DEPARTMENT OF DEFENSE EXPLOSIVES SAFETY BOARD
4800 MARK CENTER DRIVE, SUITE 16E12
ALEXANDRIA, VIRGINIA 22350-3606

4 DEC 2025

DDESB-PE

MEMORANDUM FOR DIRECTOR, U.S. ARMY DEFENSE AMMUNITION CENTER
(ATTENTION: ATCL-ACE)

SUBJECT: Approval of 7-Bar Structural Strength Designation for Earth-Covered Magazine (ECM) Series 421-80-10 Revision 1

References: (a) U.S. Army Defense Ammunition Center ATCL-ACE Memorandum, 17 November 2025, Subject: Request DDESB Review for Revision 1 of Earth-Covered Magazine (ECM) Series 421-80-10 (File Number D25-040)

(b) U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Modular Storage Magazine, Box-Type Flow-Thru STD 421-80-10, Revision 1, September 2025

(c) Defense Explosives Safety Regulation 6055.09, Edition 1, Change 1, February 23, 2024

(d) U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Modular Storage Magazine, Box-Type Flow-Thru STD 421-80-10, March 2019

(e) DDESB Technical Paper 15, "Approved Protective Construction," Revision 4, 26 July 2020

As requested by reference (a), we have reviewed the reference (b) drawings for compliance with explosives safety criteria found in reference (c). Attachments to reference (a) describe the modifications that have been incorporated into those drawings. Based on our evaluation, the design contained in reference (b) is approved as a 7-Bar earth-covered magazine (ECM). This new design supersedes the original 421-80-10 magazine design of reference (d).

The maximum allowable Hazard Division 1.1 explosive limit for the reference (b) design is 500,000 pounds net explosive weight for quantity-distance.

The revised drawing set of reference (b) incorporates lessons learned from previous construction projects, corrects omissions within the drawings, and improves constructability of the structure. It also incorporates a cast-in-place topping slab over the roof panels for improved seismic performance. The design includes modifications to the blast door detailing for an updated locking system and revised welded connections between door components. Structural steel with a minimum yield strength of 50 ksi is specified for the blast door based on current industry standards and material availability.

The design of reference (b) will be added to Table AP1-1 of reference (e) as approved for new construction, and reference (d) will be moved to Table AP1-2 and considered not approved for new construction.

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