



CSC Design Number: N-013-2018

Date Certified: 3/5/2018

# Cleveland Steel Container Corporation Performance Oriented Package Testing Certification

Test Report for Non-Bulk Steel Packaging in accordance with the UN Recommendations on the Transport of Dangerous Goods, IMDG Code, ICAO Technical Instructions, IATA Dangerous Goods Regulations and the U.S. Code of Federal Regulations (CFR) Title 49, Part 178.

Test Facility: Cleveland Steel Container Corporation  
412 Mason Street  
Niles, Ohio 44446  
330-544-2271

## Periodic Retest

### 5.0 Gallon Open-head Tapered (Nested) Steel Drum

Packagings which differ from the above described design type only in their lesser design height are covered under this testing certification, in accordance with 49 Code of Federal Regulations, Part 178, Subpart M, Section 178.601(c)(4)(v).

Therefore, the tested 5.0 Gallon design referenced above covers designs of lesser height and rated capacity.

**Ⓢ 1A2/Y2.2/100/18/USA/M\*\*\*\***

This package is certified for shipment by Air.

The following Cleveland Steel Container Manufacturing Locations are registered with the United States Department of Transportation, and are eligible to appear in the above UN marking sequence in place of M\*\*\*\*

M4369 - Cleveland Steel Container Corporation, Peotone, Illinois

M4460 - Cleveland Steel Container Corporation, Niles, Ohio

M4461 - Cleveland Steel Container Corporation, Quakertown, Pennsylvania

M5845 - Cleveland Steel Container Corporation, Kilgore, Texas

Testing Representative's Signature

Date

3/5/2018

Testing Representative's Title

U.N. Technician



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**Container (Drum) Description:**

**Manufactured by:** Cleveland Steel Container Corporation, Niles, Ohio

**Manufacturing Method:** Triple Seam (3 folds on bottom circumferential seam or chime). Electric lap-welded side seam.

**Drum Type:** Open-head Tapered (Nested) Steel Drum

**Bead:** Two beads

**Height of Pail:** 13.437 Inches

**Package Tare Weight:** 4.90 lbs.

**Maximum Capacity:** 5.3 gal.

**Gauge (Body):** 24

**Gauge (Bottom):** 24

**Minimum Wall Thickness:** 0.019 inches

**Minimum Bottom Thickness:** 0.019 inches

**Inside Diameter at Top:** 11.25 inches

**Inside Diameter at Bottom:** 10.5 inches

**Cover Description:**

**Manufactured by:** Cleveland Steel Container Corporation, Streetsboro, Ohio

**Cover Type:** Hiperform (16 Lug)

**Material:** Steel

**Gauge (Top/Cover):** 24H

**Minimum Thickness:** 0.023 inches

**Gasket Material:** Flow-In

**Fitting Description**

**Fitting Manufacturer:** Not Applicable

**Fitting Type:** None

**Fitting Material:** Not Applicable

**Fitting Weight:** N/A lbs.



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**DROP TEST SPECIFICATIONS AND RESULTS (49 CFR - §178.603)**

**Sample Size:** 3 Samples/Orientation ( 6 Samples Total)      **Filling Substance:** Water filled to 98% maximum capacity  
**Packing Group:** Y      **Specific Gravity:** 2.2      **Drop Height:** 87 Inches      **Drop Weight:** 48.2 lbs.

\*\*\* See Appendix A - Test Calculations for Weight of Test Package and Drop Test Height

<b>Center of Gravity on Cover at Side Seam or w/ fitting directly over impact at 6 o'clock</b>		
<b>Sample #</b>	<b>Result</b>	<b>Comment</b>
1	Pass	No Leak
2	Pass	No Leak
3	Pass	No Leak

<b>Center of Gravity on Bottom Chime (Circumferential Seam) at Side Seam</b>		
<b>Sample #</b>	<b>Result</b>	<b>Comment</b>
4	Pass	No Leak
5	Pass	No Leak
6	Pass	No Leak

**Criteria for Passing the Test:**

A container is considered to successfully pass the drop test if for each sample tested, the container does not leak when equilibrium has been reached between internal and external pressures.

**LEAKPROOFNESS TEST SPECIFICATIONS AND RESULTS (49 CFR - §178.604)**

**Sample Size:** 3 Samples      **Filling Substance:** Air      **Test Pressure:** 20 kPa      **Test Duration:** 5 Minutes

<b>Sample #</b>	<b>Result</b>	<b>Comment</b>
7	Pass	No Leak
8	Pass	No Leak
9	Pass	No Leak

**Criteria for Passing the Test:**

A container successfully passes the Leakproofness test if for each sample tested, there is no leakage of air from the container.

**HYDROSTATIC PRESSURE TEST SPECIFICATIONS AND RESULTS (49 CFR - §178.605)**

**Sample Size:** 3 Samples      **Filling Substance:** Water      **Test Pressure:** 100 kPa      **Test Duration:** 5 Minutes

<b>Sample #</b>	<b>Result</b>	<b>Comment</b>
10	Pass	No Leak
11	Pass	No Leak
12	Pass	No Leak

**Criteria for Passing the Test:**

A container successfully passes the Hydrostatic Pressure test if for each sample tested, there is no leakage of liquid from the container.



**STACK TEST SPECIFICATIONS AND RESULTS (49 CFR - §178.606)**

\*\*\* See Appendix A - Test Calculations for Stack Test Weight

**SAMPLE SIZE:** 3 Samples

**TEST METHOD:** Dynamic Compression

**FILLING SUBSTANCE:** None (Empty)

$$\text{Load (A)} = (n - 1) * [ w + ( s * v * 8.34 * 0.98 ) ] * 1.5$$

**Where:**

A = applied load in pounds.

n = minimum number of containers required to reach 3 meters (118.11 inches).

s = specific gravity of lading.

w = maximum weight of one empty container in pounds.

v = actual capacity of container (rated capacity + outage) in gallons.

**And:**

8.34 corresponds to the weight in pounds of 1.0 gallons of water.

0.98 corresponds to the maximum filling percentage of the maximum capacity for liquids.

1.5 is a compensation factor that converts the static load of the stacking test into a load suitable for dynamic compression.

Height of Container = 13.43 Inches

Number of containers(n), reaching 118.11 inches in height = 118.1 Inches / 13.437 Inches = 8 containers

Calculated Gross Weight of Each Test Package 43.3 lbs. X 2.2 + 4.90 lbs. = 100.2 lbs.

$$\text{Load (A)} = ( 8 - 1 ) * [ 4.90 + ( 2.2 * 5.3 * 8.34 * 0.98 ) ] = 701.1 \text{ lbs. } X 1.5 = 1052 \text{ lbs.}$$

Sample #	Result	Comment
13	Pass	No Deformation
14	Pass	No Deformation
15	Pass	No Deformation

**Criteria for Passing the Test:**

A container successfully passes the Stacking test if for each sample tested, there is no deformation and there is no deterioration that could adversely affect transport safety or any distortion liable to reduce its strength or cause instability in stacks of packages.



## Appendix A - Test Calculations

### Weight of Test Package

Tare Weight of Empty Drum and Cover w/ closures (w):					4.9 lbs.
Maximum or Actual Capacity of Container (rated capacity + outage) (v):					5.3 Gallons
Maximum Liquid Fill Weight:					44.2 lbs.
98% of Maximum Liquid Fill Weight:	0.98	X	44.2 lbs.	=	43.32 lbs.
Weight of filled Test Package:	4.90 lbs.	+	43.3 lbs.	=	48.2 lbs.

### Drop Test Height

Specific Gravity of Certification: 2.2

Packing Group of Certification: Y

For Packing Group Y [ (Specific Gravity) 2.2 X 39.6 Inches ] = 87.1 Inches

### Stack Test Weight

$$\text{Load (A)} = (n - 1) * [ w + ( s * v * 8.34 * 0.98 ) ] * 1.5$$

Where:

A = applied load in pounds.

n = minimum number of containers required to reach 3 meters (118.11 inches).

s = specific gravity of lading.

w = maximum weight of one empty container in pounds.

v = actual capacity of container (rated capacity + outage) in gallons.

And:

8.34 corresponds to the weight in pounds of 1.0 gallons of water.

0.98 corresponds to the maximum filling percentage of the maximum capacity for liquids.

1.5 is a compensation factor that converts the static load of the stacking test into a load suitable for dynamic compression testing.

#### Stack Test Calculation for Dynamic Compression Testing Method:

Height of Container = 13.437 Inches

Number of containers(n), reaching 118.11 inches in height = 118.11 Inches / 13.437 Inches = 8 containers

$$\text{Load (A)} = ( 8 - 1 ) * [ 4.90 + ( 2.2 * 5.3 * 8.34 * 0.98 ) ] = 701.1 \text{ lbs. } X 1.5 = 1052 \text{ lbs.}$$