

Testing and Technical Service Office

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Delaware, Ohio 43015
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December 21, 2017

UNITED NATIONS/IMO/DOT PERFORMANCE TEST

Report No:	S-1593-FL-121417	Test Type:	Annual Retest
Test Date:	12/14/2017	Plant:	Florence, KY, 7425 Industr
Expiration Date:	12/14/2018		

Mr. Todd McDaniel,

Attached are the laboratory test result sheets of the UN/DOT Performance Test on the steel drums that was conducted at the above stated plant.

These sample containers that were made with the proper components passed the required drop, leakproofness, hydrostatic and compression tests for the following UN Marking(s):

1A2/Y1.6/150/YR 1A2/Z2.4/150/YR

Thank you and best regards.

A handwritten signature in black ink, appearing to read "Jordan Brodsky", written over a horizontal line.

Jordan Brodsky

JB:jb

Director Product Technical and Regulatory Support

TESTING and TECHNICAL SERVICE OFFICE

UNITED NATION/IMO/DOT
PERFORMANCE TEST



Date Tested: 12/14/2017
Report #: S-1593-FL-121417
Design Qualification Date: 1/3/2012
Closure Notification: See Attached

RETEST DESIGN TYPE RESULT SHEET

Drum Style Steel Drum Open Head UN Code: 1A2 Packing Group II
GBC Code / Drum Type: OHU 550 100100100 C30 0 00 0 0 / OPEN HEAD BOLT RING
Dimensions: I.D.: 571.500 MM / 22.5 In. O.H.: 863.500 MM / 34 In.

UN Certified Markings: 1A2/Y1.6/150/YR USA/GBC 1A2/Z2.4/150/YR USA/GBC USA/GBC

Maximum Capacity: 208.2 Litres / 55.0 Gallons
Capacity Range: 208.2 - 208.2 Litres / 55 - 55 Gallons
Test Mass - Gross: 234.5 KG / 517.0 Lbs.
Tare: 19.7 KG / 43.5 Lbs.
Net: 214.7 KG / 473.5 Lbs.

Package Preparation: Drums filled with water to a minimum of 98%.
Conditioning: Not Applicable

Drop Tests (49 CFR 178.603)

Drop Height: 1.60 Metres / 63.00 Inches
Results Diagonal Top Drop: **3 Drums Passed**
Results Diagonal Bottom Drop: **3 Drums Passed**

Vibration Test (49 CFR 178.608)

Capable of withstanding, without rupture or leakage, the vibration test procedure in 49 CFR 178.608.

Leakproofness Test (49 CFR 178.604)

Air Pressure Applied: 3 psi
Results after 5 minutes: **3 Drums Passed**

Hydraulic (Hydrostatic) Test (49 CFR 178.605)

Internal (Hydraulic) Pressure: 100 kPa for a period of 5 minutes
Results: **3 Drums Passed**

Static Compression Test (49 CFR 178.606)

Total Mass: 1272.52 KG (3.5 Drums x 509.0 KG each)
Duration: 24 Hours
Results: **3 Drums Passed**

TEST RESULTS CERTIFIED BY: **GREIF TESTING and TECHNICAL SERVICES**

This test report is the property of Greif. The know-how, methods and techniques disclosed in this report are confidential information which can only be used by those persons with specific written authorization from Greif.

Jordan Brodsky
Director, Product Technical and Regulatory Support

**UN / IMO / DOT PERFORMANCE TEST
ADDITIONAL DRUM INFORMATION**



Report # S-1593

Closing Ring:	<u>12ga Bolt Ring</u>	Necked-In:	<u>No</u>
Chime Bands:	<u>None</u>	Tapered:	<u>No</u>
Cover Gasket:	<u>EPDM Solid</u>	Agitator:	<u>No</u>
Number of Hoops:	<u>3 or more</u>	Other:	<u>None</u>
Bottle / Liner:	<u>None</u>		

Fittings:

Brand:	Size:	Flange:	Plug:	Plug Gasket	Location:
American Flange	2"	Steel	Steel	EPDM	Cover
American Flange	2"	Steel	Steel	EPDM	Cover
American Flange	2"	Steel	Steel	EPDM	Cover
American Flange	2"	Steel	Nylon	Poly Irradiated	Cover
American Flange	2"	Steel	Nylon	Poly Irradiated	Cover
American Flange	2"	Steel	Steel	EPDM	Sidewall Btm

Notes:

- 1) This information reflects only the components of the sample drums tested and may not reflect all equivalent components of the drums covered under this test.
- 2) See attached closure notification for torque values for applicable rings and plugs on test drum.
- 3) If torque for components are not included on the closure attached, the components are customer supplied and were used for testing. Proper closing of the drum is the responsibility of the shipper.

***** CLOSURE NOTIFICATION *****
 Pursuant to the requirements of the Department of Transportation in CFR 49 Part 178.2(c)(1), this is your notification of the closing method used for the the containers sold to you.

These instructions for closure are based upon the closure methods used to enable these containers to pass the United Nations test requirements as outlined by the UN marking on the package. This method of closure should be used to ensure that your containers have been closed in the same manner as when they were initially tested. To be UN certified, this drum must be closed with the same cover, closing ring, gasket and plugs (if applicable) used for certification. If the drum is purchased without these parts, contact the supplying Greif plant for the correct components.

Your product may adversely affect container materials, bung threads or closing devices. Product compatibility with the container is the shipper's responsibility.

The closure recommendations do not take into account any hazards present at your facility, or the handling, filling or shipping of your product.

Any container used for packaging hazardous materials should be inspected before filling and shipment. Containers with obvious damage or deterioration should not be filled or shipped.

Ring Closing Instructions:

- 1) Place cover on the drum, making sure that the gasket is in place.
- 2) Snap the closing ring over the cover and top lip of the drum. Make sure that the ring's lugs point down below the ring. Also, make sure the bottom edge of the closing ring engages under the lip of the drum.
- 3) Insert the bolt completely through the lug without threads. Next, screw on the jam nut if included. Finally screw the bolt into the threaded lug.
- 4) While tightening the bolt, tap along the entire perimeter of the ring with a mallet, starting directly across from the bolt.
- 5) Tighten the bolt according to the manufacturer's recommended torque and gap listed below. The cover and ring should not spin, and the free ends of the ring should not touch.
- 6) If used, tighten the jam nut or locking nut against the lug without threads. This prevents the bolt from backing out of the closing ring.

Plug Closing Instructions:

- 1) Place the plugs into the appropriate bung.
- 2) Turn the plug gently clockwise, making sure that the plug is entering the bung properly.
- 3) Using a torque wrench, tighten the plug according to the manufacturer's recommended torque below.

Drums with rings and plugs closed in this manner have met the UN performance requirement as specified in the container markings.

For Item # DRST00058NA20005

Closing Ring	Torque	Gap
12ga Bolt Ring with EPDM Gasket	60 ft-lbs	1/8" to 5/8"
Plugs		
American Flange 2" Steel with EPDM	15 to 22 ft-lbs	
American Flange 2" Steel with EPDM	15 to 22 ft-lbs	
American Flange 2" Steel with EPDM	15 to 22 ft-lbs	
American Flange 2" Steel with EPDM	15 to 22 ft-lbs	
American Flange 2" Nylon with Poly Irradiated	15 to 22 ft-lbs	
American Flange 2" Nylon with Poly Irradiated	15 to 22 ft-lbs	

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October 02, 2018

UNITED NATIONS/IMO/DOT PERFORMANCE TEST

Report No:	S-1747-AL-092118	Test Type:	Annual Retest
Test Date:	9/21/2018	Plant:	Alsip, IL
Expiration Date:	9/21/2019		

Mr. Trevor Davies,

Attached are the laboratory test result sheets of the UN/DOT Performance Test on the steel drums that was conducted at the above stated plant.

These sample containers that were made with the proper components passed the required drop, leakproofness, hydrostatic and compression tests for the following UN Marking(s):

1A2/Y1.8/150/YR 1A2/Z2.7/150/YR

Thank you and best regards.

A handwritten signature in black ink, appearing to read "P. Zamperin". The signature is written over a horizontal line.

Phil Zamperin

PZ:dt

Director, Quality Assurance and Regulatory Affairs

TESTING and TECHNICAL SERVICE OFFICE

UNITED NATION/IMO/DOT
PERFORMANCE TEST



Date Tested: 9/21/2018
Report #: S-1747-AL-092118
Design Qualification Date: 10/29/2013
Closure Notification: See Attached

RETEST DESIGN TYPE RESULT SHEET

Drum Style Steel Drum Open Head UN Code: 1A2 Packing Group II
GBC Code / Drum Type: OHU 550 100100100 C30 / OPEN HEAD BOLT RING
Dimensions: I.D.: 565.150 MM / 22.25 In. O.H.: 869.950 MM / 34.75 In.

UN Certified Markings: 1A2/Y1.8/150/YR USA/GBC 1A2/Z2.7/150/YR USA/GBC USA/GBC

Maximum Capacity: 208.2 Litres / 55.0 Gallons
Capacity Range: 208.2 - 208.2 Litres / 55 - 55 Gallons
Test Mass - Gross: 232.6 KG / 512.8 Lbs.
Tare: 19.2 KG / 42.4 Lbs.
Net: 213.3 KG / 470.4 Lbs.

Package Preparation: Drums filled with water to a minimum of 98%.
Conditioning: Not Applicable

Drop Tests (49 CFR 178.603)

Drop Height: 1.80 Metres / 70.87 Inches
Results Diagonal Top Drop: **3 Drums Passed**
Results Diagonal Bottom Drop: **3 Drums Passed**

Vibration Test (49 CFR 178.608)

Capable of withstanding, without rupture or leakage, the vibration test procedure in 49 CFR 178.608.

Leakproofness Test (49 CFR 178.604)

Air Pressure Applied: 3 psi
Results after 5 minutes: **3 Drums Passed**

Hydraulic (Hydrostatic) Test (49 CFR 178.605)

Internal (Hydraulic) Pressure: 150 kPa for a period of 5 minutes
Results: **3 Drums Passed**

Static Compression Test (49 CFR 178.606)

Total Mass: 965.48 KG (3.5 Drums x 386.2 KG each)
Duration: 24 Hours
Results: **3 Drums Passed**

TEST RESULTS CERTIFIED BY: **GREIF TESTING and TECHNICAL SERVICES**

Phil Zamperin

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Director, Quality Assurance and Regulatory Affairs

**UN / IMO / DOT PERFORMANCE TEST
ADDITIONAL DRUM INFORMATION**



Report # S-1747

Closing Ring:	<u>12ga Bolt Ring</u>	Necked-In:	<u>No</u>
Chime Bands:	<u>None</u>	Tapered:	<u>No</u>
Cover Gasket:	<u>EPDM Solid</u>	Agitator:	<u>No</u>
Number of Hoops:	<u>3 or more</u>	Other:	<u>None</u>
Bottle / Liner:	<u>None</u>		

Fittings:

Brand:	Size:	Flange:	Plug:	Plug Gasket	Location:
American Flange	2"	Steel	Steel	EPDM	Cover
American Flange	3/4"	Steel	Steel	EPDM	Cover
American Flange	2"	Steel	Nylon	EPDM	Cover
American Flange	3/4"	Steel	Nylon	EPDM	Cover

Notes:

- 1) This information reflects only the components of the sample drums tested and may not reflect all equivalent components of the drums covered under this test.
- 2) See attached closure notification for torque values for applicable rings and plugs on test drum.
- 3) If torque for components are not included on the closure attached, the components are customer supplied and were used for testing. Proper closing of the drum is the responsibility of the shipper.

***** BOLT RING CLOSURE NOTIFICATION *****

Pursuant to the requirements of the Department of Transportation in CFR 49 Part 178.2(c)(1), this is your notification of the closing method used for the the containers sold to you.

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Your product may adversely affect container materials, bung threads or closing devices. Product compatibility with the container is the shipper's responsibility.

The closure recommendations do not take into account any hazards present at your facility, or the handling, filling or shipping of your product.

Any container used for packaging hazardous materials should be inspected before filling and shipment. Containers with obvious damage or deterioration should not be filled or shipped.

Ring Closing Instructions:

- 1) Place cover on the drum, making sure that the gasket is in place.
- 2) Snap the closing ring over the cover and top lip of the drum. Make sure that the ring's lugs point down below the ring. Also, make sure the bottom edge of the closing ring engages under the lip of the drum.
- 3) Insert the bolt completely through the lug without threads. Next, screw on the jam nut if included. Finally screw the bolt into the threaded lug.
- 4) While tightening the bolt, tap along the entire perimeter of the ring with a mallet, starting directly across from the bolt.
- 5) Tighten the bolt according to the manufacturer's recommended torque and gap listed below. The cover and ring should not spin, and the free ends of the ring should not touch.
- 6) If used, tighten the jam nut or locking nut against the lug without threads. This prevents the bolt from backing out of the closing ring.

Plug Closing Instructions:

- 1) Place the plugs into the appropriate bung.
- 2) Turn the plug gently clockwise, making sure that the plug is entering the bung properly.
- 3) Using a torque wrench, tighten the plug according to the manufacturer's recommended torque below.

Drums with rings and plugs closed in this manner have met the UN performance requirement as specified in the container markings.

August 9, 2018 - rev.0

For Item # DRST00058NA20007

Closing Ring	Torque	Gap
12ga Bolt Ring with EPDM Gasket	60 ft-lbs	1/8" to 5/8"

Plugs

American Flange 2" Steel with EPDM	15 to 22	ft-lbs
American Flange 3/4" Steel with EPDM	8 to 15	ft-lbs
American Flange 2" Nylon with EPDM	15 to 22	ft-lbs
American Flange 3/4" Nylon with EPDM	8 to 11	ft-lbs