

Viking Packing Specialist

5505 Bird Creek Ave. • Tulsa, OK 74015
And/or 1828 North 105th East Avenue • Tulsa, OK 74116
Phone: (800) 788-8525 • Fax: (918) 252-5518

UNITED NATIONS PERFORMANCE ORIENTED PACKAGING TEST RESULTS

Test Document No.: VPS-F-013-23
Requested by: Viking Packing Specialist
Performed by: Viking Packing Specialist
Manufactured by: Viking Packing Specialist
Date: 9/12/2023
Retest Date: 9/11/2025

1. Product Tested:

Packaging Nomenclature: Combination Packaging
Outer Package: 4G Corrugated Box (see Appendix A)
Dimensions: 12" x 12" x 12" (I.D.)
Inner Package: See appendix B for approved inners
Maximum gross wt. (kg): 26 kg
Viking Part No.: VPS-F-013


2. Object of Test:


Determine performance of package design according to PASS/FAIL criteria set forth by the United States Code of Federal Regulations Title 49 sections 178.603, 178.606, and 178.608 to Packing Group I standards.

3. Tests Performed:

TEST	SPEC	INTENSITY	RESULTS
Drop	49 CFR 178.603	1.8 m	PASS
Stacking	49 CFR 178.606	234 kg	PASS
Vibration	49 CFR 178.608	1 Hour	PASS

Viking Packing Specialist certifies that samples of the package described in this report were tested as described above and met all testing requirements. This package is also certified under IMDG, ICAO, IATA and the UN Recommendations on the Transport of Dangerous Goods. It is the responsibility of the end user to determine authorization of use under these regulations. The use of other packaging methods or components other than those documented in this report may render this certification invalid

Certified By: 
DG Testing Manager
Marvin Godfrey

Approved By: 
President
David Weilert

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TEST METHODS & RESULTS

The packages were conditioned at 23° C ($\pm 2^\circ$ C) and 50% ($\pm 2\%$) RH for 24 hours immediately prior to testing, per 49 CFR 178.602(d)(1).

1. DROP TEST- 49 CFR 178.603

Five (5) filled packages, closed as for shipment, were subjected to a free fall drop from 1.8 meters (5.9 feet) as required.

Containers	Point of Impact	Result
#1	Flat onto the bottom panel	PASS
#2	Flat onto the top panel	PASS
#3	Flat onto the long side panel	PASS
#4	Flat onto the short side panel	PASS
#5	Onto the bottom manufacturer's joint corner	PASS

2. STACKING TEST- 49 CFR 178.606

Three (3) filled containers were closed as for shipment and subjected to a static compression load of 234 kg, equivalent to a 3-meter-high stack of identical packages, continuously for 24 hours.

Containers	Actual Load	Result
#1	234 kg	PASS
#2	234 kg	PASS
#3	234 kg	PASS

3. VIBRATION STANDARD- 49 CFR 178.608

Three (3) filled samples, closed as for shipment, were placed on a vibration platform having 25.4 mm peak-to-peak displacement and vibrated in normal shipping orientation for one (1) hour such that a 1.6 mm thick piece of material could be passed between the bottom of the samples and the platform. Immediately thereafter, the packages were removed from the platform, turned over and examined for leakage.

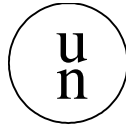
Containers	Vibration	Result
#1	1 HOUR	PASS
#2	1 HOUR	PASS
#3	1 HOUR	PASS

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4. Packaging tested, certified, and provided by Viking Packing Specialist bear the marking:



4G/X26/S/**

USA/M4563

**Denotes two-digit year of manufacture

See appendices for additional information regarding this report. Information is included as follows.

- Appendix A – Specific outer package detail.
- Appendix B – Inner and supplementary packaging/configurations tested in this outer package.
- Appendix C – Packing/Closure Instructions.
- Appendix D – Testing Photographs.

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Appendix A – Outer Package Detail

Designated Packaging Code:	4G
Dimensions:	12" x 12" x 12" I.D
Board Combination:	42 lb liner 23 lb medium (double wall)
Seam:	Stitched
Bursting Strength:	275 lb double wall
Marked max. gross wt. (kg):	26 kg
Maximum net wt. (kg)	25.3 kg
Closure:	3" hot-melt tape. Mfg.: Shurtape. Mfg. P/N: HP-200.
Alternative Closure:	2" cellulose tape. Mfg.: Cantech. Mfg. P/N: 206-00 or equivalent

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Appendix B – Inner Package Detail

NOTES

1. Inner packages of equal or smaller size than those listed may be used in this combination package without further testing if:
 - They are of similar design to those originally tested.
 - The material of construction is equivalent to or stronger than the material originally tested.
 - The closures are of similar design and are no larger than those used for testing.
 - Additional cushioning material is used, and the inner packages are secure.
 - Inner packages are oriented in the same way as tested.
 - The gross package weight does not exceed that of the tested package.
2. Fewer inner packages than listed may be used in this combination package without further testing if:
 - Additional cushioning is used to fill void space.
 - Movement of inner packages is prevented.

See the following for inner packages and supplementary packages tested in this outer package.

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UNITED NATIONS PERFORMANCE ORIENTED PACKAGING TEST RESULTS

Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with two (2) five-quart cans and two (2) one-quart cans. Water and lead shot were used to simulate product and achieve test weight.

Style	5 Quart Round Metal Paint Type Can
Capacity	4.73 Liters
Spec. Gravity	1.6
Closure	Friction Fit Lid
Qty	2
Net Wt.	8 kg each

Style	Quart Round Metal Paint Type Can
Capacity	0.946 Liters
Spec. Gravity	1.6
Closure	Friction Fit Lid
Qty	2
Net Wt.	1.7 kg each

Supplemental The outer package was lined with a 3mm thickness polyliner, taped closed. Each can was placed into a 3mm polybag closed with a hand-tied knot. Bubble wrap was used to fill void space, and cushion inner packages.

When shipping via aircraft, these cans must be sealed with a Ringlock Safety Seal.

Spec. sheets on file and available upon request.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with two (2) five-quart cans and two (2) one-quart cans. Water and lead shot were used to simulate product and achieve test weight.

Style	5 Liter Round Metal Paint Type Can
Capacity	5 Liters
Spec. Gravity	1.6
Closure	Friction Fit Lid
Qty	2
Net Wt.	8.328 kg each

Style	Quart Round Metal Paint Type Can
Capacity	0.946 Liters
Spec. Gravity	1.6
Closure	Friction Fit Lid
Qty	2
Net Wt.	1.7 kg each

Note The 5-liter cans tested are to be utilized as an intermediate package for items that do not meet the pressure testing requirements of 49 CFR 173.27(c) and must not exceed either the specific gravity or the net weight listed above.

Supplemental The outer package was lined with a 3mm thickness poly liner, taped closed. Each can was placed into a 3mm polybag closed with a hand-tied knot. Bubble wrap was used to fill void space, and cushion inner packages.

When shipping via aircraft, these cans must be sealed with a Ringlock Safety Seal.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with eleven (11) one-quart cans. Water and lead shot were used to simulate product and achieve test weight.

Style	Quart Round Metal Paint Type Can
Capacity	0.946 Liters
Spec. Gravity	1.8
Closure	Friction Fit Lid
Qty	11
Net Wt.	2 kg each

Supplemental The outer package was lined with a 3mm thickness poly liner, taped closed. Each can was placed into a 3mm polybag closed with a hand-tied knot. Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with nine (9) one-liter round plastic bottles. Water and lead shot were used to simulate product and achieve test weight.

Style	1 Liter Round Plastic Bottle
Capacity	1 Liter
Spec. Gravity	1.8
Closure	Screw top lid with tape
Qty	9
Net Wt.	2 kg each

Supplemental The outer package was lined with a 3mm thickness poly liner, taped closed. Each can was placed into a 3mm polybag closed with a hand-tied knot. Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with two (2) one-gallon, plastic bleach type bottles. Water and lead shot were used to simulate product and achieve test weight.

Style	1 Gallon plastic bleach type bottle
Capacity	3.78 Liters
Spec. Gravity	1.7
Closure	Screw top lid with tape
Qty	2
Net Wt.	6.8 kg each

Supplemental The outer package was lined with a 3mm thickness poly liner, taped closed. Each can was placed into a 3mm polybag closed with a hand-tied knot. Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report.
The package was tested with one (1) steel box used to simulate battery.

Style	Steel box
Size	10" x 10" x 10"
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	1
Net Wt.	25 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with three (3) PBE units. Lead shot was used to achieve test weight.

Style	PBE unit
Size	9.5" x 8.5" x 4"
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	3
Net Wt.	5 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with twelve (12) plywood boxes filled with lead shot to simulate batteries.

Style	Battery
Size	10" x 3" x 2"
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	12
Net Wt.	1.9 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with one (1) plywood box filled with lead shot to simulate chemical/first aid kit.

Style	Chemical/First Aid kit
Size	11.5” x 11.5” x 6”
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	1
Net Wt.	3 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with twelve (12) mock chemical oxygen generators. Lead shot was used to achieve article weight.

Style	Oxygen Generators
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	12
Net Wt.	1.5 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with twenty (20) aerosol cans. Lead shot was used to achieve article weight.

Style	Aerosol Can
Size	9.5” L x 2.5” D
Capacity	N/A
Spec. Gravity	N/A
Closure	N/A
Qty	20
Net Wt.	.4 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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Appendix B – Inner Package Detail (continued)

The package tested is a combination package with outer packages as listed in this report. The package was tested with five (5) half-gallon plastic bottles. Lead shot was used to achieve article weight.

Style	Half (1/2) Gallon Plastic Bottle
Capacity	Half (1/2) Gallon
Spec. Gravity	N/A
Closure	Screw Top with tape
Qty	5
Net Wt.	2.7 kg each

Supplemental Bubble wrap was used to fill void space, and cushion inner packages.

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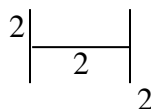
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Appendix C – Packing/Closure Instructions

1. Inspect container, and all components for damage. If container is found to be free from damage proceed to step 2. If container is damaged; procure a different container and inspect.
2. Fold bottom flaps of container to meet in the center. Box flaps must be sealed with 3” minimum width, 1.9 mm thickness, synthetic rubber/ hot melt adhesive tape (Shurtape HP200 or equivalent). Place 2 strips of the tape across each seam (6 total) in an “H” fashion. Tape must be extended down vertical sides of box a minimum of 2” on each end.



3. If a polyliner is required, place a polyliner which conforms to this report into the box with the top open for filling.
4. If a polybag is required, place each inner package into a polybag (for inner packaging containing liquid) which conforms to this report and close each bag with a hand-tied knot.
5. Place adequate absorbent/cushioning material into the polyliner (if required) within the container.
6. Place inner packages into container, spacing all inner packages as evenly as possible from one another, and oriented upright.
7. Fill all void space with absorbent/cushioning material.
8. If a polyliner is required, close polyliner and seal with tape. Wrap liner 3-4 times to insure a proper closure. Alternatively, a zip tie may be used to seal polyliner.
9. Fold top flaps to center of container and double tape seam as specified in step 2.
10. Ensure gross package weight does not exceed that marked on the package and in this report.

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UNITED NATIONS PERFORMANCE ORIENTED PACKAGING TEST RESULTS

Testing Photos

Bottom Drop	Top Drop
	
End Drop	Wall Drop
	
Corner Drop	
	

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Testing Photos

Stack Test



Vibration Test



Stacking Height = **SH**

Height of Package = **PH**

Number of Packages = ***n***

Max. Gross weight of package = **MGW** (kg)

Stacking Load = $[(SH/PH) = n - 1] \times MGW$

234 kg = $[(120/12'') = 10 - 1] \times 26\text{kg}$