2012 INSENSITIVE MUNITIONS & ENERGETIC MATERIALS TECHNOLOGY SYMPOSIUM

40mm Enhanced Blast Insensitive Explosive Munitions

Aw Cheng Hok
contact no: +65 96374533
e-mail: awch@stengg.com

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OBJECTIVE

- To develop the next generation 40mm munitions with improved IM signature.
- To improve performance over the existing in-service 40mm munitions with Comp A5 filling.
AGENDA

- Introduction to EBIX
- Advantages of EBIX Munitions
- IM Tests for EBIX Munitions
- Performance Test for EBIX Munitions
- Summary
INTRODUCTION TO EBIX

Pressed Formulation (MX-09)

MX 09 Powder  
Pressed Charges

Explosive Safety tests (STANAG 4170)
Certified safe for transportation and loading into projectile

Density  
Critical Diameter  
VoD

1.87 g/cm³  
< 5.3mm  
~ 7800 m/s
ADVANTAGES OF EBIX MUNITIONS

Enhanced Soldier Firepower & Survivability

- 40mm Enhanced Blast Insensitive Explosive munitions will provide multi target effects, thereby enhancing the firepower of the troops significantly

- Process Benefits of EBIX Munitions
  - Press formulation
  - Direct replacement for Comp A5

- Operational Benefits of EBIX Munitions
  - Provide door & wall breaching capabilities
  - Effective against confined area
  - No degradation in fragmentation & penetration effects
  - Compatible to all LV grenade launchers & HV automatic grenade launchers

- Logistic Benefits
  - Insensitive munitions properties
ADVANTAGES OF EBIX MUNITIONS

EBIX into door

EBIX into enclosed room
## IM TESTS FOR EBIX MUNITIONS

### Summary of Insensitive Munitions test results for 40mm EBIX munitions

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- **Desired Response (STANAG 4439)**
- **Test Response**

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IM TESTS FOR EBIX MUNITIONS

Fast Heating Test (STANAG 4240)
IM TESTS FOR EBIX MUNITIONS
Fast Heating Test (STANAG 4240)

TYPE V: Burning Reaction
IM TESTS FOR EBIX MUNITIONS
Slow Heating Test (STANAG 4382)
IM TESTS FOR EBIX MUNITIONS
Slow Heating Test (STANAG 4382)

TYPE V: Burning Reaction
IM TESTS FOR EBIX MUNITIONS

Bullet Impact Test (STANAG 4241)
IM TESTS FOR EBIX MUNITIONS

Bullet Impact Test (STANAG 4241)

TYPE V: Burning Reaction

Advanced Material Engineering Pte Ltd
IM TESTS FOR EBIX MUNITIONS

Fragment Impact Test (STANAG 4496)
IM TESTS FOR EBIX MUNITIONS

Fragment Impact Test (STANAG 4496)

TYPE V: Burning Reaction

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IM TESTS FOR EBIX MUNITIONS

Sympathetic Reaction Test (STANAG 4396)

Unconfined

Confined
IM TESTS FOR EBIX MUNITIONS

Sympathetic Reaction Test (STANAG 4396)

TYPE VI: No Reaction
IM TESTS FOR EBIX MUNITIONS
Shaped Charge Jet Test (STANAG 4526)

TYPE VI: No Reaction

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PERFORMANCE TESTS FOR EBIX MUNITIONS

**Peak Overpressure vs Range**

- 40mm LV - Comp A5
- MX-09

**Positive Time Duration vs Range**

- 40mm LV - Comp A5
- MX-09

**Impulse vs Range**

- 40mm LV - Comp A5
- MX-09

**½” Thick Plywood Perforation (Average)**

- 40mm LV - Comp A5
- MX-09

EBIX Fragments

Comp. A5 Fragments

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PERFORMANCE TESTS FOR EBIX MUNITIONS

EBIX 40mm HEDP
Comp A5 40mm HEDP

Entry hole on 63.5mm Mild Steel Plate

EBIX 40mm HEDP
Comp A5 40mm HEDP

Exit hole on 63.5mm Mild Steel Plate
PERFORMANCE TESTS FOR EBIX MUNITIONS

VARIOUS TYPES OF EBIX MUNITIONS FIRING IN AUSTRALIA ON 22-03-2011

Gray Town Test Range at Melbourne
SUMMARY

- 40mm EBIX munitions is currently in production and also evaluating by various customers.
- Technology Readiness Level : 8

Equipping soldiers with enhanced firepower & survivability
Thank You