



**RDECOM**



**BAE SYSTEMS**



**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**

**The Application of New IM Explosive Candidates in the M795 Projectile**

IMEM 15 – 18 October 2007

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US Army ARDEC

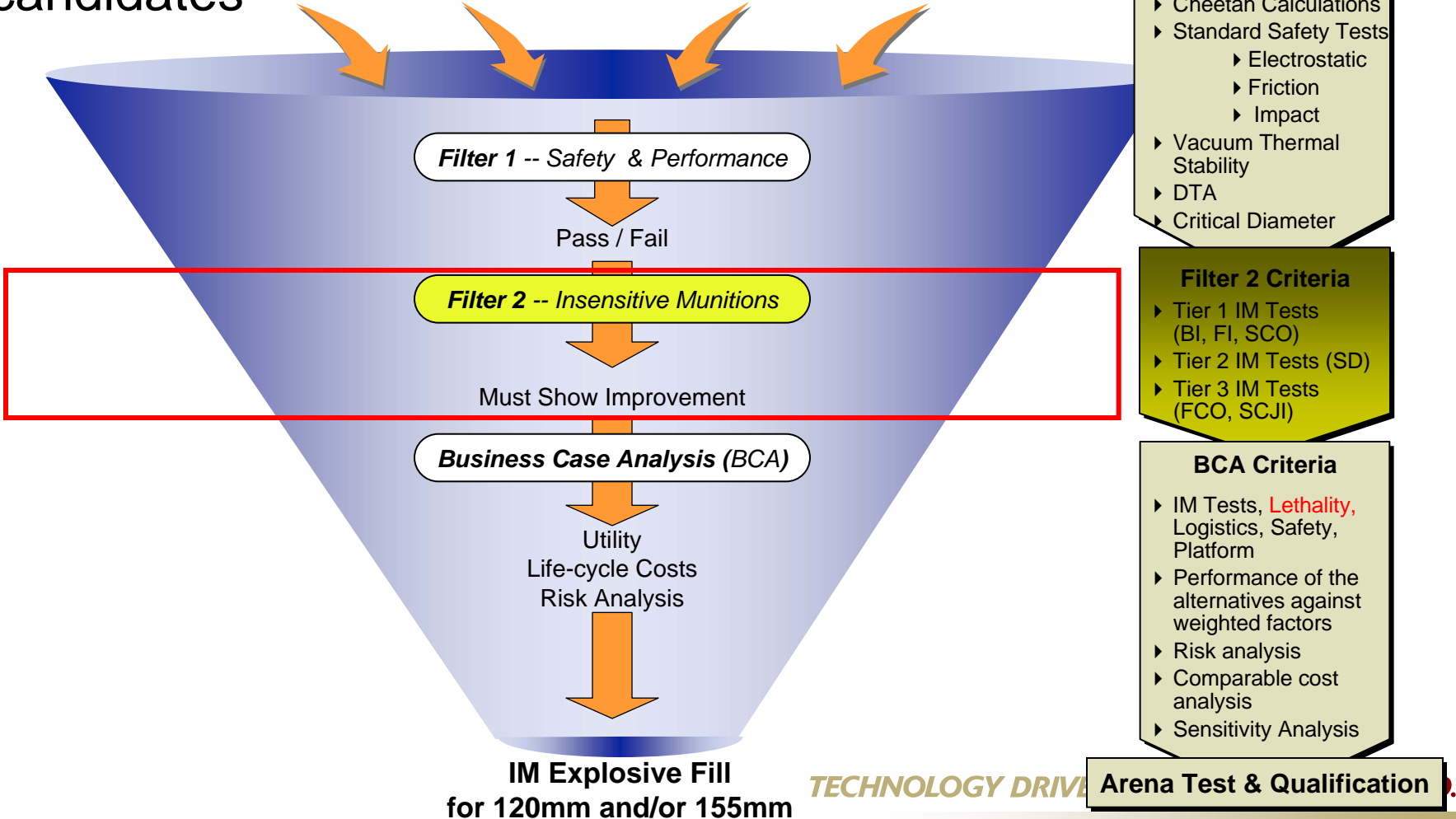
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- ✓ **Common Low-cost IM Explosive Program**  
– James Rutkowski
- ✓ **The Characterization of IM Explosive Candidates for TNT Replacement**  
– Brian Roos
- ✓ **Explosive Ingredients and Compositions for the IM M795 Artillery Ammunition**  
– Andrew Wilson

- Here I will provide the detailed IM test results for M795 filled with IMX candidates

## Munitions Fill Types

- “Funnel” framework to progressively screen candidates



- Venting Technology for Cook-off Environments
  - System Solution --- Explosive-alone cannot satisfy Cook-off
  - 155mm Artillery Concepts

## Incorporated Venting Solutions



**Standard Lifting Plug**  
**Will Not Pass (Type III)**



**Partial Venting (Type IV)**



**Meltable Fuze Plug (Type V)**

## Mil-Std-2105C, Liquid Fuel Fire, Witness Plate & Pressure Gage



IMX-101 Pass

IMX-102 Pass\*

IMX-103 Pass

\*Based on new lifting plug



MIL STD 2105C / 50F/hr / Precondition 145F / Witness Plate & Pressure Gage



Pass

IMX-101  
IMX-102  
IMX-103

} **Pass**





## MIL STD 2105C / 6000 ft/s Army Fragment / Witness Plate & Pressure Gage



IMX-101  
IMX-102  
IMX-103

Pass



## Mil-Std-2105C / .50 Caliber AP Bullet / Witness Plate & Pressure Gage



Pass

IMX-101 Pass

IMX-102 Pass

IMX-103 Fail - Equivalent to TNT (Type IV)





## Mil-Std-2105C, Diagonal Configuration, Witness Plate & Pressure Gages

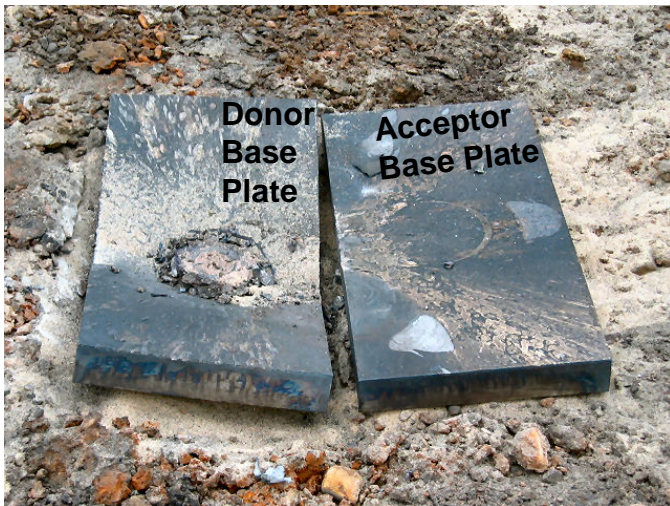


SD Test Setup



Donor side witness plate

# All Pass



Donor  
Base  
Plate

Acceptor  
Base Plate



Acceptor side witness plate





## Mil-Std-2105C, Unconditioned Jet, Witness Plate & Pressure Gages

May 4<sup>th</sup>, 2007  
(Picatinny Arsenal)



Test Set-up with 50mm SCJ



3 "Large" Pieces  
NO Detonation  
**PASS**

**IV**



4 "Large" Pieces NO Detonation

**IV**

**PASS**  
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## Mil-Std-2105C, Unconditioned Jet, Witness Plate & Pressure Gages

May 17<sup>th</sup>, 2007  
(Picatinny Arsenal)



Test Set-up with 81mm SCJ



## Examples



NO Detonation  
**PASS**

III



High-order Detonation  
**FAIL**

I





# Conditioned SCJI



81mm Shaped Charge

LX-14 with Al  
conditioning plate

JSIMTP standard

RPG-7 Surrogate



## – Demonstrated IM Compliance

- With Pass all IM tests

**Passed SD  
Passed SCJI**

IM Test: FCO SCO BI FI SD SCJI

IM Test:	FCO	SCO	BI	FI	SD	SCJI	
Passing Criteria	V	V	V	V	III	III	
M795 Baseline (TNT)	FAIL	FAIL	FAIL	FAIL	FAIL	FAIL	
IMX-101	PASS	PASS	PASS	PASS	PASS	PASS	PASS
IMX-102	(PASS)	PASS	PASS	PASS	PASS	PASS	PASS
IMX-103	PASS	PASS	FAIL	PASS	PASS	FAIL	FAIL

50mm 81mm

- IM HE Loading of 155 mm Projectiles – Paul

Fielding this technology saves lives, facilities & assets

Demonstrated IM Compliance

Results far exceeded expectations

Suitable & Sustainable solution

**Demonstrated PASS  
SD, 50mm SCJI & 81mm SCJI**