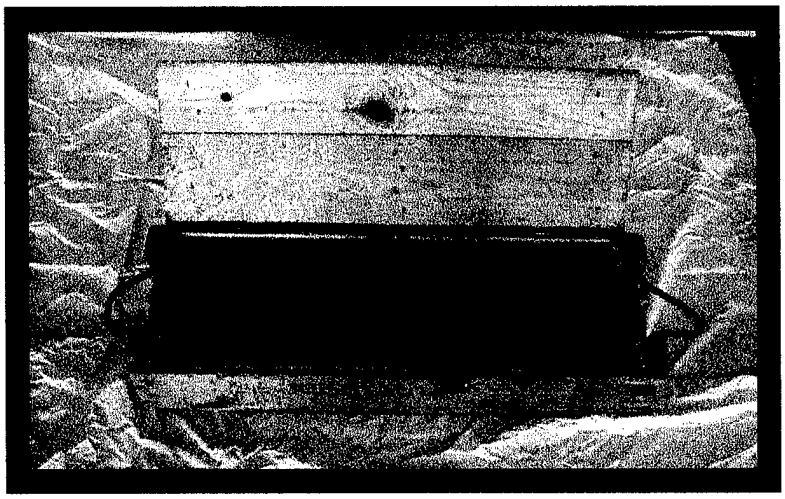
FINAL REPORT
JANUARY 2002

REPORT NO. 02-04



BOX, WOODEN FOR 105MM HOWITZER AMMUNITION IN A FIBER CONTAINER, M105A3, UNITED NATIONS (UN) PERFORMANCE ORIENTED PACKAGING (POP) TEST

Distribution Unlimited

Prepared For:

McAlester Army Ammunition Plant
McAlester, OK 74501

VALIDATION ENGINEERING DIVISION
MCALESTER, OKLAHOMA 74501-9053

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TEST REPORT NO. 02-04 **JANUARY 2002**
BOX, WOODEN FOR 105MM HOWITZER AMMUNITION IN A FIBER CONTAINER, M105A3, UNITED NATIONS (UN) PERFORMANCE ORIENTED PACKAGING (POP) TEST

ABSTRACT

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SOSAC-DEV), was tasked by the McAlester Army Ammunition Plant (MCAAP) to conduct a UN POP Test for box, wooden for 105mm Howitzer ammunition in a fiber container, M105A3. Six test sample boxes were used in the tests. No significant flaws were found. As a result of the performance of the containers during testing, the box, wooden for 105mm Howitzer ammunition in a fiber container, M105A3 is recommended for USA-wide use.

Prepared by:

JEFFERY L. DUGAN
Validation Engineer

Reviewed by:

JERRY W. BEAVER
Chief, Validation Engineering Division

U.S. ARMY DEFENSE AMMUNITION CENTER

VALIDATION ENGINEERING DIVISION
MCALESTER, OK 74501-9053

REPORT NO. 02-04

BOX, WOODEN FOR 105MM HOWITZER AMMUNITION IN A FIBER CONTAINER, M105A3, UNITED NATIONS (UN) PERFORMANCE ORIENTED PACKAGING (POP) TEST

TABLE OF CONTENTS

PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SOSAC-DEV), was tasked by the McAlester Army Ammunition (MCAAP) to conduct a UN POP Test for certification of the box, wooden for 105mm Howitzer ammunition in a fiber container, M105A3.

B. AUTHORITY. This test was conducted IAW mission responsibilities delegated by the U.S. Army Operations Support Command (OSC), Rock Island, IL. Effective 9 July 1993, the three-letter designator "DEV" was assigned for use when conducting UN POP tests. Effective 9 August 1994 this designation was included in the Joint Regulation AR 700-143, Performance Oriented Packaging of Hazardous Materials. Reference is made to the following:

IOC-R, 10-23, Mission and Major Functions of USADAC, 7 January 1998.

C. OBJECTIVE. To determine if this item meets UN POP requirements.

D. CONCLUSION. As tested, the box, wooden for 105mm Howitzer ammunition in a fiber container, M105A3 meets all UN POP requirements with no problems encountered during testing.

PART 2 – ATTENDEES

DATE PERFORMED: 30 October – 2 November 2001

ATTENDEE	MAILING ADDRESS
Jeffery L. Dugan General Engineer DSN 956-8090 (918) 420-8090	Director U.S. Army Defense Ammunition Center ATTN: SOSAC-DEV 1 C Tree Road, Bldg. 35 McAlester, OK 74501-9053
Daryl K. Sieczkowski Electronics Technician DSN 956-8988 (918) 420-8988	Director U.S. Army Defense Ammunition Center ATTN: SOSAC-DEV 1 C Tree Road, Bldg. 35 McAlester, OK 74501-9053

PART 3 -TEST PROCEDURES

The test procedures outlined herein were extracted and summarized from 49 CFR, Subpart M, Section 178.600. All tests were conducted to Packing Group II requirements.

A. DROP TEST. Each package will be dropped onto a non-yielding surface from the height and orientations listed below. The drop height is measured as the vertical distance from the target to the lowest point on the package. The drop height for Packing Group I is 1.8 meters (5.9 feet), for Packing Group II it is 1.2 meters (3.9 feet), and Packing Group III is 0.8 meters (2.6 feet) for materials which have a specific gravity (SG) exceeding 1.2, the drop height must be calculated as follows: for Packaging Group I the SG X 4.9 feet; for Packaging Group II the SG X 3.3 feet; and, for Packaging Group III the SG X 2.2 feet.

Packaging	No. of Tests	Drop Orientation of Samples
Steel drums, Aluminum drums, Metal Drums (other than steel or aluminum), Steel jerricans, Plywood drums, Wooden barrels, Fiber drums, Plastic drums and jerricans, Composite packagings which are in the shape of a drum	Six ... (three for each drop)	First drop (using three samples): The package must strike the target diagonally on the chime or, if the packaging has no chime, on the circumferential seam or an edge. Second drop (using the other three samples): The package must strike the target on the weakest part not tested by the first drop, for example a closure or, for some cylindrical drums, the welded longitudinal seam of the drum body.
Boxes of natural wood, Plywood boxes, Reconstituted wood boxes, Fiberboard boxes, Plastic boxes, Steel or aluminum boxes, Composite packagings which are in the shape of a box.	Five... (one for each drop)	First drop: Flat on the bottom (using the first sample). Second drop: Flat on the top (using the second sample). Third drop: Flat on the long side (using the third sample). Fourth drop: Flat on the short side (using the fourth sample). Fifth drop: On a corner (using the fifth sample).
Bags — single-ply with a side seam	Three... (three drops per bag).	First drop: Flat on a wide face (using all three samples. Second drop: Flat on a narrow face (using all three samples). Third drop: On an end of the bag (using all three samples).
Bags — single-ply without a side seam, or multi-ply	Three... (three drops per bag).	First drop: Flat on a wide face (using all three samples). Second drop: On an end of the bag (using all three samples).

B. LEAKPROOFNESS TEST. Three samples of each different packaging must be tested and pass the leakproofness test. The packaging must be restrained under water while the internal air pressure is applied. An internal air pressure must be applied to the packaging as indicated for the following groups;

(1) Packaging Group I: Not less than 30 kPa (4 psi)

(2) Packaging Group II: Not less than 20 kPa (3 psi)

(3) Packaging Group III: Not less than 20 kPa (3 psi)

The test must be conducted for a minimum time of 5 minutes.

C. HYDROSTATIC PRESSURE TEST. Three test samples are required for each different packaging. For packagings constructed of stainless steel, monel, or nickel, only one sample is required for periodic retesting of packagings. Metal packagings and composite packagings other than plastic, including their closures, must be subjected to the test for 5 minutes. Plastic packagings and composite packagings, including their closures, must be subjected to the test pressure for 30 minutes. The test pressure must be applied continuously and evenly, and it must be keep constant throughout the test period. The hydraulic pressure applied, taken at the top of the receptacle, and determined by any one of the following methods must be:

(1) Not less than the total gauge pressure measured in the packaging at 55 degrees C (131 degrees F), multiplied by a safety factor of 1.5. This total gauge pressure must be determined on the basis of a maximum degree of filling with a filling temperature of 15 degree C (59 degree F);

(2) Not less than 1.75 times the vapor pressure at 55 degrees C (122 degrees F) of the material to be transported minus 100 kPa (15 psi), but with a minimum test pressure of 100 kPa (15 psi); or

(3) Not less than 1.5 times the vapor pressure at 55 degrees C (131 degrees F) of the material to be transported minus 100 kPa (15 psi), but with a minimum test pressure of 100 kPa (15 psi).

Packagings intended to contain hazardous materials of Packing Group I must be tested to a minimum test pressure of 250 kPa (36 psi).

D. STACKING TEST. Three test samples must be subjected to a force applied to the top surface of the test sample equivalent to the total weight of identical packages that might be stacked on it during transport. The minimum height of the stack, including the test sample, must be 3.0 meters (10 feet). The duration of the test must be 24 hours, except that plastic drums, jerricans, and composite packaging 6HH, intended for liquids, shall be subjected to the stacking test for a period of 28 days at a temperature of not less than 40 degrees Celsius (104 degrees Fahrenheit). Alternative test methods that yield equivalent results may be used if approved by the Associate Administrator for Hazardous Materials Safety.

E. VIBRATION TEST. Three sample packagings, selected at random, must be filled and closed as for shipment. The three samples must be placed on a vibrating platform that has a vertical or rotary double-amplitude (peak-to-peak displacement) of one inch. The packages should be constrained horizontally to prevent them from falling off the platform, but must be left free to move vertically, bounce and rotate. The test must be performed for one hour at a frequency that causes the package to be raised from the vibrating platform to such a degree that a piece of material approximately 1.6mm (0.063 inch) thickness (such as steel strapping or paperboard) can be passed between the bottom of any package and the platform.

F. PASS/FAIL CRITERIA. A package passes the above tests if there is no rupture or leakage from any of the samples. No test sample should show any deformation that could adversely affect transportation safety or any distortion liable to reduce packaging strength.

PART 4 – TEST RESULTS

UN POP tests for certification of the box, wooden for 105mm Howitzer ammunition in a fiber container, M105A3 were conducted on the boxes with part number 7549072. Applicable tests conducted were as follows:

A. DROP TEST. Drop tests were conducted on 31 October 2001 from 3.9 feet on test samples 2, 3, and 4. The impact surface was a steel sheet covering a concrete surface that provided an unyielding surface. The drops conducted were oriented flat-bottom, flat-top, flat-long side, flat-short side, and corner. Post drop inspections showed no significant damage. Photo 1 shows the setup used for the drop tests.

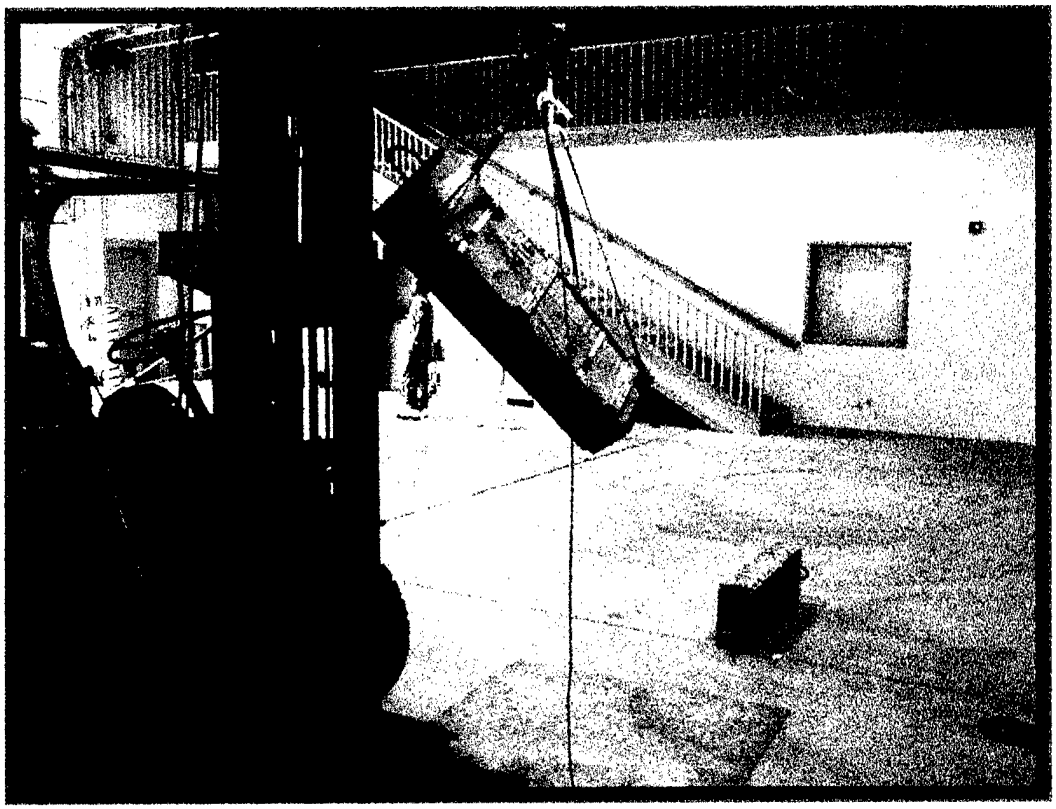

Photo 1. Drop Test Setup for UN POP Testing

B. **COMPRESSION TEST**. The compression test was conducted on 31 October to 1 November on test sample 1 and from 1 November to 2 November on test samples 5 and 6. The test compression was for 24 hours. The compression weight was 2,200 pounds. This weight equates to a minimum stack height of 10 feet as required by UN POP test procedures. End of test inspection indicated no damage. See Photo 2 for test setup for compression tests.

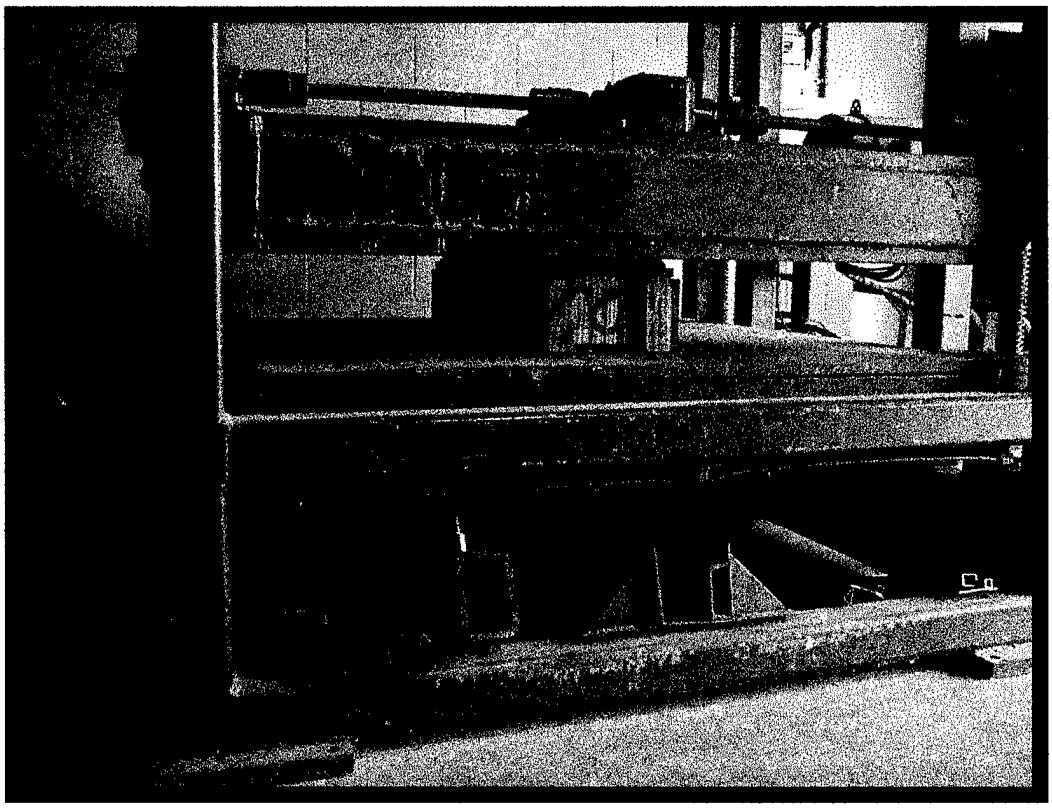

Photo 2. Compression Test Setup for UN POP Testing

C. **VIBRATION TEST -** The vibration tests were conducted on 31 October 2001 on test samples 2, 3, and 4. The test ran for 1 hour for each test sample in the lateral and longitudinal directions. The test samples were vibrated at 234

rpm in the lateral direction and 266 rpm in the longitudinal direction. Post vibration test inspections showed no significant damage. Photo 3 shows the setup for the vibration tests.

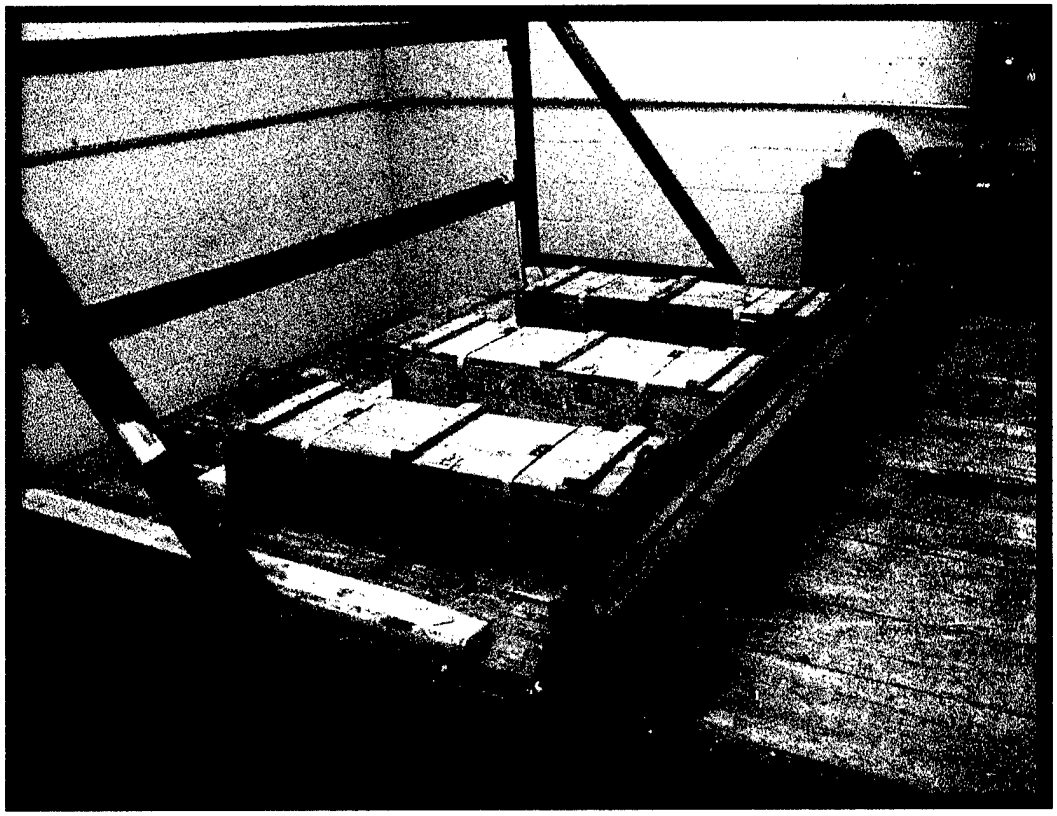

Photo 3. Vibration Test Setup for UN POP Testing

UN POP TESTS (STANDARD FORM)

BOX, WOODEN FOR 105MM HOWITZER AMMUNITION IN A FIBER CONTAINER, M105A3, UNITED NATIONS (UN) PERFORMANCE ORIENTED PACKAGING (POP) TEST

U.S. Army Defense Ammunition Center
ATTN: SOSAC-DEV, 1 C Tree Road
McAlester, OK 74501-9053

918-420-8908

Jerry W. Beaver

Test Report Number: 02-04

Service Code: DEV

Product NSN: **

Nomenclature: Cartridge, 105mm HE M1 W/O Fuze

Shipping Name: Cartridges for Weapons

UN ID Number: **

Hazard Class: **

Packaging Group: II

Physical State: Solid

NALC/DODAC: **

CAA Number: N/A

EX Number: **

CFR 49 Packaging Method: 130

Net Explosive Weight: **

** For this information see the Joint Hazard Classification System for the item to be shipped.

DESCRIPTION OF PACKAGINGS TO BE TESTED

EXTERIOR CONTAINER

Exterior Container: Box, Wooden

CFR 49 Reference Number: 178.513

UN Code: 4C1

NSN Exterior Container:

Specifications: 4C1

Net Quantity Weight: 145.5 lbs. (66 kg)

Tested Gross Weight: 145.5 lbs. (66 kg)

Dimensions Interior: 32 X 10.375 X 5.25

Manufacturer: Unknown

Year Container Manufactured: 1966

Drawing Number(s): 7549072

Cushioning: None

Closure: ¾" steel banding

INTERMEDIATE CONTAINER

Intermediate Container Description: N/A

Specification Number: N/A

Container NSN: N/A

Intermediate Container Cushioning: N/A

Intermediate Container Closure Method: N/A

Intermediate Container Dimensions: N/A

Number Of Intermediate Containers: N/A

UNIT CONTAINER

Unit Container Description: Fiber Tube

Unit Container Specification: MIL-C-2439, Drawing 7549073

Unit Container NSN: N/A

Unit Container Cushioning: N/A

Unit Container Closure Method: Tape, nylon

Unit Container Dimensions: 5.156 DIA. X 31.875 L

Number of Unit Containers: 2

SPECIAL NOTES

All exterior, intermediate, and unit containers must be inspected prior to use. Inspect for physical damage, structural integrity and leakproofness of the containers.

SUPPLEMENTAL INFORMATION

Permitted Transportation Modes:

Military or DOD licensed truck, rail, and ship.

Military or DOD licensed aircraft.

Specific Gravity: N/A
Hydrostatic Test Pressure Applied: N/A
Leakproofness Test Applied: N/A

TEST PROCEDURES

Test Conducted	Test Method	Test Results
(1) Pre-Conditioning (fiberboard)	Part 178.602	N/A
(2) Drop Test	Part 178.603(e)(1)(ii)	Pass
(3) Leakproofness Test	Part 178.604	N/A
(4) Hydrostatic Pressure Test	Part 178.605	N/A
(5) Stacking Test (500 lbs.)	Part 178.606(c)(1)	Pass
(6) Vibration Test	Part 178.608(b)(3)	Pass

UN POP Marking

u 4C1/Y66/S/01

n USA/DOD/DEV

CERTIFICATION

Unless expressly stated to the contrary, we certify that all of the above applicable tests have been performed in strict conformance to CFR 49, Subpart M, Parts 178.600 – 178.608. Based on the successful test results shown above, this container is deemed suitable for transport of the hazardous material described herein, provided that maximum tested weights and quantities are not exceeded and the packaging is assembled as tested. The use of other packaging methods or components may make this test invalid.

PREPARED BY: _____ DATE: 1 Nov2001
JEFFERY L. DUGAN
Test Engineer

SUBMITTED BY: _____ DATE: 1 Nov 2001
JERRY W. BEAVER
Chief, Validation Engineering Division

APPROVED BY: _____ DATE: 1 Nov 2001
WILLIAM R. FRERICHS
Associate Director for Engineering

PART 5 – SPECIAL PACKAGING INSTRUCTIONS

SPECIAL PACKAGING INSTRUCTION

Form Approved OMB No. 0704-0188

1. PART OR DRAWING NO. NOMENCLATURE			2. CODE IDENT	3. SPI NO.
N/A * LIGHT BOX PROCEDURES-MIL-B-2427			59678	ADPLBOX001
4. NATIONAL STOCK NO.			5. DATE OF SPI (YYMMDD)	5. REVISION
N/A *			010709	A
7. QUP/UNIT OF ISSUE	8. ICQ	9. UNIT PACK WT (lb) (0.0)	10. UNIT PACK CU (CU.FT)	11. UNIT PACK SIZE (INCHES)
VARIOUS*	----	145.0 MAX	3.200 MAX	L<45" L+W+H< 70"

	18. STEPS	19. REQD	20. DESCRIPTION
12. MILITARY PRESERVATION MIL-STD-2073-1	1	AR	FILLER, ASTM D4727, SF OR CF, SEE NOTE F
	2	AR	CUSHIONING, SEE NOTE F
13. CLEANING N/A	3	1	WOOD BOX, MIL-B-2427, TY 1 OR II, CLASS 1 OR 2 SEE NOTES A AND C
	4	AR	CLOSURE, MIL-B-2427, APPENDIX
14. DRYING N/A			
15. PACKING MIL-STD-2073-1			
a. LEVEL A N/A			
b. LEVEL B N/A			
16. MARKING 8796522			

17. NOTES/DRAWING *THESE BLOCKS WILL VARY DEPENDING UPON ITEMS BEING PACKED.

A. THIS DOCUMENT CONTAINS INSTRUCTIONS FOR THE PREPARATION OF LIGHT BOXES WEIGHING NOT MORE THAN 145 LBS. BUT WITH A TOTAL CUBE OF 3.200 CUBIC FEET OR LESS. THIS SPI IS DESIGNED TO UTILIZE EXISTING MIL-B-2427 WOODEN BOXES IN THE INVENTORY THAT MEET THE REQUIREMENTS IN STEP 3 AND APPLIES TO ANY NSN THAT MEETS THE REQUIREMENTS OF NOTE C. CONTAINERS THAT MEET THE REQUIREMENTS OF STEP 3 BUT ARE OF A SMALLER CUBE OR SIZE THAN SPECIFIED IN BLOCKS 10 AND 11, MAY ALSO BE UTILIZED IN ACCORDANCE WITH THIS SPECIAL PACKAGING INSTRUCTION.

B. THE LIGHT BOX MARKING REQUIREMENT OF 8796522 APPLIES TO THIS PACKAGE.

C. REQUIREMENTS FOR USE OF THE CONTAINER IN STEP 3 FOR LIGHT PACKS:

1. THE QUANTITY BEING PACKAGED IS LESS THAN THE FULL STANDARD PACK QUANTITY.

2. APPROVED INNER PACK CONFIGURATION (i.e. CARTONS, FIBER TUBES, METAL CONTAINERS (M2A1, M19A1 etc.)) ARE NOT CHANGED FROM THE ORIGINAL PACK, EXCEPT FOR ADDITIONAL CUSHIONING AND/OR FILLER NEEDED TO OBTAIN A TIGHT PACK.

3. AS AN ALTERNATIVE TO THE ORIGINAL EXTERIOR BOX FOR EITHER PPP-B-585, ASTM D6251/D 6251M, PPP-B-621, MIL-B-2427, MIL-B-46506 OR MIL-B-48024.

4. IF A COMPETENT AUTHORITY APPROVAL (CAA) IS REQUIRED FOR THE ITEM BEING SHIPPED, IT MUST MEET THE PACKAGING REQUIREMENTS SPECIFIED ON THE CAA.

D. THE PROPER SHIPPING NAME AND IDENTIFICATION NUMBER SHALL BE AS SPECIFIED BY UN NUMBER LISTED IN THE JOINT HAZARD CLASSIFICATION SYSTEM OR A CURRENT INTERIM HAZARD CLASSIFICATION FOR NSN BEING PACKED.

E. THE POP MARKING FOR THE CONTAINER IS AS FOLLOWS:

4C1/Y66/S/(YEAR PACKED)
USA/DOD/AYA

F. FILLER OR CUSHIONING MATERIAL (A-A-59135, A-A-59136, ASTM D4727, A-A-1898, PPP-C-1797) SHALL BE USED TO OBTAIN A TIGHT PACK.

WSC: ITEM SIZE: ITEM WEIGHT: APPROVED: for Kimberly Wheat

STATEMENT A, UNLIMITED

DD form 2169, Oct 96 *Previous editions are obsolete* Page 1 of 1 Pages

PART 6 - DRAWING

The following drawings represent the Box, Wooden for Howitzer Ammunition in a Fiber Container, M105A3, Drawing No. 7549072.

DRAWING SIZE C

REVISIONS				
ZONE	SYM	DESCRIPTION	DATE	APPROVAL
	AF	REDRAWN WITH CHANGE ERR Z9Z1244AE (ECP M9A2052/890814)	900313	
	AG	NOR MOK2021/900702	900917	PF
	AH	ERR Z9Z1308H (ECP M9A2002/890814)	910319	PF

LIST OF PARTS

LINE NO.	NAME OF PART	NO. REQD	MATERIAL KIND	MATERIAL GRADE	DRAWING OR SPEC NUMBER	REMARKS
1	BOX, PACKING	1	WOOD	TYPE II A, CLASS 5	MIL-B-2427	B,E
2						
3						
4						
5	FILLER ASSEMBLY, ALT	1			8865572	C
6	FILLER, END	A	FILLER, SHEET FORM		MIL-F-50449	
7	FILLER, SIDE	A	FILLER, SHEET FORM		MIL-F-50449	D
8	FILLER, TOP	A	FILLER, SHEET FORM		MIL-F-50449	D
9						
10	SEAL, METALLIC	1			F8794342	
11	SHEET	1	POLYETHYLENE PLASTIC	TYPE I, GR B FINISH 1	L-P-378	J
12	STRAPPING	2			MIL-B-2427	G
13						
14						
15						

A–AS REQUIRED
B–GRADE "B" BOXES SHALL BE USED FOR DRILL CARTRIDGES.
C–THE FILLER ASSEMBLY SHALL HAVE THE FOLLOWING DIMENSIONS:
DIM "A"=14 3/4; DIM "B"=13.
D–NOT REQUIRED WHEN ALTERNATE FILLER ASSEMBLY IS USED.
E–NAIL BOX IN ACCORDANCE WITH FIG. 8 OF SPECIFICATION, EXCEPT THAT EACH END OF EACH SIDE SHALL BE NAILED WITH 4 NAILS UNIFORMALLY SPACED.
F
G–STRAPPING NOT REQUIRED WHEN ALTERNATIVE PACKING BOX IS USED.
J–ONE PLASTIC SHEET REQUIRED FOR EVERY SIX BOXES PACKED.

BOX, PACKING
32. x 10 3/8 x 5 1/4 INSIDE DIMENSIONS
TOLERANCE ON INSIDE DIMENSIONS + 1/8
ADVISORY O.D. 37 1/4 x 11 15/16 x 7 19/32

FILLER, END
8 1/2 MIN x 3 1/2 MIN x 1/16 THICK

FILLER, SIDE
21. MIN x 3 1/2 MIN x 1/16 THICK

FILLER, TOP
21. MIN x 8 1/2 MIN x 1/16 THICK

SHEET
8. FT MIN x 4 FT MIN x .004 THICK
PREFOLDED TO FIT INTO BOX (24 x 8 ADVISORY)

STRAPPING
41. LONG ADVISORY

NOTES:–
1–ONE PLASTIC SHEET REQUIRED FOR EVERY SIX BOXES PACKED. TWO BOXES WITH PLASTIC SHEETS PER PALLET REQUIRED (MIN).
2–FOR M413, M444 AND M444E1 CARTRIDGES REFER TO DWG 9246039 FOR ADDITIONAL MARKING INSTRUCTIONS.

MARKING INSTRUCTIONS
THE BOX SHALL BE MARKED IN ACCORDANCE WITH DRAWING C8796522. (SEE NOTE 2)
THE DOT MARKING TO BE APPLIED SHALL BE AS PERTINENT:– (SEE TABLE).
THE DESCRIPTIVE NOMENCLATURE OF THE ITEM PACKED SHALL BE AS PERTINENT:– (SEE TABLE).
THE CUBICAL DISPLACEMENT SHALL BE:– "2"
THE FSN AND DODIC NUMBER SHALL BE AS PERTINENT:– (SEE TABLE).
IN ADDITION "WITH PLASTIC SHEET" SHALL BE ADDED UNDER NOMENCLATURE OR LOT NUMBER (AS SPACE ALLOWS) ON APPLICABLE BOX (SEE NOTE J)
SIZE OF LETTERS SHALL BE 7/16 MIN.

PACKING INSTRUCTIONS
PACK CONTAINERS WITH PROJECTILE ENDS REVERSED.
WHEN PACKING CARTRIDGE, SMOKE, WP, PROJECTILE END OF FIBER CONTAINER SHALL BE PLACED AT END OF BOX OPPOSITE THAT MARKED NOSE END.
PLACE PLASTIC SHEET (IN FOLDED FORM) ON TOP OF CONTAINERS. (SEE NOTE 1)
INSERT END, SIDE AND TOP FILLERS AS REQUIRED TO INSURE TIGHT PACKING.
FOR CLOSING, SEALING AND STRAPPING INSTRUCTIONS, SEE DRAWING C8796522.
WHEN ALTERNATIVE FILLER ASSEMBLY IS USED IT SHALL BE PLACED AT REAR OF BOX.
INSERT 2 CONTAINERS IN PROPER POSITION.
ADD END FILLERS AS REQUIRED FOR TIGHT PACKING.
CLOSE COVER FORCING FILLER ASSEMBLY OVER TOP OF CONTAINERS.

AH	AH
SHEET 2	SHEET 1
REVISION STATUS OF SHEETS	

CURRENT DESIGN ACTIVITY CAGE CODE 19200
U.S. ARMY
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

FOR ASSOCIATED LIST SEE 7549072.
FOR M105A3 FIBER CONTAINER, SEE DRAWING F7549073.

LINE NO.	WEIGHTS (ESTIMATED) PART	(POUNDS)
1	BOX (EMPTY)	23.7
2	CONTAINERS (2)	11.1
3	ROUNDS (2)	84.1
4	FILLER, STRAPPING, ETC.	1.1
5		120.0

DISTRIBUTION STATEMENT A.
APPROVED FOR PUBLIC RELEASE;
DISTRIBUTION IS UNLIMITED

NEXT ASSY	USED ON
	BOX/105MM HOW
APPLICATION	

MECHANICAL PROPERTIES

DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON DECIMALS ±
FRACTIONS ± ANGLES ±
THIRD ANGLE PROJECTION

ORIGINAL DATE OF DRAWING 13 AUG 58
DRAFTSMAN CLW — CHECKER F.D.V.
ENGR JMS
H M WEINER
G R BUCK

PART NO. 7549072
PICATINNY ARSENAL DOVER, NEW JERSEY
BOX, PACKING, AMMUNITION, FOR 105MM HOWITZER AMMUNITION IN FIBER CONTAINER, M105A3

SIZE C — CODE IDENT NO. 19203 — 7549072
SCALE — UNIT WT. — SHEET 1 OF 2

LATEST REVISION CAD GENERATED AT CAFI, MALVERN (0001)

LINE NO.	DESCRIPTIVE NOMENCLATURE	DOT. MARKING	STORAGE AND SHIPPING INFORMATION (DO NOT MARK ON PACKAGE) FSN & DODIC	EXPLOSIVE HAZARD	STORAGE COMPATABILITY
1	2-CARTRIDGE 105MM HE M413 DUALGRAN W/FUZE MTSQ XM554 FOR HOW. M2A1, M2A2, M49 AND M103.	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES	1315 929 3875-C462	CLASS 5	GROUP E
2	2-CARTRIDGE 105MM HE M444 DUALGRAN W/FUZE MTSQ M548 FOR HOW. M2A1, M2A2, M49, M103, M137 AND M137A1.		1315 797 7199-C462	CLASS 5	GROUP E
3	2-CARTRIDGE 105MM HE M1 DUALGRAN W/SUPPL CHG & FUZE MTSQ M500 FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4852-C443	CLASS 5	GROUP E
4	2-CARTRIDGE 105MM HE M1 DUALGRAN W/SUPPL CHG & FUZE MTSQ M500A1 FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4854-C443(A)	CLASS 5	GROUP E
5	2-CARTRIDGE 105MM HE M1 DUALGRAN W/SUPPL CHG & FUZE MTSQ M500A1 FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4862-C443(B)	CLASS 5	GROUP E
6	2-CARTRIDGE 105MM HE M1 W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4758-C444	CLASS 5	GROUP E
7	2-CARTRIDGE 105MM HE M1 W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4753-C444(A)	CLASS 5	GROUP E
8	2-CARTRIDGE 105MM HE M1 W/SUPPL CHG & FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4761-C444	CLASS 5	GROUP E
9	2-CARTRIDGE 105MM HE M1 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4799-C444	CLASS 5	GROUP E
10	2-CARTRIDGE 105MM HE M1 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 028 4813-C444(A)	CLASS 5	GROUP E
11					
12					
13					
14					
15					
16	2-CARTRIDGE 105MM HE M1 DUALGRAN W/FUZE PD, M557, 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 089 5168-C444	CLASS 5	GROUP E
17	2-CARTRIDGE 105MM HE M1 DUALGRAN W/SUPPL CHG & FUZE MTSQ M564 FOR HOW. M2A2, M103 AND M137		1315 926 4054-C515(B)	CLASS 5	GROUP A
18					
19					
20					
21					
22	2-CARTRIDGE 105MM HE M444 DUALGRAN W/FUZE MT XM585 FOR HOW. M2A1, M2A2, M49, M103, M137 AND M137A1.		1315 965 0739-C462	CLASS 5	GROUP E
23	2-CARTRIDGE 105MM LEAFLET BE M488 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.			CLASS 4	GROUP E
24	2-CARTRIDGE 105MM LEAFLET BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 305 0862-C450	CLASS 4	GROUP E
25	2-CARTRIDGE 105MM LEAFLET BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 324 1414-C450(A)	CLASS 4	GROUP E
26	2-CARTRIDGE 105MM TACTICAL CS XM629 DUALGRAN W/FUZE MTSQ M548 FOR HOW. M2A1, M2A2, M49, M103 AND M137.	SEE NOTE E	1315 926 9327-C468(A)	CLASS 5	GROUP A
27	2-CARTRIDGE 105MM ILLUMINATING M314A2 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES	1315 028 4794-C449	CLASS 4	GROUP E
28	2-CARTRIDGE 105MM ILLUMINATING M314A2 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4823-C449(A)	CLASS 4	GROUP E
29	2-CARTRIDGE 105MM ILLUMINATING XM314A2E1 W/FUZE M565 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4826-C449(B)	CLASS 4	GROUP E
30	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/FUZE M565 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 782 5531-C449(B)	CLASS 4	GROUP E
31	2-CARTRIDGE 105MM SMOKE BE M84B1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES	1315 028 4845-C451	CLASS 5	GROUP A
32	2-CARTRIDGE 105MM SMOKE BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4792-C451	CLASS 5	GROUP A
33	2-CARTRIDGE 105MM SMOKE BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4834-C451(A)	CLASS 5	GROUP A
34	2-CARTRIDGE 105MM SMOKE HC BE M84B1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4850-C452	CLASS 5	GROUP A
35	2-CARTRIDGE 105MM SMOKE HC BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4840-C452	CLASS 5	GROUP A
36	2-CARTRIDGE 105MM SMOKE HC BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4839-C452(A)	CLASS 5	GROUP A
37	2-CARTRIDGE 105MM SMOKE BE M84B1 W/FUZE MTSQ M501 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4846-C453	CLASS 5	GROUP A
38	2-CARTRIDGE 105MM SMOKE BE M84B1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 305 0860-C453	CLASS 5	GROUP A
39	2-CARTRIDGE 105MM SMOKE BE M84B1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4828-C453(A)	CLASS 5	GROUP A
40	2-CARTRIDGE 105MM SMOKE WP M60 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4811-C454	CLASS 5	GROUP A
41	2-CARTRIDGE 105MM SMOKE WP M60 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4831-C454(A)	CLASS 5	GROUP A
42	2-CARTRIDGE 105MM SMOKE WP M60 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4838-C454(B)	CLASS 5	GROUP A
43	2-CARTRIDGE 105MM SMOKE WP M60 DUALGRAN W/FUZE PD M57 MODIFIED FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4814-C454	CLASS 5	GROUP A
44	2-CARTRIDGE 105MM SMOKE BE M84B1 W/FUSE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4848-C455	CLASS 5	GROUP A
45	2-CARTRIDGE 105MM SMOKE BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 4795-C455	CLASS 5	GROUP A
46	2-CARTRIDGE 105MM SMOKE BE M84B1 DUALGRAN W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 301 1782-C455(A)	CLASS 5	GROUP A
47	2-CARTRIDGE 105MM SMOKE WP M60A1 DUALGRAN W/FUZE PD M557, 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 439 8121-C454(A)	CLASS 5	GROUP A
48	2-CARTRIDGE 105MM SMOKE HC BE M84A1 W/FUZE MTSQ M548 FOR HOW. M2A2, M103 AND M137.		1315 143 6970-C452(A)	CLASS 5	GROUP A
49	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M548 FOR HOW. M2A2, M103 AND M137.		1315 143 6974-C453(A)	CLASS 5	GROUP A
50	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M548 FOR HOW. M2A2, M103 AND M137.		1315 143 6972-C455(A)	CLASS 5	GROUP A
51	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M548 FOR HOW. M2A2, M103 AND M137.		1315 143 6973-C451(A)	CLASS 5	GROUP A
52	2-CARTRIDGE 105MM SMOKE WP M60 DUALGRAN W/FUZE PD M557, 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49, M103 AND M137.		1315 892 4895-C454(B,C)	CLASS 5	GROUP A
53	2-CARTRIDGE 105MM GAS HD M60 DUALGRAN W/FUZE PD M51A5 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M49 AND M103.	AMMUNITION FOR CANNON WITH GAS PROJECTILES	1315 322 6365-C442(A)	CLASS 5	GROUP A
54	2-CARTRIDGE 105MM GAS HD M60 DUALGRAN W/FUZE PD M57 MODIFIED FOR HOW. M2A1, M2A2, M49 AND M103.		1315 C28 4829-C442(A)	CLASS 5	GROUP A
55	2-CARTRIDGE 105MM GAS GB M360 DUALGRAN W/FUZE PD M508 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 640 8857-C441	CLASS 5	GROUP A
56	2-CARTRIDGE 105MM GAS GB M360 DUALGRAN W/FUZE PD M508 FOR HOW. M2A1, M2A2, M49 AND M103.		1315 203 8985-C441(A)	CLASS 5	GROUP A
57	2-CARTRIDGE 105MM DUMMY M14 W/FUZE DUMMY M59 FOR HOW. M2A1, M2A2, M49 AND M103.	DRILL CARTRIDGE INERT	1315 028 5043-C458		
58	2-CARTRIDGE 105MM DUMMY M14 W/FUZE TSQ M54 DUMMY INERT FOR HOW. M2A1, M2A2, M49 AND M103.		1315 028 5045-C458		
59	CARTRIDGE 105MM SMOKE WP M60A2 DUALGRAN W/FUZE P.D. M 557 0.05 SEC DELAY FOR HOW. M2A1, M2A2, M103 AND M137.	AMMUNITION FOR CANNON WITH SMOKE PROJECTILES	1315 113 5741-C454	CLASS 5	GROUP A
60	2-CARTRIDGE 105MM SMOKE HC BE M84A1 DUALGRAN W/O FUZE FOR HOW. M2A2, M103 AND M137.			CLASS 5	GROUP A
61	2-CARTRIDGE 105MM SMOKE HC BE M84A1 DUALGRAN W/FUZE MT M565 FOR HOW. M2A2, M103 AND M137.		1315 143 6986-C452(A)	CLASS 5	GROUP A
62	2-CARTRIDGE 105MM SMOKE BE M84E1 DUALGRAN W/FUZE MT M565 FOR HOW. M2A2, M103 AND M137.		1315 143 6985-C453(A)	CLASS 5	GROUP A
63	2-CARTRIDGE 105MM SMOKE BE M84E1 DUALGRAN W/FUZE MT M565 FOR HOW M2A2, M103 AND M137.		1315 143 6983-C455(A)	CLASS 5	GROUP A
64	2-CARTRIDGE 105MM SMOKE BE M84E1 DUALGRAN W/FUZE MT M565 FOR HOW. M2A2, M103 AND M137.		1315 143 6984-C451(A)	CLASS 5	GROUP A
65	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.			CLASS 5	GROUP A
66	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.			CLASS 5	GROUP A
67	2-CARTRIDGE 105MM SMOKE BE M84E1 W/FUZE MTSQ M501A1 FOR HOW. M2A1, M2A2, M49 AND M103.			CLASS 5	GROUP A
68	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/FUZE MT M565 FOR HOWITZER M2A1, M2A2, M49 AND M103.	AMMUNITION FOR CANNON WITH ILLUMINATING PROJECTILES	1315 926 9299-C449(A)	CLASS 4	GROUP E
69	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/FUZE MT M565 FOR HOWITZER M2A1, M2A2, M49 AND M103.		1315 926 9298-C449	CLASS 4	GROUP E
70	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/O FUZE M577A1 FOR HOWITZER M2A1, M2A2, M49 AND M103.		1315 01299 5858-C542	CLASS [illegible] 2	GROUP G
71	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/FUZE M577A1 FOR HOWITZER M2A1, M2A2, M49 AND M103.		1315 01300 2748-C449	CLASS [illegible] 2	GROUP G
72	2-CARTRIDGE 105MM ILLUMINATING M314A3 W/O FUZE MT565 FOR HOWITZER M2A1,M2A2 M49 AND M103.				

NOTES:
A-INDICATES STEEL CASE.
B-INDICATES STEEL CASE, SPIRAL WRAPPED.
C-INDICATES COMP B BURSTING CHARGE
D-NO REFERENCE LETTER ADJACENT FSN INDICATES BRASS CASE.
E-AMMUNITION FOR CANNON WITH GAS PROJECTILES.

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DO NOT SCALE DRAWING

THIRD ANGLE PROJECTION

15 APR 1959

K.P. T.W.

J.M.C. T.J.M.

H M WEINER

G R BUCK

PART NO. 7549072

BOX, PACKING, AMMUNITION, FOR 105MM HOWITZER AMMUNITION IN FIBER CONTAINER M105A3

F 19203 7549072