

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-301E-25
Requested by: Viking Packing Specialist
Performed by: Viking Packing Specialist
Manufactured by: Viking Packing Specialist
Date: 5/19/2025
Retest Date: 5/18/2027

1. Product Tested:

Packaging Nomenclature: Combination Packaging
Outer Package: 4H2 (Solid Plastic Box)
Dimensions: 14.375" x 14.375" x 42.125" (I.D)
13.375" x 13.375" x 41.125" (Cavity)
Inner Package: See appendix B for approved inners.
Maximum gross wt. (kg): 60 kg
Viking Part No.: VPS-301E

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	420 kg	PASS
Vibration	49 CFR 178.608	1 Hour	PASS
Thermal Resistance	49 CFR 178 App D	400° F	PASS
Flame Penetration	49 CFR 178 App E	1700° F	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

1. DROP TEST- 49 CFR 178.603

Packages were conditioned to -20° C (-4° F) prior to testing. 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 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 420 kg, equivalent to a 3-meter-high stack of identical packages, continuously for 24 hours.

Containers	Actual Load	Result
#1	420 kg	PASS
#2	420 kg	PASS
#3	420 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. THERMAL RESISTANCE TEST – 49 CFR 178 APPENDIX D

When exposed to a temperature of 400° F for a period of not less than three hours, the outer surface of the cylinder may not exceed a temperature of 93 °C (199 °F) and the oxygen generator must not actuate.

Container	Temperature (Time)	Result
#1	400° F (3 HOURS)	PASS

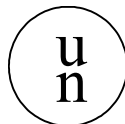
5. FLAME PENETRATION RESISTANCE TEST – 49 CFR 178 APPENDIX E

Three (3) specimens of the outer packaging materials must be tested and there must be no flame penetration of any specimen within 5 minutes after application of the flame source and the maximum allowable temperature at a point 4 inches above the test specimen, centered over the burner cone, must not exceed 205 °C (400 °F).

Specimen	No Flame Penetration	Result
#1	5 MINUTES	PASS
#2	5 MINUTES	PASS
#3	5 MINUTES	PASS

The temperature did not exceed 400°F.

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



4H2/X60/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 – Closure Instructions
- Appendix D – Testing Photographs

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Appendix A – Outer Package Detail

Designated Packaging Code:	4H2
Dimensions:	14.375" x 14.375" x 42.125" (I.D.) 13.375" x 13.375" x 41.125" (Cavity)
Marked max. gross wt. (kg):	60 kg
Maximum net wt. (kg)	25 kg
Closure:	Two (2): Large, guarded, twist latches. mfg. Penn Elcom

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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.

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

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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 1 (ONE) mock cylinder inner package.

Style	Compressed gas cylinder
Size	37.125" L x 9.375" D
Qty.	1
Net Wt.	25 kg

Supplemental A protective liner was placed within the container cavity to cushion inner packages, fill all void space, and insulate container to comply with thermal resistance requirements per 49 CFR, Part 178, Appendix D.

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Appendix C – Packing/Closure Instructions

1. Inspect container, and all components for damage. If the container is found to be free from damage proceed to step 2. If the container is damaged, procure a different container and inspect.
2. Release latches and remove top of shipping container.
3. Place cylinder into container liner. Close liner by rolling excess liner material down to top of liner insulation (3-4 rolls) and fasten using hook and loop closure.
3. Replace container top and engage twist latches.
4. Ensure gross package weight does not exceed that marked on the container.
5. Ensure that all legal requirements for shipment of this material have been met.

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Appendix D - Testing Photographs

Bottom Drop	Top Drop
	
Wall Drop	End Drop
	
Corner Drop	
	

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Appendix D - Testing Photographs (continued)

Stack Test	Vibration Test
	

Stacking Height = **SH**

Height of Package = **PH**

Number of Packages = ***n***

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

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

420 kg = $[(120/15.125) \approx 8 - 1] \times 60 \text{ kg}$