

M&M Industries, Inc.

UN SOLIDS TEST REPORT

5.0 K1 Pail with (V2) Non-Gasketed K1 NP CR Cover

Test Type: Design Qualification

Additional Package Designs Covered by this report:

N/A

Test Report Number: 50K1V2-1

Completion Date: 3/5/2024

Test Facility/Packaging Manufacturer

Test Facility: M&M Industries
316 Corporate Place
Chattanooga, TN 37419

Packaging Manufacturer: M&M Industries
1435 E 14th St.
Chattanooga, TN 37404

Completed By: [Signature]
Title: Quality Manager

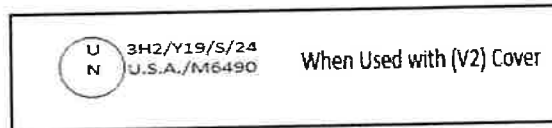
[Signature]
President

Samples Prepared By: Christian Hancock
QC Tech II

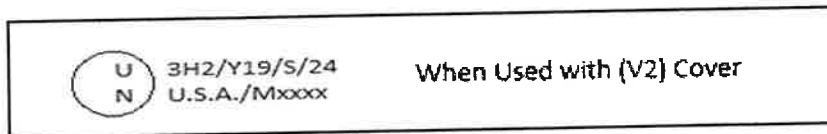
PACKAGE FILL WEIGHT INFORMATION

Overall package tare weight: 1.73 kg
Filling Substance weight: 17.27 kg 38.07 lbs. (Approx.)
Package UN weight - Gross: 19 kg

UN MARKING



Additional UN Marks covered by this report:





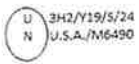
CLOSURE METHOD: PER ATTACHED INSTRUCTIONS

NOTES:

It is the responsibility of the end user to determine authorization for use of the packaging under the Hazardous Materials Regulations.

The use of packaging methods or components other than those documented in this report may render this certification invalid.

COVER		DRAWING
Description		
Cover Size:	5.0	
Style:	K1	
Fittings:	N/A	
Gasket:	N/A	
Wall Thickness:	0.090	
Method of Manufacture: Injection Molded		
Material:	HDPE/PP Blend	
Mold #	40K1CB	
Tare Weight (kg):	0.38	
Overall Dimensions		
Height:	1.28"	
Top Diameter:	L=11.74" W=10.06"	
Bottom Diameter:	L=11.23" W=9.35"	
Thread Dimensions		
Major Diameter:	N/A	
Minor Diameter:	N/A	
Markings	SPI "2" HDPE Recycling Symbol 40K1CB K1 www.mmpail.com For Patent Details Reference www.mmpail.com	

DRUM		DRAWINGS	
Description			
Pail Size:	5.0		
Style:	K1		
Gasket:	NA		
Method of Manufacture: Injection Molded			
Material:	High Density Polyethylene		
Wall Thickness:	0.090		
Mold#:	20447		
Tare Weight (kg):	1.35		
Capacity			
Overflow without cover in place (Water)(kgs):	22.34		
Overall Dimensions			
Height:	14.55"		
Diameter Below Stacking Lug:	L=11.14" W=9.29"		
Bottom Diameter:	L=10.53" W=8.90"		
Diameter at Curl (M2 Only):	NA		
Thread Dimensions			
Major Diameter:	NA		
Minor Diameter:	NA		
Markings	<p>M&M Industries, Inc. Chattanooga, TN 37419 Phoenix, AZ 85043 www.ultimatepail.com</p> <p>SPI "2" HDPE Recycling Symbol 5.0 U. S. Gals</p> <div style="text-align: center;">  </div> <p>When Used with (V2) Cover</p>		

- 0.6 Top Grade
 - 1.0 New Generation
 - 1.25 Lite Latch
 - 2.0 M2
 - 2.5 K1
 - 3.5 Drum
 - 5.0 Revolutionary
 - 5.5 Euro Drum
 - 6.5
 - 12.0
- NA
 Screw top liquid - .260" - .340" Dia x 36.938" - 38.446" L Neoprene

DROP TEST CALCULATIONS

Maximum Fill Capacity with cover in place(water):	20.54	kg	
95% Of Maximum fill Capacity (water):	19.51	kg	
Overall Package Tare Weight:	1.73	kg	
Actual Filling substance weight:	17.27	kg	38.07 lb.
Package Test Weight:	19	kg	41.89 lb.

1 lb.= 0.4535924kg 1 kg = 2.204622 lb.

Packing Group Allowed (Chemical): Y(PG II&III) Package Test Level: Y(PG II&III)

Gross Mass (UN Mark on pail) 19 kg

DROP TEST				
Sample Size:	6 Samples/3 per orientation			
Test Contents:	Sand Mesh 2-635			
Additional Test Contents:	Vermiculite	18 Bags	Approx. Weight of Add. Contents	3.6
Conditioning:	-18 C (0 F) sample temperature at time of test, min. 24 hr. conditioning.			
Drop Height:	Inches:	48	Meters:	1.2 (PG II) 1 m=3.280840 ft.
Test Equipment:	Mechanical Drop Tester and thermometer in filled sample (inside freezer)			
Test Standard:	Title 49 CFR; Section 178.603			
Target:	A rigid, non-resilient, flat and horizontal surface.			

Criteria for passing the test for solids:

Any discharge from a closure is slight and ceases immediately after impact with no further leakage; and no rupture is permitted in packaging's for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging.

DROP TEST SET-UP AND RESULTS		
Drop Orientation	Sample	Results
Diagonal Top Chime	1	Pass
Diagonal Top Chime	2	Pass
Diagonal Top Chime	3	Pass
Flat on Side	1	Pass
Flat on Side	2	Pass
Flat on Side	3	Pass

STACKING & STACKING STABILITY TEST CALCULATIONS/RESULTS

Stack Test Minimum Load Calculation										
Number of packages in a 3m High Stack (118/ Nesting Height (NH))-1)										
<u>(118</u>	/	<u>NH)</u>	=	<u>#</u>	-	<u>-1</u>	=	<u>#3m HS</u>		
118	/	14.45	=	8.17	-	1	=	7.17		
Stack Test Load Calculation (Individual Package)										
		<u>Gross Mass</u>	X	<u>#3m HS</u>	=	<u>Load</u>				
		19	X	7.17	=	136.23	kg			
						Appox.		<u>300.33 lbs.</u>		
Actual Weight Placed on Pails:							<u>400</u>	lbs	<u>181.43</u>	kg

TEST INFORMATION				
Stack Test				
Test contents:	Sand mesh size 2-635			
Additional test contents:	Vermiculite	18 bags	Approx. Weight of Add. Contents	3.6
Conditioning:	Standard room temperature/RH			
Equipment:	Dead load weight/Guided load fixture			
Test Duration:	24 hours			
Test Standard:	Title 49 CFR; Section 178.606			

Criteria for passing the Stack Test

No test sample may leak or show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, or cause instability in stacks of packages.

STACK TEST RESULTS				
SAMPLE #	START TIME	DURATION	END TIME	RESULTS
1	11:00 PM	24 hours	11:00 PM	Pass
2	11:00 PM	24 hours	11:00 PM	Pass
3	11:00 PM	24 hours	11:00 PM	Pass

STACK STABILITY RESULTS	
RESULTS	CRITERIA FOR PASSING THE TEST
Pass	<ul style="list-style-type: none"> In guided load tests, stacking stability must be assessed after test completion. Two filled packaging's of the same type must be placed on the test sample The stacked packages must maintain their position for 1 hour. <p>For stack stability, M&M places the filled samples one on top of the other. The bottom sample is rotated to the top until all three samples have been subjected to stacking stability for one hour each</p>

Additional Drops (If REQUIRED for Variation 5)

Criteria for passing the test for solids

Any discharge from a closure is slight and ceases immediately after impact with no further leakage; and no rupture is permitted in packaging's for materials in Class 1 which would permit spillage of loose explosive substances or articles from the outer packaging.

Description:

Sample	Drop Orientation	Results
1	Diagonal Top Chime	
2	Diagonal Top Chime	
3	Diagonal Top Chime	

Description:

Sample	Drop Orientation	Results
1	Diagonal Top Chime	
2	Diagonal Top Chime	
3	Diagonal Top Chime	

Description:

Sample	Drop Orientation	Results
1	Diagonal Top Chime	
2	Diagonal Top Chime	
3	Diagonal Top Chime	

Description:

Sample	Drop Orientation	Results
1	Diagonal Top Chime	
2	Diagonal Top Chime	
3	Diagonal Top Chime	

M&M INDUSTRIES, INC.

MANUFACTURER'S NOTIFICATION FOR M & M INDUSTRIES, INC. UN/DOT PACKAGING FOR HAZARDOUS SOLIDS

At M&M Industries, we understand your goal to safely transport your valuable products along roads and highways. You want to provide your customers with value while keeping their trust. While we are legally bound to provide you with the following information, M&M Industries also wants you to know we value your endeavor and want to help you reach your goal, every day.

Under the U.S. Department of Transportation's Title 49CFR it is the **Shipper's Responsibility** to determine that the packaging or container is an authorized packaging, including all part 173 requirements. The selected packaging must be properly assembled for transportation in accordance with the manufacturer's notification. **Please do all the testing and research necessary to ensure that you have selected the proper M & M Industries container for use with your product.**

To meet UN/DOT Standards, this package must be properly closed for shipment. At the time of transfer, the packaging does not meet the UN standard because it is disassembled. Only when assembled as specified in the closing instructions below, and using the components described herein, is this packaging certified to meet the UN standard. Failure to follow the closing instructions or substituting package components with components other than those identified in the following paragraph will render the UN/DOT Certification invalid.

A copy of the manufacturer's notification, including closing instructions, must be made available for inspection by a representative of the Department of Transportation upon request for at least 90 days once the package is offered to the initial carrier for transportation in commerce, as of this time (June 2013). However, M&M Industries recommends that you retain these documents for a minimum of 365 days after the package is offered for shipment. The current record retention requirements are subject to change and are found in 49CFR 173.22(a)(4), <http://www.ecfr.gov>

M&M Industries takes superb pride in our Quality Assurance program and systems. However, even with our very best efforts, fittings on covers / pails can become damaged or shift during transportation or storage after leaving our facility. M&M Industries recommends that fillers/offers take all steps deemed necessary to check the fittings on each pail / cover, to meet your quality standards. An example of this is a screw cap on a cover that may vibrate or back off during transportation. The offeror of a hazardous material may be open to liability if they do not take the necessary precautions. Should you have any questions, please contact customer service at **(800) 331-5305**.

THESE CLOSING INSTRUCTIONS REMAIN IN EFFECT UNTIL FURTHER NOTICE.

**CLOSING INSTRUCTIONS FOR:
Life Latch® K1 Containers**

Identification of Packaging:

This packaging type is identified by:

Pail Size (gallons)	Pail Mold Number	Lid Mold Number	Lid length (ref only, measured at top of lid, not including lift ledge)	Lid Width
3.5	23005	21712	11.75"	10"
4.0	19423	21712	11.75"	10"
5.0	20447	21712,40K1CB (V2)	11.75"	10"
6.5	20952	21712	11.75"	10"

UN Markings for Life Latch® K1 Containers:

An appropriate UN marking must be maintained for each M&M Industries container design. The UN markings for M&M Industries Life Latch® K1 containers are listed below.

Pail Size (gallons)	UN Mark	Lid	Certified for
3.5	3H2/Y15/S	NA	Solids Only
4.0	3H2/Y15/S	NA	Solids only
5.0	3H2/Y23/S	NA	Solids only
5.0 (With V2 Lid Only)	3H2/Y19/S	NA	Solids Only
6.5	3H2/Y25/S	NA	Solids only

In accordance with the U.S. Department of Transportation's Title 49CFR, Section 178.2, manufacturers of U.N. Standard/DOT Specification packages are required to notify in writing each person to whom that packaging is transferred of all requirements in this part not met at the time of transfer, and with information specifying the type(s) and dimensions of the closings, including gaskets and any other components needed to ensure that the packaging is capable of successfully passing the applicable performance tests. This information must include any procedures to be followed, including closing instructions for inner packaging and receptacles, to effectively assemble and close the packaging for the purpose of preventing leakage in transportation.

Specifically, the following items pertain to the Life Latch® K1 containers:

1. Life Latch® K1 containers are certified to the UN/DOT performance-oriented packaging standards and are marked with the appropriate UN markings on the container.
2. The Life Latch® K1 pail must always be used with the correct Life Latch® K1 lid to meet the UN/DOT performance-oriented packaging standards.

A. CLOSING INSTRUCTIONS FOR THE Life Latch® K1 PAIL AND LID:

1. **Rubber mallet (minimum 16 oz.)**
 - a. Center the lid on the pail by hand so that all four corners of the lid are aligned with the corners of the pail. Ensure that the inner skirt of the lid is sitting inside the opening of the pail prior to lidding. (Figure A).



Figure A

- b. Hammer the cover into place with the rubber mallet by striking the cover in the corners of the cover's outer ring (Figure 1). Strike cover until it snaps onto the rim of the pail. For best results, strike all four corners and then strike at 12 o'clock position, 3 o'clock and 9 o'clock and then on each side of the CR tab (Figure 2).



Figure 1



Figure 2

- c. Continue to hammer the cover into place all the way around the outer ring, until the cover is evenly seated all the way around the pail.
2. **Pneumatic press with six cylinder 3.5-, 4-, 5- and 6.5-gallon sizes (Figure B),**
 - i. Adjust downward stroke of top plate so that it goes beyond pail rim by 1/16-1/8"
 - ii. Center the pail and lid under the press.
 - iii. Apply a minimum of 80 psi from a regulated air supply to the lid listening for a defining snap.
 - iv. Inspect the lid after application to confirm it is properly seated.

Figure B: Pneumatic Press



d. Inspect lid after application to confirm it is properly seated.

Properly seated K1 lid (Even, fully seated):



Revision History

Rev.	Description of Change(s)	Written by:	Approved by:	Date:
1	New Revision-Adding CR Instructions	Ahron Bobbin	Terry Iker	10/22/2019
2	Added (V2) Lid, 3.5 K1	Ahron Bobbin	Tenna Minwell	7/18/2022
3	Changed Square to "K1" and removed reference to lids with triggers	Ahron Bobbin	Kim Holley	4/1/2023

ASTM D999 VIBRATION TESTING



**5 Gallon Square Pail with K1 Square Lid (V2)
with K1 Square Lid**

TEST REPORT #: 22-MN10165

TESTING PERFORMED FOR:

M & M INDUSTRIES, INC.
316 Corporate Place
Chattanooga, TN 37419

ATTN: Ahron Bobbin

TESTING PERFORMED BY:

TEN-E PACKAGING SERVICES, INC.
1666 County Road 74
Newport, MN 55055
Phone: 651-459-0671
Fax: 651-459-1430

May 3, 2022

TABLE OF CONTENTS

OBJECTIVE2
INDUSTRY STANDARD REFERENCES.....2
COMPONENT INFORMATION (TEN-E Packaging Services Quality Control Audit)3
TEST SAMPLE PREPARATION.....5
TEST PROCEDURES AND RESULTS.....6
 VIBRATION TEST..... 6
DISCLAIMER OF WARRANTIES7

OBJECTIVE

To conduct vibration testing on the 5 Gallon Square Pail with K1 Square Lid (V2) with K1 Square Lid.

INDUSTRY STANDARD REFERENCES


Vibration:	ASTM®D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO®2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency

®American Society for Testing and Materials (ASTM)
 ®International Organization for Standardization (ISO)

EQUIPMENT


All inspection, measuring and test equipment that can affect product quality is calibrated and adjusted at prescribed intervals, or prior to use, and is traceable to NIST, using ANSI Z540 as an overall guide for calibration certification.

COMPONENT INFORMATION (TEN-E Packaging Services Quality Control Audit)

COVER		DRAWING
Manufacturer: M&M Industries, Chattanooga, TN		
Description:	6.5 Gallon Rectangular Open Head Hinged Cover with Tear Strip	
Material:	High Density Polyethylene, Natural	
Method of Manufacture:	Injection Molded	
Tare Weight:	365 Grams (0.804 Lbs.)	
Overall Dimensions:		
• Height	1.649"	
• Top Length	12.234"	
• Bottom Length	11.869"	
• Top Width	10.110"	
• Bottom Width	10.310"	
• Bottom Ring Height	1.135" (Overall Height with Bottom Ring)	
Markings (QC Audit):	M&M Industries, Inc. MM Chattanooga, TN. 37419 Phoenix, AZ. 85043 www.ultimatepail.com 3 4/22 40K1CB SPI "2" HDPE Recycling Symbol	



TEN-E Packaging Services, Inc.

OPEN HEAD PLASTIC JERRICAN		DRAWING
Manufacturer: M&M Industries, Chattanooga, TN		
Description:	5 Gallon Open Head Jerrican with Front and Rear Molded Handles	
Material:	High Density Polyethylene, White	
Method of Manufacture:	Injection Molded	
Tare Weight:	1,307 Grams (2.881 Lbs.)	
Capacity:		
• Rated	6.5 Gallon	
• Overflow	21.2 Kg (5.600 Gallons)	
Overall Dimensions:		
Length:		
• Top Length	12.071" (Stacking Lug) 11.474" (Rim)	
• Bottom Length	10.528"	
Width:		
• Top Width	10.163" (Stacking Lug) 9.672" (Rim)	
• Bottom Width	8.813"	
• Height	14.910"	
Markings (QC Audit):	(u/n) 3H2 / Y23 / S / 22 USA / M6490 4/22 4 E 20447 M & M Industries, Inc. Chattanooga, TN. 37419 Phoenix, AZ. 85043 www.ultimatepail.com SPI "2" HDPE Recycling Symbol	



TEN-E Packaging Services, Inc.

TEST SAMPLE PREPARATION

TEST SAMPLE PREPARATION FOR 5 Gallon Square Pail with K1 Square Lid (V2)

Overall Package Tare Weight: 1.673 Kg 3.688 Lbs.

95% Maximum Fill Capacity:

Clay/Coal Mix 17.327 Kg

Package Test Weight:

Clay/Coal Mix 19.0 Kg 41.9 Lbs.

CLOSING METHOD


K1 Square Lid: Pneumatic Lid Press: 80 psi

TEST PROCEDURES AND RESULTS

VIBRATION TEST

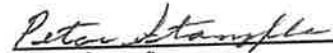
TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Clay 1/Coal Mix (8-600 mesh)	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength. (§178.608)
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. 10000 Transportation Simulator	

VIBRATION TEST SET-UP AND RESULTS

	Sample #	Results	Comments/Observations
	1	PASS	No leakage or damage.
	2	PASS	
	3	PASS	

DISCLAIMER OF WARRANTIES

TEN-E PACKAGING SERVICES, INC. certifies that the previously described testing services have been performed in accordance with standard good laboratory practices, and ASTM D999 and ISO 2247. The results included within this test report relate only to the items tested. **ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE, FIT FOR A PARTICULAR PURPOSE OR IN COMPLIANCE WITH ANY FEDERAL OR STATE REGULATIONS, ARE DISCLAIMED.** In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by **M & M Industries, Inc.**, for services rendered.



Peter Stampfle
Packaging Engineer
TEN-E Packaging Services, Inc.
1666 County Road 74
Newport, MN 55055