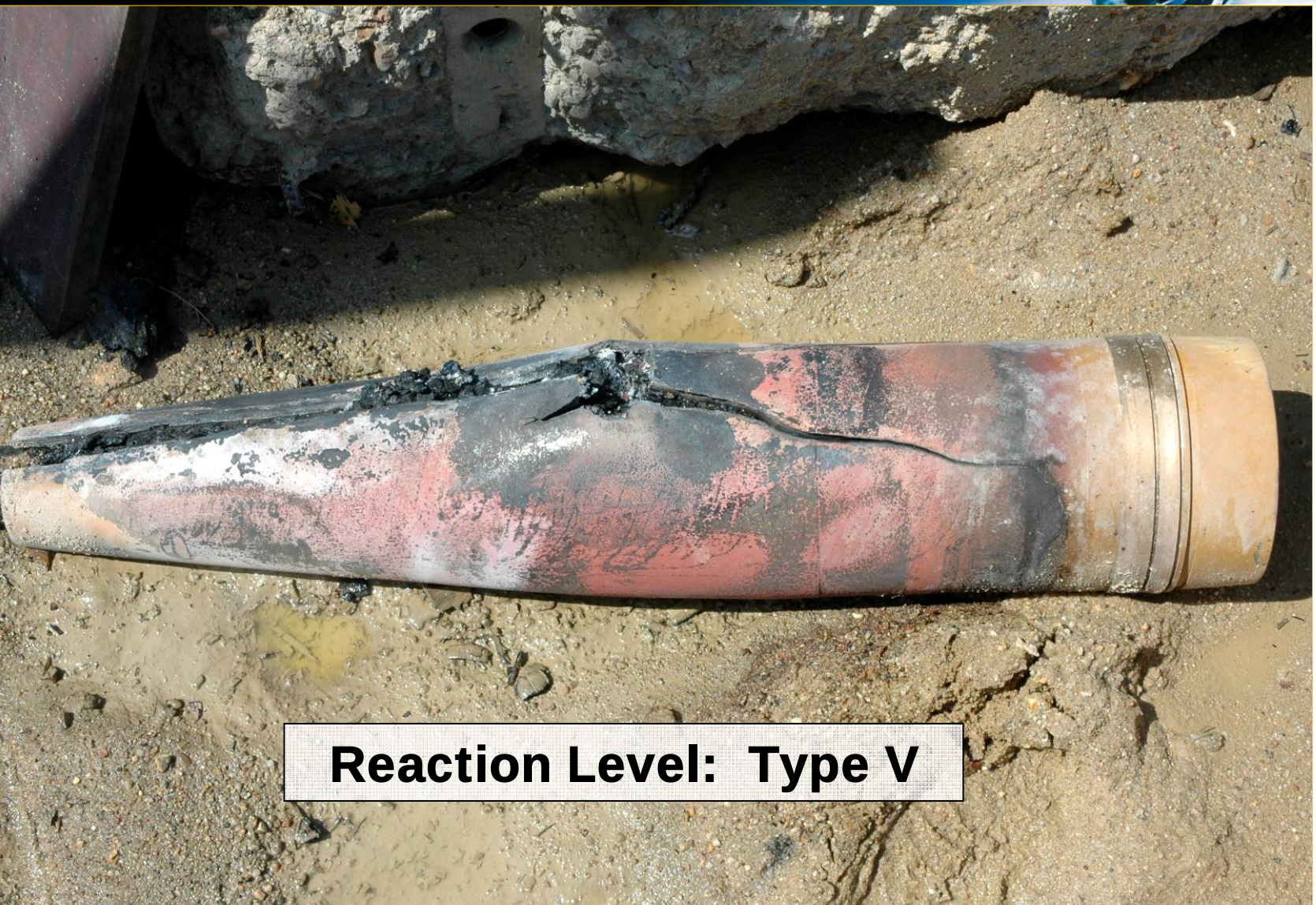
Shaped Charge Jet Test
155mm - B2268A



Conclusions

EURENCO has tailored new cast PBX formulations, NTO/RDX based, which exhibit optimized IM/Performances trade-offs for large caliber applications.

Low level gap test results allow B2267A and B2268A to meet EIDS criteria as well as Sympathetic Reaction requirements in 155mm configuration.

B2267A fully meets STANAG 4439 Shaped Charge jet requirement (Reaction Level III)

B2268A largely exceeds STANAG 4439 Shaped Charge jet requirement (Reaction level V, burning).

B2268A is a suitable formulation to get, at no risk, fully STANAG 4439 compliant munitions ranging from 155mm shells to 500 lbs class aircraft bombs with performances equivalent to PBXN-109.