



INDUSTRIES

# UN LIQUIDS TEST REPORT

5.0 Screw Top Liquid Pail w/Screw Top Cover w/American Flange Plastic Spout

Test Type: Periodic Retest

Additional Package Designs Covered by this report:

5.0 Screw Top Liquid Pail w/ Screw Top Cover Non-Spouted

Test Report Number: 5.0STLS-07

Completion Date: 4/13/2020

### Test Facility/Packaging Manufacturer

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

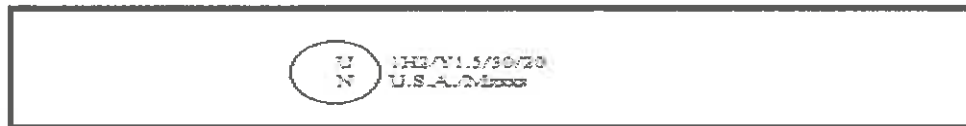
Packaging Manufacturer: M&M Industries, Inc.  
316 Corporate Place  
Chattanooga, TN 37419

Completed By: *Terry Jken*  
Title: Director of Quality

*Glen M. Morris*  
President/CEO

**PACKAGE FILL WEIGHT INFORMATION**

Overall package tare weight: 1.96 kg  
Filling substance weight: 21.64 kg      47.71 lbs. (Approximately)  
Package UN weight -Gross: 23.6 kg  
Maximum Specific Gravity: 1.5


**UN MARKING****Additional UN Marks covered by this report:****CLOSURE METHOD: PER ATTACHED INSTRUCTIONS****Notes:**

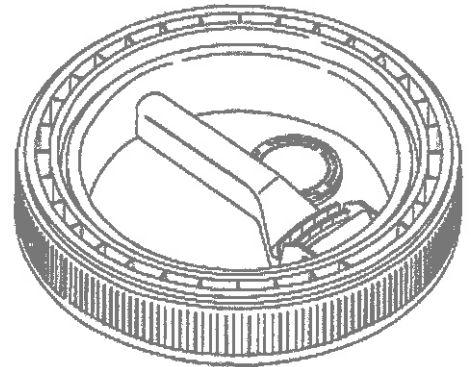
***It is the responsibility of the end user to determine authorization for use of the packaging un the Hazardous Material Regulations.***

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

**COVER**

**DRAWING**

|  |   |
|--|---|
| <b>Description</b>                             |   |
| Cover Size                                     | 5.0   |
| Style:   | Screw Top   |
| Fittings:                                      | Plastic Spout (American Flange BUB38000N0112)                                       |
| Gasket:  | N/A See Drum Spec   |
| Wall Thickness:                                | 0.100   |
| <b>Method Of Manufacture: Injection Molded</b> |   |
| Material:                                      | High Density Polyethylene   |
| Mold#  | 11396   |
| Tare Weight:                                   | .72KG   |
| <b>Overall Dimensions</b>                      |   |
| Height:  | 1.87"   |
| Top Diameter:                                  | 12.48"  |
| Bottom Diameter:                               | 13.08"  |
| <b>Thread Dimensions</b>                       |   |
| Major Diameter:                                | 12.74   |
| Minor Diameter:                                | 12.34"  |
| Inner Skirt Diameter:                          | N/A   |
| <b>Markings</b>                                | M&M Industries, Inc.<br>Chattanooga, TN 37419                                       |
|  | SPI "2" HDPE Recycling Symbol   |
|  |  |
| Open/Closing Instructions in English           |   |



**DRUM**

**DRAWINGS**

**Description**

|  |   |
|--|---|
| Size:  | 5.0   |
| Style:   | Liquid Pail   |
| Gasket:  | Screw top liquid - .260" - .340" Dia x 36.938" - 38.446" L Neoprene |
| <b>Method of Manufacture: Injection Molded</b> |   |
| Material:                                      | High Density Polyethylene   |
| Wall Thickness:                                | 0.090   |
| Mold #:  | 11395   |
| Tare Weight:                                   | 1.24  |

**Capacity**

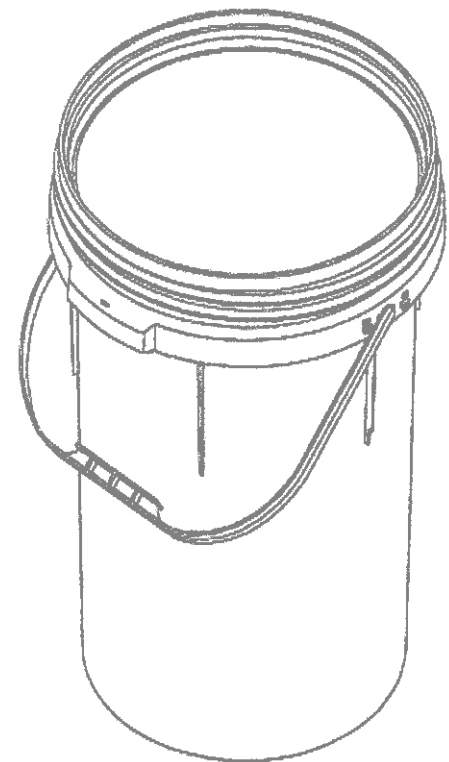
|  |       |
|--|-------|
| Overflow without cover in place (Water)(kgs) | 24.02 |
| Overflow with cover in place (water) (kgs)   | 20.36 |
| Nominal (Gallons)                            | 5.37  |

**Overall Dimensions**

|                              |        |
|------------------------------|--------|
| Height:                      | 16.48" |
| Diameter Below Stacking Lug: | 11.12" |
| Bottom Diameter:             | 10.55" |
| Diameter at Curl(M2 Only)    | N/A    |

**Thread Dimensions**

|                 |        |
|-----------------|--------|
| Major Diameter: | 12.54" |
| Minor Diameter: | 12.37" |



PERSPECTIVE VIEW

**Markings**

M&M Industries, Inc.  
 Chattanooga, TN 37419  
 SPI "2" HDPE Recycling Symbol  
 19 liters  
 5.0 U. S. Gals  
 N.R.C. .090  
 Pat No. 4,732, 788  
 Other Pat Pending  
 Pat No. 6.729, 491



**DROP TEST CALCULATIONS**

Overall Package Tare Weight: 1.96 kgs  
 Actual Filling Substance weight: 21.64 kgs      47.71 lbs. (approximate)  
 (Water/Antifreeze solution)  
 Package Test Weight: 23.6 kgs      52.03 lbs. (approximate)  
 Specific Gravity : 1.5      1 lb. = 0.4535924 kg  
 1 kg = 2.204622 lb.

Packing Group: ( PG II and III)      Package Test Level: ( PG II and III)

| DROP TEST          |   |           |                   |                                |
|--------------------|---|-----------|-------------------|--------------------------------|
| Sample Size:       | 6 Samples/ 3 Samples per Orientation  |           |                   |                                |
| Filling Substance: | Water/Antifreeze solution   |           |                   |                                |
| Conditioning:      | -18°C (0°F) Sample Temperature at time of test, min. 24 hr. conditioning with cold solution |           |                   |                                |
| Drop Height:       | Inches: (actual)  | <u>60</u> | Meters: (minimum) | <u>1.5</u>   1 m= 3.280840 ft. |
| Test Equipment:    | Mechanical Drop Tester, Thermometer inside filled sample in freezer                         |           |                   |                                |
| Test Standard:     | Title 49 CFR; Section 178.603   |           |                   |                                |
| Target:            | A rigid, non-resilient, flat, and horizontal surface.                                       |           |                   |                                |

**Criteria for passing the test for Liquids**

Each packaging does not leak when equilibrium has been reached between the internal and external pressures.

| DROP TEST ORIENTATION AND RESULTS |        |         |
|-----------------------------------|--------|---------|
| Drop Orientation                  | Sample | Results |
| Diagonal Top Chime                | 1      | Pass    |
| Diagonal Top Chime                | 2      | Pass    |
| Diagonal Top Chime                | 3      | Pass    |
| Flat on Side                      | 4      | Pass    |
| Flat on Side                      | 5      | Pass    |
| Flat on Side                      | 6      | Pass    |

**LEAKPROOFNESS/HYDROSTATIC PRESSURE TESTING**

| <b>LEAKPROOFNESS TEST</b> |  |
|---------------------------|--|
| Sample Size:              | 3 Samples  |
| Test Pressure:            | Apply 20 kpa to the test samples                 |
| Area Of Pressurization:   | Top of Receptacle                                |
| Fill Substance:           | Air  |
| Test Duration:            | Leave pressure on each test sample for 5 minutes |

**Criteria for passing the test:**

A packaging passes the test if there is no leakage of air from the packaging. [178.504(f)]

| <b>TEST RESULTS</b> |      |
|---------------------|------|
| Sample 1            | Pass |
| Sample 2            | Pass |
| Sample 3            | Pass |

| <b>INTERNAL HYDROSTATIC PRESSURE TEST</b> |                       |
|---|-----------------------|
| Sample Size:                              | 3 Samples             |
| Test Pressure:(kpa)                       | 30                    |
| Area of Pressurization:                   | Top of Receptacle     |
| Fill Substance:                           | Water                 |
| Test Duration:                            | 30 Minutes per Sample |

**Criteria for passing the test:**

A package passes the hydrostatic test if, for each test sample, there is no leakage of liquid from the package. [178.605€]


| <b>TEST RESULTS</b> |      |
|---------------------|------|
| Sample 1            | Pass |
| Sample 2            | Pass |
| Sample 3            | Pass |

## DYNAMIC COMPRESSION TEST

Test Type: Dynamic Compression

| TEST INFORMATION   | TEST CRITERIA   |
|--|---|
| <b>TEST CONTENTS:</b> Empty without closures<br><b>CONDITIONING:</b> Ambient<br><b>PRE-LOAD APPLIED:</b> 50 lbs.<br><b>MINIMUM TEST LOAD</b> 650.0 lbs<br><b>REQUIRED: kg (LBS)</b> 299.82 kgs<br><b>PLATEN TRAVEL RATE:</b> 1/2" per Minute<br><b>TEST EQUIPMENT:</b> Ulrich Compression System | · After application of the required load, there can be no buckling of the sidewalls sufficient to cause damage to its contents.<br>· In no case may the maximum deflection exceed one inch. (§ 178.606) |

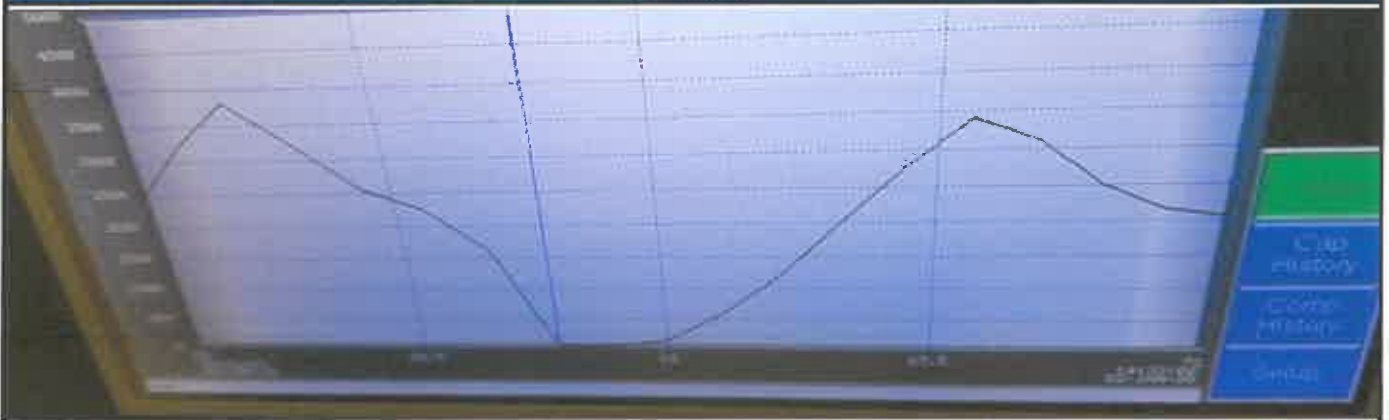
### DYNAMIC COMPRESSION TEST SET-UP AND RESULTS

|  | Sample # | Load: (lbs) | Deflection: | Results |
|--|----------|-------------|-------------|---------|
|  | 1        | 650         | .1901"      | Pass    |
|  | 2        | 650         | .1887"      | Pass    |
|  | 3        | 650         | .1900"      | Pass    |

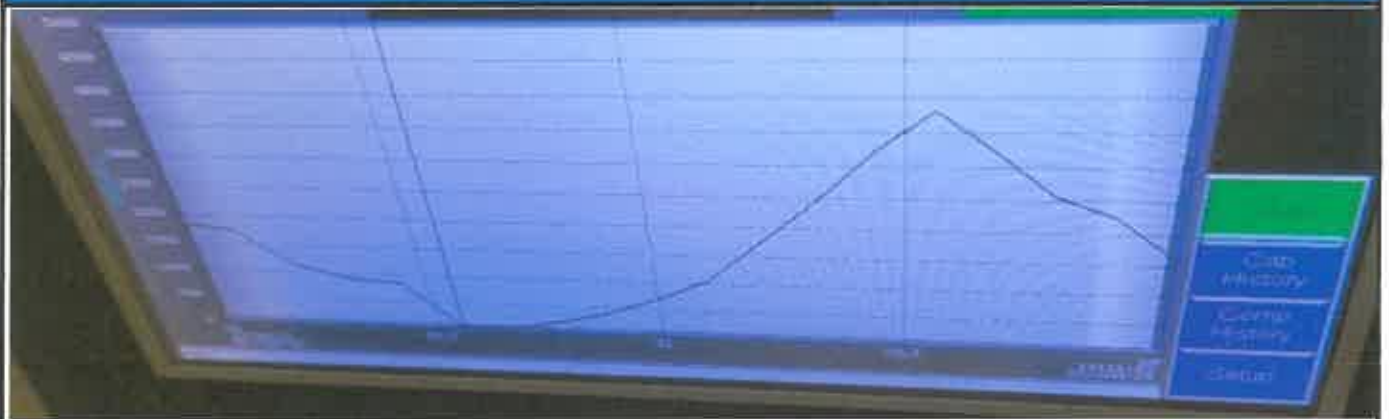
**Note:** After meeting the minimum top load requirements of 178.606 (C )(2)(ii), each container was taken to failure.

**LOAD VS. DEFLECTION GRAPHS**

**SAMPLE #1**



**SAMPLE #2**



**SAMPLE #3**



**Maximum Load at Deflection**

| Sample # | Maximum Load (Lbs.) | Deflection (Inches) |
|----------|---------------------|---------------------|
| 1        | 4046                | .345"               |
| 2        | 3927                | .357"               |
| 3        | 3971                | .318"               |



**INFORMATION USED FOR CALCULATIONS**

|                                       |                  |             |
|---------------------------------------|------------------|-------------|
| Overall Packaging Tare Weight:        | 1.96             |             |
| Overflow Capacity with cover (water): | 20.36            | 5.4 gallons |
| Packing Group:                        | ( PG II and III) |             |
| Product Specific Gravity:             | 1.5              |             |
| Packing Group Multiplication Factor:  | 1                |             |
| Nesting Height of one Package (NH):   | 16.4             |             |

**98 % OF OVERFLOW**

Overflow Capacity (OFC) x 98%

|            |   |            |       |            |
|------------|---|------------|-------|------------|
| <u>OFC</u> | x | <u>98%</u> |       |            |
| 20.36      | x | 98% =      | 19.95 | kg (water) |

**PACKAGE TEST WEIGHT**

Overall Package Tare Weight (PTW) + 98% Overflow Capacity (OFC)

|            |   |                  |         |                 |
|------------|---|------------------|---------|-----------------|
| <u>PTW</u> | + | <u>98% OFC =</u> |         |                 |
| 1.96       | + | 19.95            | 21.9 Kg | 48.3 Lbs. Water |

**CALCULATED PACKAGE GROSS MASS (CPGM)**

Overall Package Tare Weight (PTW) + (Product SG (PSG) x 98% Overflow(OFC)

|            |   |             |   |                 |  |
|------------|---|-------------|---|-----------------|--|
| <u>PTW</u> | + | <u>(PSG</u> | x | <u>98% OFC)</u> |  |
| 1.96       | + | 1.5         | x | 19.95           |  |
|            |   | 31.9 Kg     |   | 70.3 Lbs.       |  |

**DYNAMIC COMPRESSION TEST LOAD CALCULATIONS**

- A =** Applied Load in Lbs.
- n =** Minimum number of containers that, when stacked reach a height of 3m (118 Inches)
- s =** Product Specific gravity (PSG)
- w =** Overall package tare weight (Lbs.)
- v =** Maximum Container Capacity (Gal.)
- 8.3** Weight in pounds of 1 gallon of water
- 1.5** Compensation factor that converts the static load of the stacking test into a load suitable for Dynamic Compression Testing

$$A = \frac{n \times ((w + (S \times V \times 8.3 \times 0.98)) \times 1.5)}{6.2} = \frac{299.82 \text{ Kg} \times 1.5}{6.2} = 650.0 \text{ Lbs.}$$

n = Number of Packages in a 3m High Stack (118/ Nesting Height (NH))-1

$$\frac{118}{118} / \frac{NH}{16.4} - 1 = \frac{n}{6.2}$$

### Additional Drops (If REQUIRED for Variation 5)

***Criteria for passing the test for Liquids***

Each packaging does not leak when equilibrium has been reached between the internal and external pressures.

**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 |         |



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

**General Information:**

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, everyday.

**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 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 (March 2015). 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/offerors 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.

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

**Identification of Packaging:**

This packaging is UN certified for both liquid and solid hazardous materials. For LIQUIDS, only the 5 gallon Life Latch ® Liquid container is UN certified, and it must contain the following gasket:

| Lid Size   | Gasket Material      | Gasket Length   | Gasket Diameter | Spout Options   |
|------------|----------------------|-----------------|-----------------|---|
| 5.0 Gallon | Closed cell Neoprene | 36.938"-38.445" | .260"-<br>.340" | Sonically welded Polyethylene American Flange spout #BUB0380000N0112 with 1.50" opening, 2.50" total fitting. |

This package type is identified by:

| Size                        | Pail ID Number | Matching Lid ID number | Lid Diameter(ref only, measured at bottom) |
|-----------------------------|----------------|------------------------|--|
| 5.0 Gallon Liquid Screw Top | 11395          | 11396                  | 13.053"                                    |



**UN Markings for Life Latch® Liquid Containers:**

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

|                        |   |
|------------------------|---|
| 5.0 Gallon Liquid Pail | 1H2/Y30/S (for solids)<br>1H2/Y1.5/30 (for liquids) |
|------------------------|---|

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 packagings 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® Liquid containers:

- Life Latch® Liquid containers are certified to the UN/DOT performance oriented packaging standards and are marked with the appropriate UN markings on the container.
- The Life Latch® Liquid pail must always be used with the correct Life Latch® Liquid lid in order to meet the UN/DOT performance oriented packaging standards.
- Life Latch® Liquid containers are not UN certified for air transportation.

## CLOSING INSTRUCTIONS FOR SOLIDS and LIQUIDS:

Only the 5 Gallon Life Latch ® Liquid style container with GASKETED lid is UN certified for liquid and solid hazardous materials. Package components required:

- Appropriately marked UN/DOT certified M&M Industries Pail, gasketed 5 gallon
- Matching lid size with handle attached

**To close:** Seat lid on top of pail (engraved MM on bottom of pail). Rotate lid counterclockwise until the lid drops down over the threads, once the lid drops over the threads rotate cover clockwise a complete 360 degrees, the square symbol on the bottom outside of the cover should pass the numbers on the side of the pail by a minimum of .500". For ease of application, use the built in hand lever on the cover. **Inspect lid after application to confirm it is properly seated.**

