AMC

Mortar Propulsion FCT Programs

Swiss 120mm Mortar Propelling Charge

Austrian Celluloid Mortar Increment Containers

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AMC

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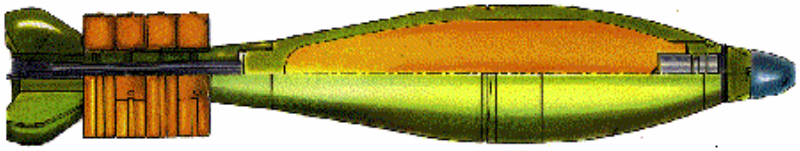


Project Title: Swiss 120mm Mortar M234 Propelling Charge
Objective: Qualify an extruded-impregnated (EI) propellant for the U.S. 120mm mortar propulsion system.
Foreign Manufacturer: Rheinmetall/Nitrochemie Wimmis AG

Project Title: Austrian Celluloid Mortar Increment Containers
Objective: Qualify celluloid mortar increment containers (MICs) for the U.S. 60mm and 120mm mortar propulsion systems
Foreign Manufacturer: Kaufman & Gottwald Ges.m.b.h (KAGO)

Sponsor: PEO AMMO / PM CAS

FCT – Swiss 120mm Mortar Charge Propellant

Benefits

- Lower temperature coefficient will result in increased range to meet Future Combat System's (FCS) requirements.

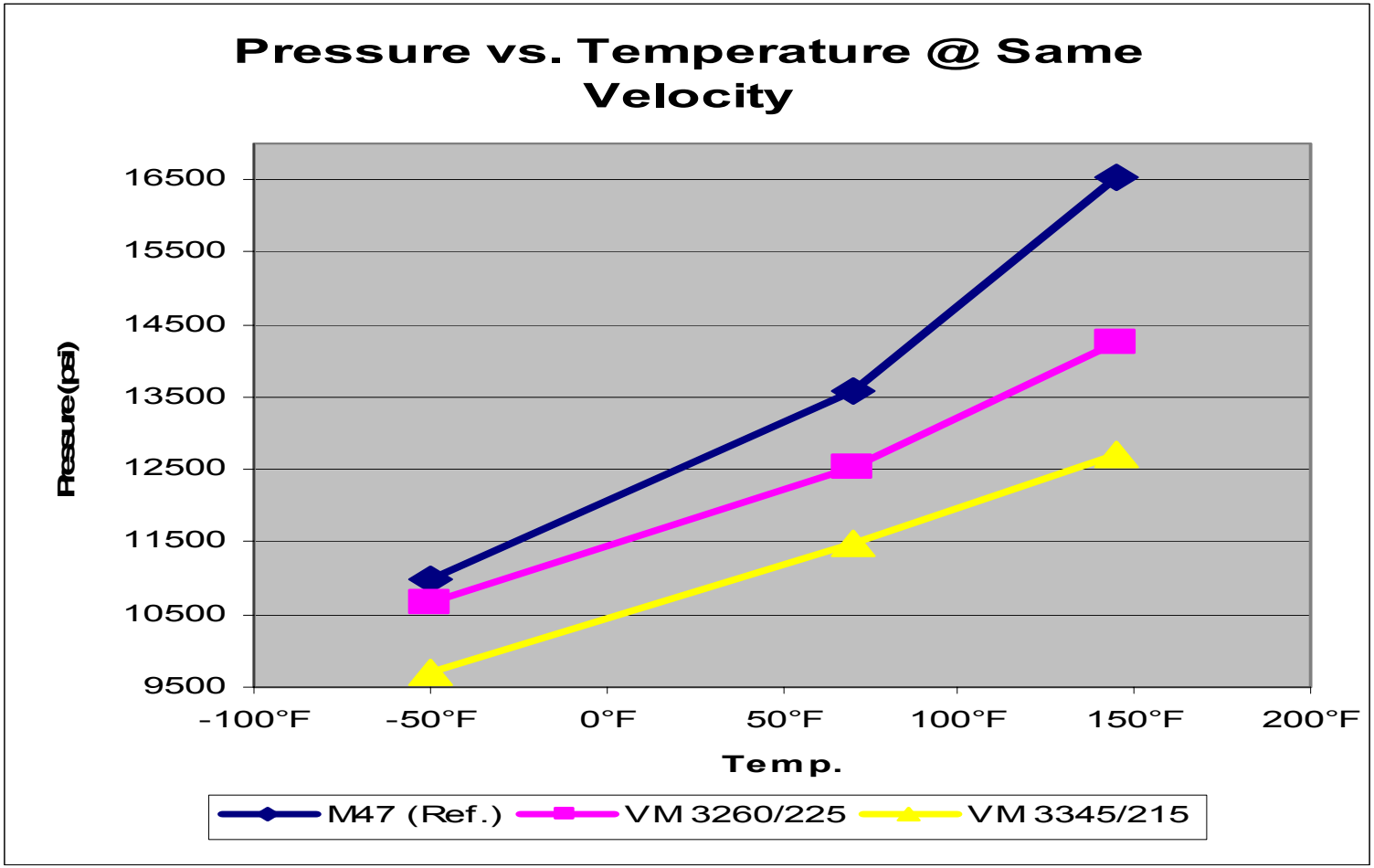
- Lower flame temperature resulting in a reduction of blast over pressure and longer sustained firing.

- Increased stability with a 3 times longer shelf life.

- Diphenylamine (DPA), the stabilizer in M47, is eliminated. This results in environmental compliance with Executive Order 12856 – Eliminate or reduce the unnecessary acquisition of products containing extremely hazardous substances or toxic materials. Estimated cost avoidance of $11M in M47 propellant compliance costs.

FCT – Swiss 120mm Mortar Charge Propellant

Benefits (cont'd)



FCT - Swiss 120mm Mortar Charge Propellant

Accomplishments

- Initiated production of EI main charge propellant candidates for initial evaluation.
- Conducted preliminary ballistic testing of initial propellant candidates.
- Ballistic test results were evaluated and EI main charge propellant downselected.
- Manufactured downselected main charge propellant for initial evaluation testing.

Planned Accomplishments

- Start initial evaluation testing – 4Q FY05
- Complete initial evaluation testing – 1Q FY06
- Manufacture main charge propellant for qualification testing – 2Q FY06
- Qualification testing – 3Q FY06

FCT– Swiss 120mm Mortar Charge Propellant

Test and Evaluation

Phase 1: Initial Evaluation- Propelling Charge Test Plan:

Load Swiss EI 120mm mortar propelling charge propellant at Yuma Proving Ground and conduct following preliminary testing as a risk mitigation effort:

Test	Procedure	Test Rds	Control Rds
Charge Assessment	----------	15	-
Uniformity	TOP 4-2-200	60	30
Blast Overpressure	MIL-STD-147B and MTP 4-2-822	15	10
Hot and Dry Cycle	ITOP 4-2-820 and TOP 4-2-504	10	5
Cold Soak	TOP 4-2-504	10	5
	Total Rounds	**110**	**50**

FCT – Swiss 120mm Mortar Charge Propellant

Test and Evaluation (cont'd)

Phase 2: Qualification Test Plan:

Load production lot of Swiss EI 120mm mortar propelling charge propellant at Yuma Proving Ground and conduct qualification testing as follows:

Test	Procedure	Test Rds	Control Rds
Velocity and Pressure	TOP 4-2-700	60	20
Secured Cargo Vibration	TOP 1-1-050	40	14
Sequential Rough Handling	TOP 4-2-602	80	28
Hot and Dry Cycle	ITOP 4-2-820 and TOP 4-2-504	24	8
Cold Soak	TOP 4-2-504	24	8
Adverse Condition	AR 70-38, MIL-STD-810 and TOP 4-2-504	60	20
Rate of Fire	MTP 3-2-050	300	--
Blast Overpressure	MIL-STD-147B and MTP 4-2-822	30	10
	Total Rounds	**618**	**108**

Conclusion

Preliminary results support that EI main charge propellant for the 120mm mortar should achieve the program objective of increased range. In addition, this propellant eliminates the use of a hazardous component and has a shelf life three times longer than the current 120mm main charge propellant.

FCT – Austrian Celluloid MICs

Benefits

- Cost savings for 60mm and 120mm MICs
- Use of celluloid material has significant potential to improve the robustness of the MIC for semi and auto-loading capability, i.e. FCS application.
- Celluloid MICs provide 100% waterproofing and air tightness.

FCT – Austrian Celluloid MICs

Accomplishments

- Celluloid MIC drawings completed, reviewed and accepted to meet the performance envelope for U.S. propulsion systems.
- Celluloid MIC tooling certificates were submitted and approved.
- Completed manufacture of both 60mm and 120mm celluloid MIC tooling for US design.
- Met with celluloid sheet manufacturer and sheets were prepared for KAGO's use to manufacture MICs.

Planned Accomplishments

- Manufacture initial evaluation test quantities – 4Q FY05
- Conduct initial evaluation testing – 1Q FY06.
- Manufacture qualification test quantities – 2Q FY06
- Qualification testing – 3Q FY06.

FCT – Austrian Celluloid MICs

Test and Evaluation

Phase 1: Initial Evaluation Test Plan:

Load KAGO 60mm and 120mm MICs at Yuma Proving Ground and conduct following preliminary testing as a risk mitigation effort:

Test	Procedure	Test Rds	Control Rds
Residue and Debris	TOP 3-2-801	30	20
Charge Assessment	----------	15	--
Uniformity	TOP 4-2-200	45	20
Rough Handling	TOP 4-2-602	20	10
Adverse Condition	AR 70-38, MIL-STD-810 and TOP 4-2-504	30	15
	Total Rounds	**140**	**65**

FCT – Austrian Celluloid MICs

Test and Evaluation (cont'd)

Phase 2: Qualification Test Plan:

Load KAGO 60mm & 120mm MICs at a Yuma Proving Ground and conduct qualification testing as follows:

Test	Procedure	Test Rds	Control Rds
Residue and Debris	TOP 3-2-801	30	20
Velocity and Pressure	TOP 4-2-700	60	20
Secured Cargo Vibration	TOP 1-1-050	40	14
Sequential Rough Handling	TOP 4-2-602	80	28
Hot and Dry Cycle	ITOP 4-2-820 and TOP 4-2-504	24	8
Cold Soak	TOP 4-2-504	24	8
Adverse Condition	AR 70-38, MIL-STD-810 and TOP 4-2-504	60	20
Rate of Fire	MTP 3-2-050	300	---
	Total	**618**	**118**

Conclusion

- Celluloid MIC drawings and tooling completed.
- Celluloid MIC manufacturing process is being optimized.
- Initial evaluation and qualification testing scheduled for FY06.