

**FINAL REPORT
MAY 2001**

REPORT NO. 01-12



**DECONTAMINATING APPARATUS,
PORTABLE (DAP), 14 LITER, M13,
MANUFACTURED BY ALL-BANN ENTERPRISES,
UNITED NATIONS (UN) PERFORMANCE ORIENTED
PACKAGING (POP) TEST**

Distribution Unlimited

Prepared For:
U.S. Army Soldier and Biological
Chemical Command
Rock Island Arsenal
Rock Island, IL 61299-7390



**VALIDATION ENGINEERING DIVISION
MCALESTER, OKLAHOMA 74501-9053**

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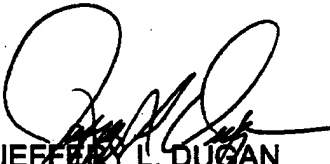
MAY 2001

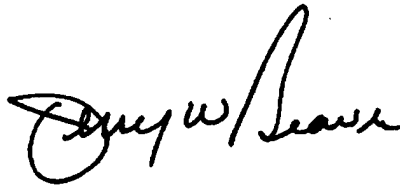
ABSTRACT

The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SMAAC-DEV), was tasked by the U.S. Army Soldier and Biological Chemical Command (SBCCOM) to conduct a UN POP Test for the DAP, M13. Six containers were used in the tests. No significant flaws were found. As a result of the performance of the containers during testing, the DAP, M13 is recommended for USA-wide use.

Prepared by:

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U.S. ARMY DEFENSE AMMUNITION CENTER

VALIDATION ENGINEERING DIVISION
MCALESTER, OK 74501-9053

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PART 1 – INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SMAAC-DEV), was tasked by the U.S. Army Soldier and Biological Chemical Command (SBCCOM) to conduct a UN POP Test for certification of the DAP, M13. The containers were manufactured by All-Bann Enterprises, Incorporated, in Anaheim, CA.

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 M13 with NSN 4230-01-133-4124 manufactured by All-Bann Enterprises, Incorporated meets all UN POP requirements with no problems encountered during testing.

PART 2 – ATTENDEES

DATE PERFORMED: DECEMBER 2000

ATTENDEE

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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). 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 kept 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 DAP, M13 manufactured by All-Bann Enterprises, Incorporated, Anaheim, CA, were conducted on the container with NSN 4230-01-133-4124. Applicable tests that were conducted were as follows:

A. DROP TEST. Drop tests were conducted on 13 December 2000 from 3.9 feet. 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. Figure 1 shows the setup used for the drop tests.



Figure 1. Drop Test Setup for UN POP Testing

B. LEAKPROOFNESS TEST. The leakproofness tests were conducted on 9 January 2001. The three test samples were pressurized to 5 psi and submerged using weights in a tank of water. The test samples were watched for 30 minutes without any detection of any leaks. Figure 2 shows the setup for the leakproofness test.



Figure 2. Leakproofness Test Setup for UN POP Testing

C. **HYDROSTATIC TEST.** The hydrostatic tests were done on 9 January 2001 on three test samples. The samples were pressurized to 15 psi with water for thirty minutes. All test samples passed, with no leaks detected. See Figure 3 for the setup for the hydrostatic tests.



Figure 3. Hydrostatic Test Setup for UN POP Testing

D. **COMPRESSION TEST.** The compression test was conducted on 9-10 January 2001 for 24 hours. The compression weight was 500 pounds and tested from 1530 hours on 9 January through 1600 hours on 10 January 2001. 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.

E. VIBRATION TEST - The vibration test was conducted on 9 January 2001 on three test samples. The test ran for 1 hour for each specimen and each specimen ran at 249 cycles-per-minute. Following completion of the test, inspections revealed no damage to the containers. Figure 4 shows the setup for the vibration tests.

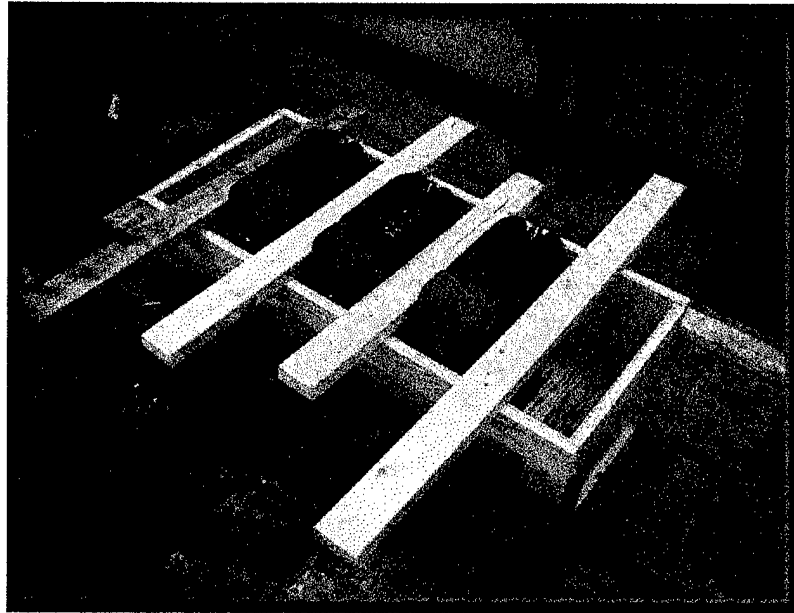


Figure 4. Vibration Test Setup for UN POP Testing

The above tests met the requirements of ASTM E 499-73.

UN POP TESTS (STANDARD FORM)

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UNITED NATIONS (UN) PERFORMANCE ORIENTED
PACKAGING (POP) TEST**

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

918-420-8908

Jerry W. Beaver

Test Report Number: 01-12

Service Code: DEV

Product NSN: 6850-01-136-8888

Nomenclature: Decontaminating
Agent, DS2

Shipping Name: Caustic Alkali Liquids, n.o.s.
(Diethylenetriamine, Ethylene Glycol
Monomethyl Ether, Sodium Hydroxide)

UN ID Number: 1719

Hazard Class: 8

Packaging Group: II

Physical State: Liquid

NALC/DODAC: N/A

CAA Number: N/A

EX Number: N/A

CFR 49 Packaging Method: 202

Net Explosive Weight: N/A

DESCRIPTION OF PACKAGINGS TO BE TESTED
EXTERIOR CONTAINER

Exterior Container: Decontaminating Apparatus, Portable, 14 Liter, M13

CFR 49 Reference Number: 173.7A

UN Code: 3A1

NSN Exterior Container: 4230-01-133-4124

Specifications: 3A1

Net Quantity Weight: 54 lbs. (24.5 kg)

Tested Gross Weight: 56 lbs. (25.4 kg)

Dimensions Interior: 18.75 X 14.00 X 6.63

Manufacturer: All-Bann Enterprises, Inc., Anaheim CA

Year Container Manufacturer: 1984

Drawing Number(s): TM 3-4230-214-12&P, E5-51-527, D5-51-575

Cushioning: None

Closure: None

INTERMEDIATE CONTAINER

Intermediate Container Description: None

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: N/A

Unit Container Specification: N/A

Unit Container NSN: N/A

Unit Container Cushioning: N/A

Unit Container Closure Method: N/A

Unit Container Dimensions: N/A

Number of Unit Containers: N/A

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, DOD, or commercial truck, rail, and ship.

Military cargo aircraft.

Specific Gravity: .98

Hydrostatic Test Pressure Applied: 15 psi

Leakproofness Test Applied: 5 psi

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	Pass
(4) Hydrostatic Pressure Test	Part 178.605	Pass
(5) Stacking Test (500 lbs.)	Part 178.606(c)(1)	Pass
(6) Vibration Test	Part 178.608(b)(3)	Pass

UN POP Marking

U 3A1/Y/100/01

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:


JEFFERY L. DUGAN
Test Engineer

DATE: 7/16/2001

SUBMITTED BY:


JERRY W. BEAVER
Chief, Validation Engineering Division


DATE: 7-11-01


APPROVED BY:


WILLIAM R. FRERICHS
Associate Director for Engineering

DATE: 18 JUL 2001

PART 5 – SPECIAL PACKAGING INSTRUCTIONS

SPECIAL PACKAGING INSTRUCTION						Form Approved OMB No. 0704-0188	
1. PART OR DRAWING NO. NOMENCLATURE 5-51-575 FLUID CONTAINER ASSEMBLY			2. CODE IDENT 59678		3. SPI NO. (AM) P M13 REFILL DEMIL		
4. NATIONAL STOCK NO. 6850-01-136-8888			5. DATE OF SPI (YYMMDD) 010611		5. REVISION A		
7. QUP/UNIT OF ISSUE 28 EA	8. ICQ -	9. UNIT PACK WT (lb) (0.0) 1404		10. UNIT PACK CU (CU.FT) 26.666	11. UNIT PACK SIZE (INCHES) 40 X 48 X 24		
		18. STEPS	19. REQD	20. DESCRIPTION			
12. MILITARY PRESERVATION				SEE BELOW FOR PALLETIZATION			
13. CLEANING				INSTRUCTIONS INTENDED FOR DEMIL			
14. DRYING							
15. PACKING							
a. LEVEL A							
b. LEVEL B							
16. MARKING							
<p>17. NOTES/DRAWING THE FLUID CONTAINER SHALL BE PLACED IN A 4 X 7 PATTERN ON 40 X 48 PALLET. APPLY A 1/2 INCH HORIZONTAL STRAP CENTERED AROUND THE CONTAINERS. PLACE A PIECE OF 1/2 PLY WOOD 40" X 45-1/2" (APPROX) ON TOP. APPLY TWO LOAD STRAPS AROUND THE 48 INCH DIMENSION AND TWO TIEDOWN STRAPS AROUND THE 40 INCH DIMENSION.</p> <p>MARKING: MIL-STD-129 MARKINGS, THE PERFORMANCE ORIENTED PACKAGING SYMBOL, UN MARKINGS, AND CORROSIVE LABEL CAN BE PLACED ON A MARKING BOARD AND APPLIED TO TWO ADJACENT SIDES.</p> <p>ID MARKINGS(to include):</p> <p>6850-01-136-8888 FLUID CONTAINER ASSEMBLY PN 5-51-575 28 EA WT:</p> <p>UN MARKINGS:</p> <p>UN 1719 CAUSTIC ALKALI LIQUID NOS (DIETHYLENETRIAMINE ETHYLENE GLYCOL MONOMETHYL ETHER SODIUM HYDROXIDE)</p> <p>FLASH POINT 168 DEG F</p> <p>POP MARKING:  3A1/Y/100/01 USA/DOD/DEV</p> <p>WSC: ITEM SIZE: 10 X 6.68 X 19.12 ITEM WEIGHT: 48 LBS. APPROVED: <i>Mark Schmidt</i></p> <p>STATEMENT A, UNLIMITED</p>							
DD form 2169, Oct 96		Previous editions are obsolete				Page 1 of 1	

SPECIAL PACKAGING INSTRUCTION						Form Approved OMB No. 0704-0188
1. PART OR DRAWING NO. NOMENCLATURE MIL-D-51533 DECONTAMINATING APPARATUS, M13			2. CODE IDENT 59678		3. SPI NO. (AM) P M13 DEMIL	
4. NATIONAL STOCK NO. 4230-01-133-4124			5. DATE OF SPI (YYMMDD) 010611		5. REVISION A	
7. QUP/UNIT OF ISSUE 21 EA	8. ICQ -	9. UNIT PACK WT (lb) (0.0) 1320	10. UNIT PACK CU (CU.FT) 28	11. UNIT PACK SIZE (INCHES) 42 X 48 X 24		
			18. STEPS	19. REQD	20. DESCRIPTION	
12. MILITARY PRESERVATION					SEE BELOW FOR PALLETIZATION	
13. CLEANING					INSTRUCTIONS INTENDED FOR DEMIL	
14. DRYING						
15. PACKING						
a. LEVEL A						
b. LEVEL B						
16. MARKING						
<p>17. NOTES/DRAWING THE M13 SHALL BE PLACED IN A 3 X 7 PATTERN ON 40 X 48 PALLET. APPLY A 1/4 INCH HORIZONTAL STRAP CENTERED AROUND THE APPARATUSES. PLACE A PIECE OF 1/2 PLY WOOD 42" X 46" (APPROX) ON TOP. APPLY TWO LOAD STRAPS AROUND THE 48 INCH DIMENSION AND TWO TIEDOWN STRAPS AROUND THE 40 INCH DIMENSION.</p> <p>MARKING: MIL-STD-129 MARKINGS, THE PERFORMANCE ORIENTED PACKAGING SYMBOL, UN MARKINGS, AND CORROSIVE LABEL CAN BE PLACED ON A MARKING BOARD AND APPLIED TO TWO ADJACENT SIDES.</p> <p>ID MARKINGS(to include):</p> <p>4230-01-133-4124 M13 DECONTAMINATING APPARATUS PN 5-51-527 21 EA WT:</p> <p>UN MARKINGS:</p> <p>UN 1719 CAUSTIC ALKALI LIQUID NOS (DIETHYLENETRIAMINE ETHYLENE GLYCOL MONOMETHYL ETHER SODIUM HYDROXIDE)</p> <p>FLASH POINT 168 DEG F</p> <p>POP MARKING:  3A1/Y/100/01 USA/DOD/DEV</p> <p>WSC: ITEM SIZE: 14 X 6.68 X 19.12 ITEM WEIGHT: 60 LBS. APPROVED: <i>[Signature]</i></p>						
<p>STATEMENT A, UNLIMITED DD form 2169, Oct 96 Previous editions are obsolete Page 1 of 1</p>						

PART 6 - DRAWING

The following drawings represent the DAP, 14 Liter, M13,
Drawing No. E5-51-527, and Fluid Container Filled, Drawing No. D5-51-575.

