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12. PERSONAL AUTHOR(S) Farbanish, Gregory, GS-12 Mechanical Engineer					
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19. ABSTRACT (Continue on reverse if necessary and identify by block number) This report contains the testing and test results performed on wood (12013705) shipping container in accordance with or exceeding 49 CFR part 107 subpart M (178.600 et. al.) for 25mm ammunition. The packaging is submitted for performance oriented packaging certification.					
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REPORT NUMBER DOD POP HM TR/AYD 93-002

II TITLE: PERFORMANCE ORIENTED PACKAGING TESTING OF CARTRIDGE,
25MM LINKED/UNLINKED AMMUNITION, SINGLE OPENING
WOOD BOX, PER OUTER CONTAINER DRAWING 12013705

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1. DATA:

CONTAINER:

TYPE: BOX, WOOD
UN CODE: 4C1
SPECIFICATION NUMBER: MIL-B-2427, TYPE II, CLASS 2, GRADE A
MATERIAL: WOOD
CAPACITY: 42.1 LITERS
DIMENSIONS: INSIDE: LENGTH 28 1/2" (72.4cm) x WIDTH 9 3/4" (24.8cm) x DEPTH 9 1/4" (23.5cm). OUTSIDE NOMINAL: LENGTH 31 11/16" (80.5cm) x WIDTH 11 5/16" (28.7cm) x HEIGHT* 12" (30.5cm).
* HEIGHT IS CLEAT TO CLEAT DISTANCE, ACTUAL NESTING HEIGHT IS 11 1/4" (28.5cm).
GROSS WEIGHT: 57 KG (125.7 LBS)
CONTAINER WEIGHT EMPTY: 19 LBS NOMINAL

PRODUCT:

- 1 NAME: 25MM LINKED APDS-T M791 AMMUNITION
DRAWING NUMBER: 12013533 (P&M 12013671)
UNITED NATIONS NUMBER: 0339
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS, INERT PROJECTILE
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS
NSN: 1305-01-095-6014 DODIC: A974
- 2 NAME: 25MM LINKED HEI-T M792 AMMUNITION
DRAWING NUMBER: 12013230 (P&M 12013671)
UNITED NATIONS NUMBER: 0321
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS
NSN: 1305-01-094-7016 DODIC: A975
- 3 NAME: 25MM LINKED TP-T M793 AMMUNITION
DRAWING NUMBER: 12013224 (P&M 12013671)
UNITED NATIONS NUMBER: 0339
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS, INERT PROJECTILE
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS
NSN: 1305-01-095-0248 DODIC: A976
- 4 NAME: 25MM LINKED DUMMY M794 AMMUNITION
DRAWING NUMBER: 12013880 (P&M 12013671)
UNITED NATIONS NUMBER: NOT APPLICABLE
UNITED NATIONS PACKING GROUP: N/A
UNITED NATIONS NOMENCLATURE: N/A
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS

- 5 NAME: 25MM LINKED HEI-T MK210 AMMUNITION
DRAWING NUMBER: 1397AS690 (P&M 12013671)
UNITED NATIONS NUMBER: 0321
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS
NSN: 1305-01-198-2191 DODIC: A981
- 6 NAME: 25MM LINKED TPDS-T M910 AMMUNITION
DRAWING NUMBER: 12556500 (P&M 12013671)
UNITED NATIONS NUMBER: 0328
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS, INERT
PROJECTILE
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 50 ROUNDS W/ LINKS
NSN: 1305-01-298-6414 DODIC: A940
- 7 NAME: 25MM UNLINKED HEI PGU-22/U AMMUNITION
DRAWING NUMBER: 1397AS200 (P&M 12013674)
UNITED NATIONS NUMBER: 0321
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 80 ROUNDS UNLINKED
NSN: 1305-01-136-3624 DODIC: A980
- 8 NAME: 25MM UNLINKED TP PGU-23/U AMMUNITION
DRAWING NUMBER: 1397AS390 (P&M 12013674)
UNITED NATIONS NUMBER: 0339
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS, INERT
PROJECTILE
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 80 ROUNDS UNLINKED
NSN: 1305-01-210-6802 DODIC: A978
- 9 NAME: 25MM UNLINKED HEI PGU-25/U AMMUNITION
DRAWING NUMBER: 1397AS590 (P&M 12013674)
UNITED NATIONS NUMBER: 0321
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 80 ROUNDS UNLINKED
NSN: 1305-01-250-0100 DODIC: A982
- 10 NAME: 25MM UNLINKED HPT AMMUNITION
DRAWING NUMBER: 12013725 (P&M 12013674)
UNITED NATIONS NUMBER: 0339
UNITED NATIONS PACKING GROUP: II
UNITED NATIONS NOMENCLATURE: CARTRIDGES FOR WEAPONS, INERT
PROJECTILE
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 80 ROUNDS UNLINKED
NSN: 1305-01-094-5295 DODIC: A977

11 NAME: 25MM UNLINKED DUMMY M794 AMMUNITION
DRAWING NUMBER: 12013880 (P&M 12013674)
UNITED NATIONS NUMBER: NOT APPLICABLE
UNITED NATIONS PACKING GROUP: N/A
UNITED NATIONS NOMENCLATURE: N/A
PHYSICAL STATE: SOLID
AMOUNT PER CONTAINER: 80 ROUNDS UNLINKED
NSN: 1305-01-105-4097 DODIC: A966

2. BACKGROUND:

THIS REPORT CONTAINS THE TESTING AND TEST RESULTS PERFORMED IAW OR EXCEEDING SUBPART M (178.600 ET.AL.) OF 49 CFR PART 107 ON LINKED 25MM AMMUNITION PACKED IN A WOOD BOX, MANUFACTURED IN ACCORDANCE WITH MIL-B-2427 AND DRAWING 12013705. EIGHTY (80) UNLINKED 25mm DUMMY M794 CARTRIDGES WITH PROTECTIVE COVERS WERE PACKED IN THREE SEPARATE SHIPPING AND STORAGE CONTAINER ACCORDING TO DRAWING 12013674. THIS CONTAINER (12015705) IS SUBMITTED FOR PERFORMANCE ORIENTED PACKAGING CERTIFICATION.

3. TEST:

a. STACKING TEST: THE CONTAINER IS TO BE MARKED FOR 57 KG (125 LBS). THE STACK TEST, BRIEFLY, CONSISTED OF AN EQUIVALENT APPROXIMATE LOAD OF 3.0 M (10 FEET) OF FILLED CONTAINERS STACKED ONE ON TOP OF ANOTHER FOR A 24 HOUR PERIOD. THE TEST WAS REQUIRED TO BE PERFORMED ON THREE CONTAINERS. SINCE THE CONTAINER HEIGHT IS APPROXIMATELY 11 1/4" TALL, 10 FEET EQUATES TO APPROXIMATELY 10.3 CONTAINERS (INCLUDING THE BOTTOM CONTAINER) OR A STACK LOAD OF 1288 LBS. THE ACTUAL TEST PERFORMED CONSISTED OF A 1451 LB LOAD ON 3 SEPARATE CONTAINERS FOR A 24 TO 30 HOUR PERIOD EXCEEDING THE ABOVE MINIMUM REQUIREMENTS. NO VISIBLE BUCKLING OCCURRED.

b. DROP TEST: EACH OF THE THREE CONTAINERS FROM ABOVE WERE DROPPED SIX TIMES AT A HEIGHT OF 1.2 METERS (4 FT) IN THE FOLLOWING ORIENTATIONS: TOP, BOTTOM, LARGE FACE SIDE, SMALL SIDE, BOTTOM EDGE AND TOP CORNER. EACH DROP PERFORMED IMPACTED ON A STEEL REINFORCED CONCRETE SURFACE. THE NUMBER OF DROPS, TOP CORNER DROP AND THE NUMBER OF CONTAINERS TESTED ALL EXCEED THE UN REQUIREMENTS IN TERMS OF CONTAINER RUGGEDNESS. CONTAINER REMAINED INTACT AFTER DROP TESTS WITH NO SPILLAGE OF THE CONTENTS.

c. VIBRATION TEST (TRANSPORTATION - LOOSE CARGO): THREE SHIPPING CONTAINERS LOADED WITH 25MM AMMUNITION WERE VIBRATED IN THE THREE ORTHOGONAL AXES IN ACCORDANCE WITH MIL-STD-810E, METHOD 514.4, CATEGORY III - LOOSE CARGO TRANSPORT. THIS TEST IS CONDUCTED TO SIMULATE THE UNRESTRAINED COLLISION OF THE CONTAINERS WITH THE BED AND SIDES OF THE TRANSPORT VEHICLE, AS WELL AS WITH THE OTHER CARGO. THE CONTAINERS WERE PLACED ON A PLYWOOD COVERED BED WITH OSCILLATING MOVEMENT IN A 1.0 INCH ORBITAL PATH AT 300 REVOLUTIONS PER MINUTE. THAT FREQUENCY CAUSED THE PACKAGE TO BE RAISED FROM THE VIBRATING PLATFORM TO SUCH A DEGREE THAT A PIECE OF STRAPPING MATERIAL WAS EASILY PASSABLE UNDER THE PACKAGE. THE DURATION OF THE TEST WAS 90 MINUTES, WHICH EXCEEDS THE SCENARIO OF 240 KM

OF TRUCK TRANSPORTATION OVER VARIOUS ROAD PROFILES. CONTAINER AND CONTENTS REMAINED INTACT AFTER LOOSE CARGO TEST. THE CONTAINER PERFORMANCE SATISFIES THE POP REQUIREMENTS FOR LOOSE CARGO.

4. RESULTS:

THE CONTAINERS PASSED ALL TESTS AS ADMINISTERED. NONE OF THE CONTENTS WERE DISCHARGED FROM THE CONTAINERS. THE CONTAINERS AND THEIR CONTENTS ARE CONSIDERED SAFE FOR INTERNATIONAL TRANSPORTATION IN ACCORDANCE WITH PERFORMANCE ORIENTED PACKAGING REGULATIONS.

5. REFERENCED MATERIAL:

- A. FEDERAL REGISTER, "49 CFR PART 107, 1991"
- B. MILITARY STANDARD, MIL-STD-810E, ENVIRONMENTAL TEST METHODS AND ENGINEERING GUIDELINES

6. BASED ON THE ABOVE EQUIVALENT POP TESTING, THE FOLLOWING POP SYMBOL HAS BEEN APPLIED TO CONTAINERS MANUFACTURED IAW DRAWING 12013705 AND MIL-B-2427 TO INCLUDE DRAWINGS 12013671 AND 12013674.



49 CFR 107/S/1374
MIL-STD-810E/A