

**UNITED NATIONS / DOT
PERFORMANCE CERTIFICATION**



4G PERIODIC RETEST

4 x 14783 Fire Suppression Aerosol Generator Packaging

TEST REPORT #: 22-MN20457

 4G / Y8.9 / S / **
USA / +AA7415

**Insert the year packaging is manufactured

TESTING PERFORMED FOR:

FIREAWAY, INC.
5852 Baker Road
Minnetonka, MN 55345

ATTN: Patti Buse

TESTING PERFORMED BY:+

TEN-E PACKAGING SERVICES, INC.
1666 County Road 74
Newport, MN 55055
Phone: 651-459-0671
Fax: 651-459-1430

November 3, 2022

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SECTION I: CERTIFICATION

**Periodic Retest of the Fireaway, Inc.
 4 x 14783 Fire Suppression Aerosol Generator Packaging**

TEN-E Packaging Services, Inc. is a current DOT UN Third-Party Certification Agency under §107.403 and certifies that the Fireaway, Inc. packaging referenced above has passed the standards of the DEPARTMENT OF TRANSPORTATION'S TITLE 49 CFR; Performance Oriented Packaging Standards, Section 178. This package is also certified under IMDG, ICAO/IATA Regulations and the UN Recommendations on the Transport of Dangerous Goods. It is the responsibility of the end user to determine authorization for use under these regulations. The use of other packaging methods or components other than those documented in this report may render this certification invalid.

SUMMARY OF PERFORMANCE TESTS

UN / DOT TEST	49 CFR REFERENCE	TEST LEVEL	TEST CONTENTS	TEST COMPLETED	TEST RESULTS
Drop	178.603	1.2 m	Simulated Articles	November 3, 2022	PASS
Stacking	178.606	90.7 Kg – 24 Hours	Empty	October 28, 2022	PASS
Vibration	178.608	4.0 Hz – 1 Hour	Simulated Articles	October 28, 2022	PASS
Cobb	178.516	30 Minutes	---	September 28, 2022	PASS
TEST REPORT NUMBERS:			22-MN20457, 20-MN20508		
UN MARKING: (CFR 49 – 178.503)			 4G / Y8.9 / S / ** USA / +AA7415		
PACKAGING IDENTIFICATION CODE:			4G - Fiberboard Box (178.516)		
PERFORMANCE STANDARD:			Y (Packaging meets Packing Group II and III tests)		
AUTHORIZED GROSS MASS:			8.9 Kg (19.6 Lbs.)		
"S" DESIGNATION:			Denotes Inner Packagings		
YEAR OF MANUFACTURE:			** Insert year the packaging is manufactured		
STATE AUTHORIZING THE MARK:			USA		
PACKAGING CERTIFICATION AGENCY:			(+AA) TEN-E Packaging Services, Inc. (Newport, MN CAA #2006030022)		
THIRD PARTY PACKAGING IDENTIFICATION:			+AA7415		
PERIODIC RETEST DATE:			November 3, 2024		

ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE OR FIT FOR A PARTICULAR PURPOSE, ARE DISCLAIMED. In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by Fireaway, Inc. for services rendered. In the event of future changes to the above referenced test standards, it is the responsibility of Fireaway, Inc. to determine whether additional testing or updating of past testing is necessary to verify that the packaging we have tested remains in compliance with those standards.

MANUFACTURER:

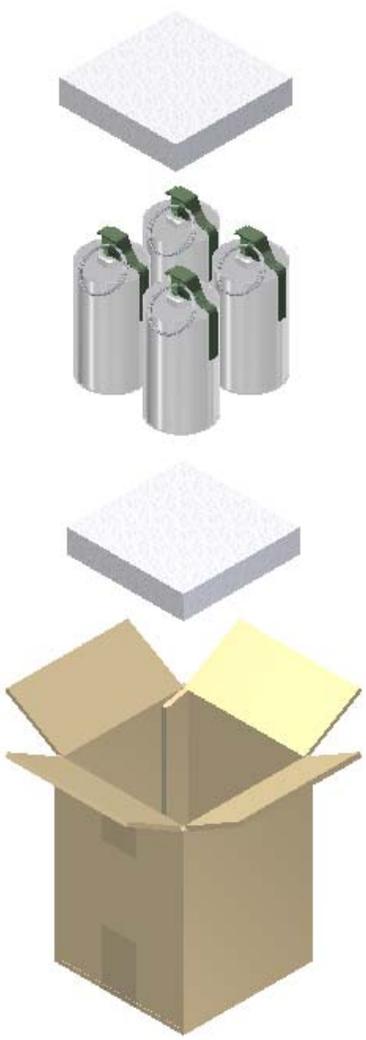
Fireaway, Inc.
 5852 Baker Road
 Minnetonka, MN 55345



Peter Stampfle
 Packaging Engineer
 TEN-E Packaging Services, Inc.
 1666 County Road 74
 Newport, MN 55055

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

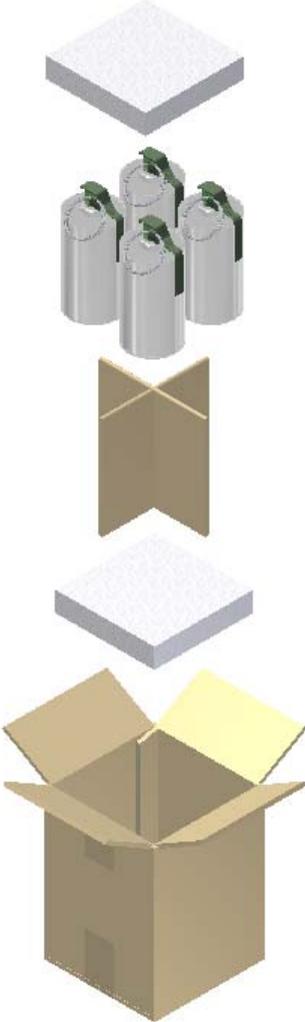
Variable #1: 4 x 14783 Fire Suppression Aerosol Generator Packaging without Partition

ASSEMBLY DRAWING	TEST LEVELS
	Certification Type: Periodic Retest
	Packaging Code Designation: 4G
	Packaging Group: II
	TEST SAMPLE PREPARATION (Refer to Section IV)
	Overall Packaging Tare Weight: 368 Grams (Less Inner Packagings)
	Gross Weight of Inner Packagings: 8,832 Grams
	Package Test Weight: 9.2 Kg 20.2 Lbs.
	Authorized Package Gross Mass: 9.2 Kg 20.2 Lbs.
	CLOSING METHODS – INNER PACKAGING
	As Prepared For Transport By Client
	CLOSING METHODS – SHIPPER
	Top Flaps:
	Manufacturer: 3M, St. Paul, MN
	Type: 3M #375 Pressure Sensitive Tape
Width: 48 mm (2")	
Overlap: 2" Minimum	
Tape Pattern: Center Seam	
Bottom Flaps:	
Manufacturer: 3M, St. Paul, MN	
Type: 3M #375 Pressure Sensitive Tape	
Width: 48 mm (2")	
Overlap: 2" Minimum	
Tape Pattern: Center Seam	
Refer to Appendix A for Manufacturer's Closure Instructions	

For Packagings with an Established Gross Mass:

If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use the newly established gross mass. In no event shall the gross mass marking on the packaging exceed the gross mass to which the packaging was tested.

Variable #2: 4 x 14783 Fire Suppression Aerosol Generator Packaging with Partition

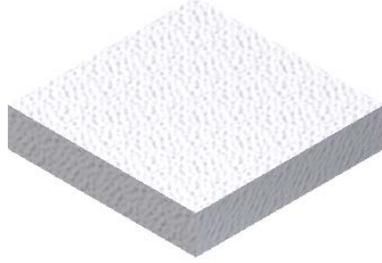
ASSEMBLY DRAWING	TEST LEVELS
	Certification Type: Periodic Retest
	Packaging Code Designation: 4G
	Packing Group: II
	TEST SAMPLE PREPARATION (Refer to Section IV)
	Overall Packaging Tare Weight: 398 Grams (Less Inner Packagings)
	Gross Weight of Inner Packagings: 8,832 Grams
	Package Test Weight: 9.2 Kg 20.2 Lbs.
	Authorized Package Gross Mass: 9.2 Kg 20.2 Lbs.
	CLOSING METHODS – INNER PACKAGING
	As Prepared For Transport By Client
	CLOSING METHODS – SHIPPER
	Top Flaps:
	Manufacturer: 3M, St. Paul, MN
	Type: 3M #375 Pressure Sensitive Tape
	Width: 48 mm (2")
Overlap: 2" Minimum	
Tape Pattern: Center Seam	
Bottom Flaps:	
Manufacturer: 3M, St. Paul, MN	
Type: 3M #375 Pressure Sensitive Tape	
Width: 48 mm (2")	
Overlap: 2" Minimum	
Tape Pattern: Center Seam	
Refer to Appendix A for Manufacturer's Closure Instructions	

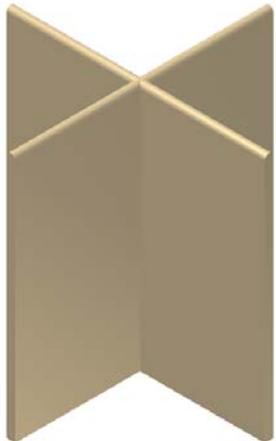
For Packagings with an Established Gross Mass:

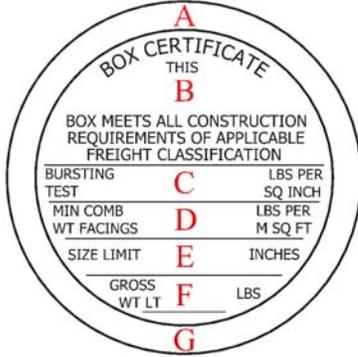
If the gross mass calculation in this report exceeds the previously established gross mass, the manufacturer may elect to maintain the current gross mass marking (e.g. the gross mass rating of the UN marking on the packaging may be less than the calculated gross mass indicated in this report) or use the newly established gross mass. In no event shall the gross mass marking on the packaging exceed the gross mass to which the packaging was tested.

COMPONENT INFORMATION

SIMULATED ARTICLE (Used in Both Variables)		DRAWING
Manufacturer: Fireaway, Inc., Minnetonka, MN		
Description:	Inert Fire Suppression Round Aerosol Generator with Top Bolt, Pin and Metal Ring	
Quantity:	4	
Material:	Aluminum	
Gross Weight:	2,216 Grams (each)	
Overall Dimensions:		
• Diameter	3.331"	
• Shoulder Height	5.668"	
• Overall Height	6.962"	
Markings (QC Audit):	INERT POP TEST	

FOAM PAD (14776) (Used in Both Variables)		DRAWING
Manufacturer: Stephen Gould Corporation, Savage, MN		
Description	Top and Bottom Foam Pads	
Quantity:	2	
Material:	White Expanded Polystyrene	
Tare Weight:	19 Grams (each)	
Overall Dimensions:		
• Length	6-7/8"	
• Width	6-3/4"	
• Thickness	1-7/16"	
Markings (QC Audit):	None	

PARTITION (PN 14775) (Used in Variable #2)		DRAWING
Manufacturer: Stephen Gould Corporation, Savage, MN		
Description:	4-Cell Slotted Partition	
Quantity:	1	
Material/Flute:	Single Wall Natural Kraft Corrugated Fiberboard, C-Flute	
Basis Weight Lbs./MSF (Outer to Inner)		
• Measured	35.4 / 23.5 / 34.9	
Board Caliper (Nominal):	0.1720"	
Tare Weight:		
• Assembled	31 Grams	
• Each Piece	16 Grams	
Overall Dimensions:		
• Assembled	6-7/8" x 6-7/8" x 7"	
• Each Piece	6-7/8" x 7"	
Markings (QC Audit):	None	

SHIPPER (14783)		
Manufacturer: Liberty Carton, Minneapolis, MN		
Description:	Regular Slotted Container	
Material/Flute (Outer to Inner):	350 Lb. Test Double Wall Natural Kraft Corrugated Fiberboard, B/C-Flute	
Basis Weight (Outer to Inner) Lbs./MSF:		
• Specification	42 / 23 / 42 / 23 / 42	
Tare Weight:	329 Grams	
DIMENSIONS		
	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	7"	7-3/8"
• Width	7"	7-3/8"
• Height	10"	11"
Board Caliper (Nominal):	0.2655"	
Manufacturer's Joint:	Inside Glued, 1-3/8" Lap	
Markings (QC Audit):	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;">  <p>4G / Y8.9 / S / 22 USA / +AA7415</p> </div> <div style="text-align: center;"> <p>Stat-X Aerosol Fire Suppression 10-22 14783 250/500</p> </div> </div>	
BOX CERTIFICATE		
(A) Corrugated Manufacturer:	Liberty Carton Co.	
(B) Structure:	Double Wall	
(C) Bursting Test	350 Lbs. Per Sq. Inch	
(D) Min comb Wt. Facings:	126 Lbs. Per M Sq. Ft	
(E) Size Limit:	105"	
(F) Gross Wt. Lt:	120 Lbs.	
(G) Location:	Minneapolis, MN	

SECTION III: TEST PROCEDURES AND RESULTS

DROP TESTS

Variable #1: Without Partition

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Simulated Articles	<ul style="list-style-type: none"> There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (§178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
DROP HEIGHT:	1.2 Meters (48") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #1: Flat on Bottom	Sample #2: Flat on Top	*Sample #3: Flat on Long Side
		
PASS: No leakage or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #4: Flat on Short Side	*Sample #5: Bottom Corner	**Sample #1: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Slight deformation at impact corner.	PASS: No leakage. Slight deformation at impact corner.

*Side and corner drops were conducted to impact the manufacturer's joint.

**Flat on bottom drop sample was also used for the top corner drop.

DROP TESTS

Variable #2: With Partition

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Simulated Articles	<ul style="list-style-type: none"> • There can be no damage to the outer packaging likely to adversely affect safety during transport. Inner receptacles, inner packagings or articles must remain completely within the outer packaging and there must be no leakage of the filling substance from the inner packaging. • Any discharge from a closure is slight and ceases immediately after impact with no further leakage. (\$178.603)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
DROP HEIGHT:	1.2 Meters (48") (Refer to Section IV)	
TEST EQUIPMENT:	L.A.B. Accu Drop 160	

DROP ORIENTATIONS AND TEST RESULTS

Sample #6: Flat on Bottom	Sample #7: Flat on Top	*Sample #8: Flat on Long Side
		
PASS: No leakage or damage.	PASS: No leakage or damage.	PASS: No leakage or damage.
*Sample #9: Flat on Short Side	*Sample #10: Bottom Corner	**Sample #6: Top Corner
		
PASS: No leakage or damage.	PASS: No leakage. Slight deformation at impact corner.	PASS: No leakage. Slight deformation at impact corner.

*Side and corner drops were conducted to impact the manufacturer's joint.

**Flat on bottom drop sample was also used for the top corner drop.

STACKING TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Empty	<ul style="list-style-type: none"> There can be no deterioration that could adversely affect transport safety or any distortion liable to reduce the package's strength, cause instability in stacks of packages, or cause damage to inner packagings that is likely to reduce safety in transport. (§178.606)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TEST LOAD APPLIED:	90.7 Kg (200.0 Lbs.) (Refer to Section IV)	
TEST DURATION:	24 Hours	
TEST EQUIPMENT:	Dead Load Weights	

STACKING TEST SET-UP & RESULTS



Sample #	Maximum Deflection After 24 Hours	Results
11	0"	PASS
12	0"	PASS
13	1/8"	PASS

Comments/Observations: Following the 24-hour stack test, there was no damage likely to affect the performance of the packaging.

Stacking Stability: Not conducted; required only for guided load tests.

VIBRATION TEST

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Simulated Articles	<ul style="list-style-type: none"> Immediately following the period of vibration, each package must be removed from the platform, turned on its side and observed for any evidence of leakage. A packaging passes the vibration test if there is no rupture or leakage from any of the packages. No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength. (\$178.608)
SAMPLE PREPARATION:	Refer to Section II	
CONDITIONING:	Ambient	
TABLE DISPLACEMENT:	1"	
TEST FREQUENCY:	4.0 Hz	
TEST DURATION:	1 Hour	
TEST EQUIPMENT:	Vertical motion using L.A.B. 10000 Transportation Simulator	

VIBRATION TEST SET-UP AND RESULTS

	Variable #1 Sample #	Variable #2 Sample #	Results	Comments/Observations
	11	14	PASS	No leakage or damage.
	12	15	PASS	
	13	16	PASS	

COBB WATER ABSORPTION TEST

TEST INFORMATION	TEST CRITERIA
NUMBER OF SAMPLES: 5 SAMPLE SIZE: 5" x 5" (Minimum) CONDITIONING: 73°F / 50% RH Chamber #215 WATER APPLIED: 100 mL / Sample TEST DURATION: 30 Minutes / Sample TEST EQUIPMENT: Precisa 100A-300M Analytical Balance Gurley Cobb Water Absorption Fixtures	<ul style="list-style-type: none"> An increase in mass greater than 155 g/m² over the 30 minute duration represents an unacceptable level of water resistance. (§178.516)

COBB WATER ABSORPTION TEST RESULTS

REPRESENTATIVE SET-UP PHOTO	Sample #	Water Absorbed
	1	114.2 g/m ²
	2	113.2 g/m ²
	3	172.2 g/m ²
	4	110.8 g/m ²
	5	107.0 g/m ²
	AVERAGE:	123.5 g/m²
	RESULT	PASS

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②	IMDG ^③	ICAO ^④	IATA ^⑤
	October 2021 Edition	22 nd Edition	2020 Edition	2021-2022 Edition	63 rd Edition
Drop:	178.603	6.1.5.3	6.1.5.3	6;4.3	6.3.3
Stacking:	178.606	6.1.5.6	6.1.5.6	6;4.6	6.3.6
Vibration:	178.608	---	---	4;1.1.1 & 4;1.1.4	5.0.2.7
Cobb:	178.516(b)(1)	6.1.4.12.1	6.1.4.12.1	6;3.1.11.1	6.2.12.2

① United States Department of Transportation Code of Federal Regulations (CFR) Title 49, Transportation, Parts 100-185

② The United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations (UN – Orange Book)

③ International Maritime Dangerous Goods Code (IMDG)

④ Technical Instructions for the Safe Transport of Dangerous Good by Air (ICAO)

⑤ International Air Transport Association (IATA) Dangerous Goods Regulations

INDUSTRY STANDARD REFERENCES

Drop:	ASTM ^⑥ D5276:	Standard Test Method for Drop Test of Loaded Containers by Free Fall
	ISO ^⑦ 2248:	Packaging – Complete, Filled Transport Packages – Vertical Impact Test by Dropping
Stacking:	ASTM ^⑥ D8409	Standard Guide for Conducting Stacking Tests on UN Packagings Using Guided or Unguided Loads
	ASTM ^⑥ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO ^⑦ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load
Vibration:	ASTM ^⑥ D999:	Standard Test Method for Vibration Testing of Shipping Containers
	ISO ^⑦ 2247:	Packaging – Complete, Filled Transport Packages – Vibration Test at Fixed Low Frequency
Cobb:	ISO ^⑦ 535:	Paper and Board – Determination of Water Absorption – Cobb Method

⑥ American Society for Testing and Materials (ASTM)

⑦ International Organization for Standardization (ISO)

EQUIPMENT

All inspection, measuring and test equipment that can affect product quality is calibrated and adjusted at prescribed intervals, or prior to use, and is traceable to NIST, using ANSI Z540 as an overall guide for calibration certification.

SECTION IV: MATHEMATICAL CALCULATIONS

Variable #1: 4 x 14783 Fire Suppression Aerosol Generator Packaging without Partition

INFORMATION USED FOR CALCULATIONS		
Overall Packaging Tare Weight(less inner articles/pkg) (PTW):	368.0	Grams
Gross Weight of (1) Inner Article/Packaging (GW):	2,208.0	Grams
Number of Inner Article/Packaging (# IP):	4	
Total Weight of Inner Articles/Packaging:	8,832.0	Grams
Additional Weight Added (AWA):	0.0	Grams
Overall Height of one Package (OH):	11.00	Inches
Stack Test-# of Samples Tested Simultaneously:	0	

AUTHORIZED PACKAGE GROSS MASS (GM) AND PACKAGE TEST WEIGHT						
Overall Pkg Tare Weight (less Inner Articles)(PTW) + Additional Weight Added (AWA) + (Gross Weight of (1) Inner Article (GW) x # of Inner Pkg (# IP))						
<u>(PTW)</u>	+	<u>AWA</u>	+	<u>(GW)</u>	x	<u># IP</u>
368.0	+	0.0	+	2,208.0	x	4
		9.2	Kg	20.2	Lbs.	

PACKING GROUP DROP HEIGHTS			
PG I	1.8 Meter	70.9 Inches	71.0 Inches
PG II	1.2 Meter	47.2 Inches	48.0 Inches
PG III	0.8 Meter	31.5 Inches	32.0 Inches

STACKING TEST MINIMUM LOAD CALCULATIONS					
Number of Packages in a 3m High Stack (118.2 / Overall Pkg Height (OH) -1)					
118.2 / Overall Height of one Pkg (OH) - 1					
<u>(118.2)</u>	/	<u>OH</u>	-1	=	<u># 3m HS</u>
118.2	/	11.00	-1	=	9.8
Stacking Test Load Calculation (Individual Package)					
Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)					
<u>GM</u>	x	<u># 3m HS</u>			
9.2	x	9.8			
		90.2	Kg	198.9	Lbs.

Variable #2: 4 x 14783 Fire Suppression Aerosol Generator Packaging with Partition

INFORMATION USED FOR CALCULATIONS		
Overall Packaging Tare Weight(less inner articles/pkg) (PTW):	398.0	Grams
Gross Weight of (1) Inner Article/Packaging (GW):	2,208.0	Grams
Number of Inner Article/Packaging (# IP):	4	
Total Weight of Inner Articles/Packaging:	8,832.0	Grams
Additional Weight Added (AWA):	0.0	Grams
Overall Height of one Package (OH):	11.00	Inches
Stack Test # of Samples Tested Simultaneously:	0	

AUTHORIZED PACKAGE GROSS MASS (GM) AND PACKAGE TEST WEIGHT						
Overall Pkg Tare Weight (less Inner Articles)(PTW) + Additional Weight Added (AWA) + (Gross Weight of (1) Inner Article (GW) x # of Inner Pkg (# IP))						
<u>(PTW)</u>	+	<u>AWA</u>	+	<u>(GW)</u>	x	<u># IP</u>
398.0	+	0.0	+	2,208.0	x	4
		9.2	Kg	20.2	Lbs.	

PACKING GROUP DROP HEIGHTS			
PG I	1.8 Meter	70.9 Inches	71.0 Inches
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STACKING TEST MINIMUM LOAD CALCULATIONS					
Number of Packages in a 3m High Stack (118.2 / Overall Pkg Height (OH) -1)					
118.2 / Overall Height of one Pkg (OH) - 1					
<u>(118.2)</u>	/	<u>OH</u>	-1	=	<u># 3m HS</u>
118.2	/	11.00	-1	=	9.8
Stacking Test Load Calculation (Individual Package)					
Authorized Pkg Gross Mass (APGM) x # of Pkg in a 3m High Stack (# 3m HS)					
<u>GM</u>	x	<u># 3m HS</u>			
9.2	x	9.8			
		90.2	Kg	198.9	Lbs.

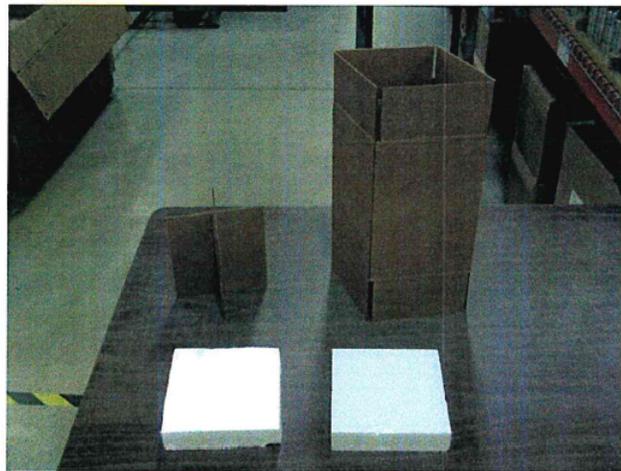
APPENDIX A: MANUFACTURER'S CLOSURE INSTRUCTIONS

Closure instructions for Fireaway Inc., First Responder 4 pack, PN 15001 for shipment.

1. Components.
 - a. 2" 3M 375 tape.
 - b. 1 PN 14783 box
 - c. 2 pcs 14776 Styrofoam insert
 - d. 2 pcs 14775 divider.
2. Seal lower flaps on box with (14783) 3M 375 tape. Note: Fold and seal flap as to not obscure POP markings on the box with tape.
3. Insert Styrofoam insert (PN 14776) into bottom of box.
4. Insert divider (PN 14775) into box.
5. Load product into box.
6. Insert 2nd Styrofoam insert on top of product.
7. Close top of box with 3M 375 tape. Note: Make sure ends of tape meet ends of tape from bottom taping.

Closure instructions for Fireaway Inc., First Responder 4 pack, PN 15001 for air shipment.

1. Components.
 - a. 2" 3M 375 tape.
 - b. 1 PN 14783 box
 - c. 2 pcs 14776 styrofoam insert
 - d. 2 pcs 14775 divider. Assemble as shown.

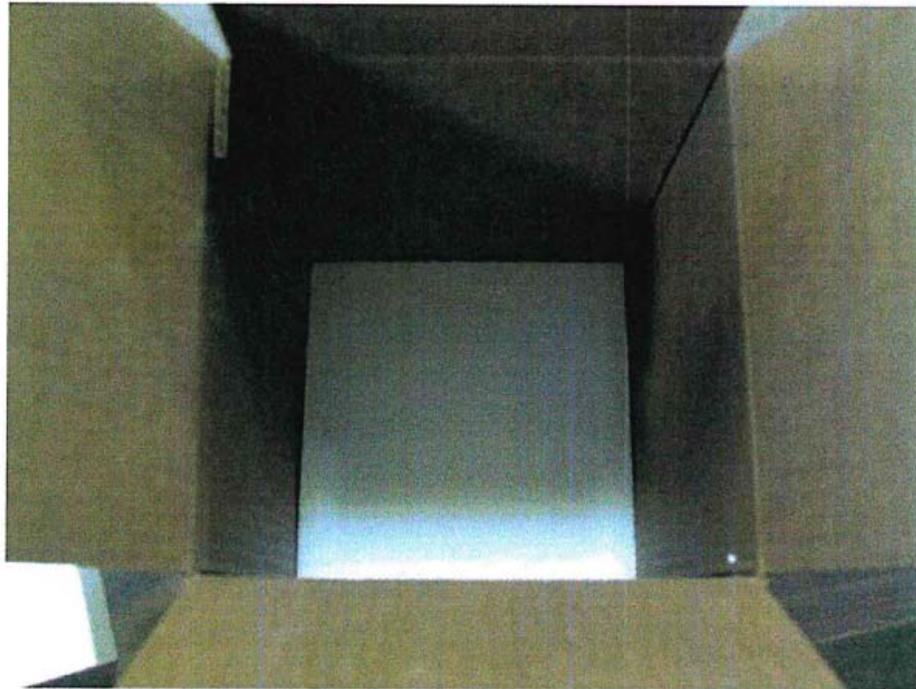


2. Seal lower flaps on box with 3M 375 tape.

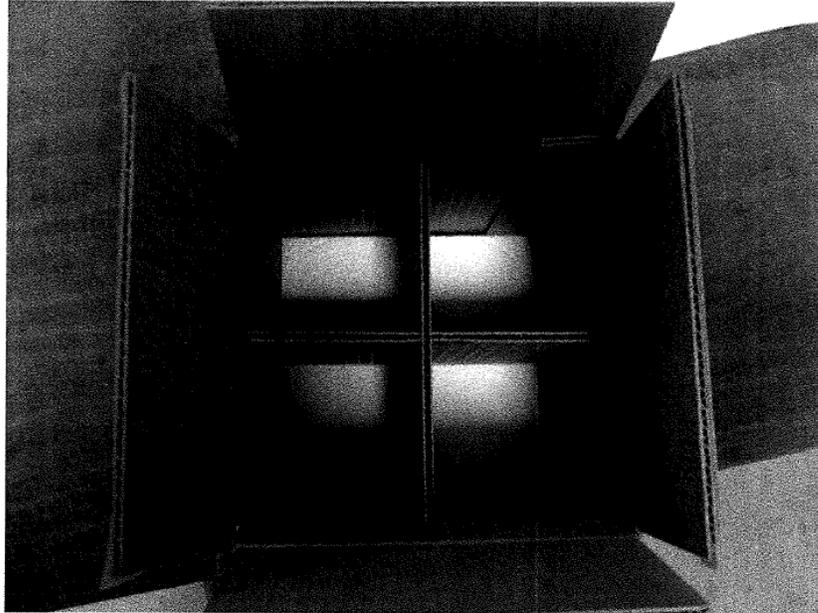




3. Insert Styrofoam insert (PN 14776) into bottom of box.



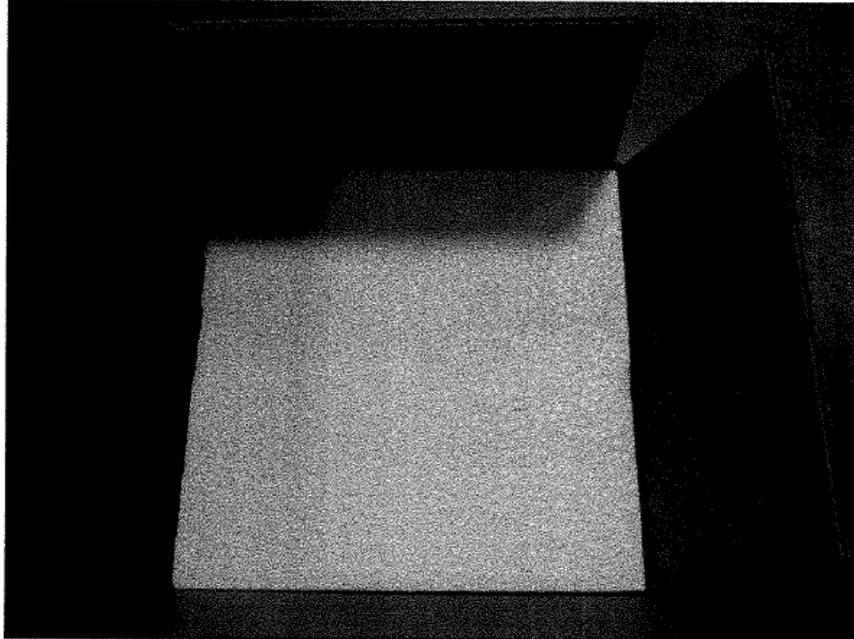
4. Insert divider (PN 14775) into box.



5. Load product into box.



6. Insert 2nd Styrofoam insert on top of product.



7. Close top of box with 3M 375 tape.

