

STACK TESTING



(3) Battery Box Configurations

TEST REPORT #: 22-MN10362

TESTING PERFORMED FOR:

LABELMASTER
5724 North Pulaski Road
Chicago, IL 60646

ATTN: Bill Barger

TESTING PERFORMED BY:

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OBJECTIVE

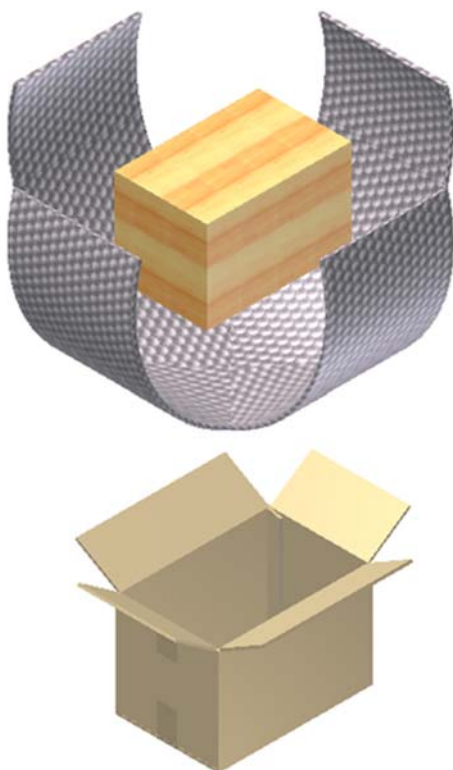
To conduct stack testing in accordance with Title 49 CFR §178.606 on the following configurations:

- Configuration #1: BX151010 Battery Shipper
- Configuration #2: BX956 Battery Shipper
- Configuration #3: Battery BX999 Battery Shipper

SECTIONS II & V: PACKAGING DESCRIPTIONS / COMPONENT DRAWINGS

Configuration #1: BX151010 Battery Shipper

ASSEMBLY DRAWING



TEST SAMPLE PREPARATION (Refer to Section IV)

Overall Packaging Tare Weight: (Less Inner Articles)	668 Grams
Gross Weight of Inner Articles:	35,000 Grams
Package Test Weight:	35.6 Kg 78.4 Lbs.
Authorized Package Gross Mass:	35.6 Kg 78.4 Lbs.

CLOSING METHODS – SHIPPER

Top Flaps:

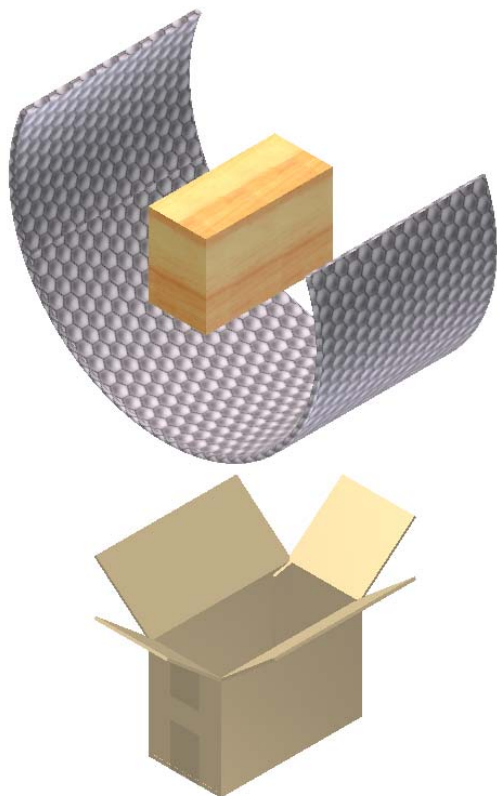
Manufacturer:	3M, St. Paul, MN
Type:	3M #375 Pressure Sensitive Tape
Width:	48 mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam

Bottom Flaps:

Manufacturer:	3M, St. Paul, MN
Type:	3M #375 Pressure Sensitive Tape
Width:	48 mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam

Configuration #2: BX956 Battery Shipper

ASSEMBLY DRAWING



TEST SAMPLE PREPARATION
(Refer to Section IV)

Overall Packaging Tare Weight: (Less Inner Articles)	232 Grams
Gross Weight of Inner Articles:	8,500 Grams
Package Test Weight:	8.7 Kg 19.1 Lbs.
Authorized Package Gross Mass:	8.7 Kg 19.1 Lbs.

CLOSING METHODS – SHIPPER

Top Flaps:

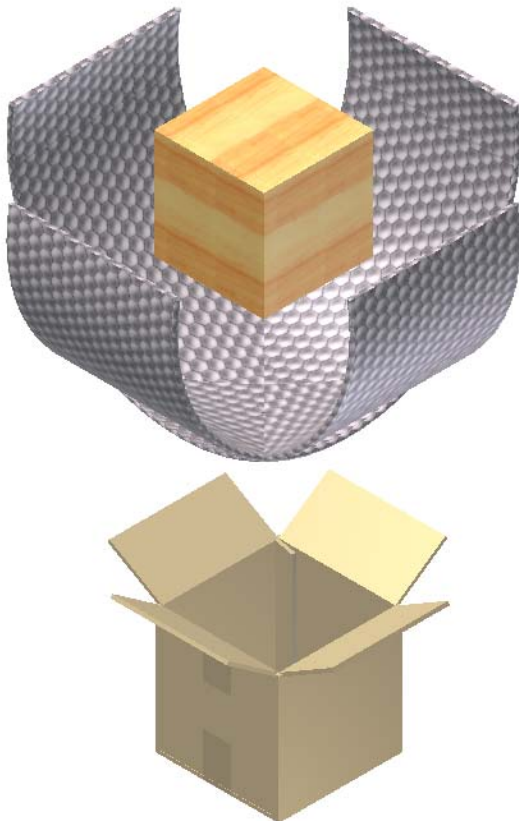
Manufacturer:	3M, St. Paul, MN
Type:	3M #375 Pressure Sensitive Tape
Width:	48 mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam

Bottom Flaps:

Manufacturer:	3M, St. Paul, MN
Type:	3M #375 Pressure Sensitive Tape
Width:	48 mm (2")
Overlap:	2" Minimum
Tape Pattern:	Center Seam

Configuration #3: Battery BX999 Battery Shipper

ASSEMBLY DRAWING



TEST SAMPLE PREPARATION
(Refer to Section IV)

Overall Packaging Tare Weight: (Less Inner Articles)	456 Grams
Gross Weight of Inner Articles:	28,200 Grams
Package Test Weight:	28.6 Kg 63.0 Lbs.
Authorized Package Gross Mass:	28.6 Kg 63.0 Lbs.

CLOSING METHODS – SHIPPER

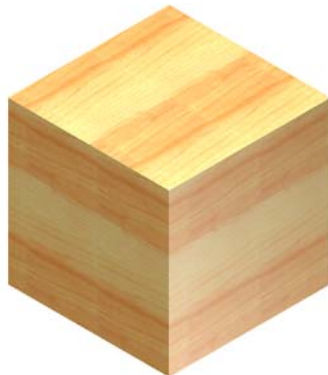
Top Flaps:


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

COMPONENT INFORMATION

SIMULATED ARTICLE		DRAWING
Description:	Wood Box filled with Lead Shot Simulating Inner Article	
Quantity:	(1) Per Variable	
Material:	Wood & Lead Shot Bags	
Gross Weights:		
• Variable #1	35.0 Kg	
• Variable #2	8.5 Kg	
• Variable #3	28.2 Kg	
Overall Dimensions:		
• Variable #1	14" x 9" x 9"	
• Variable #2	8-3/4" x 4" x 5-3/4"	
• Variable #3	8" x 8" x 8"	
Markings (QC Audit):	None	

BUBBLE WRAP (KWRAP5404)		DRAWING
Manufacturer: Associated Bag Company, Milwaukee, WI		
Description:	1" Diameter, 5/16" Bubble Size Bubble Wrap Sheets wrapped around Inner Article, enough to Wrap each Article once around.	
Material:	Low Density Polyethylene, Clear	
Tare Weights:		
• Variable #1	38 Grams (All Sheets)	
• Variable #2	10 Grams (All Sheets)	
• Variable #3	20 Grams (All Sheets)	
Overall Dimensions (Each Sheet):		
• Length	24"	
• Width	12"	
Markings (QC Audit):	None	

CONFIGURATION #1 SHIPPER (BX151010)

Manufacturer: Labelmaster, Chicago, IL	
Description:	Regular Slotted Container
Material/Flute (Outer to Inner):	275 Lb. Test Double Wall Natural, Kraft, Corrugated Fiberboard, B/C-Flute
Basis Weight (Outer to Inner) Lbs./MSF:	
• Specification	42 / 26 / 26 / 26 / 42
Tare Weight:	621 Grams

DIMENSIONS

	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	15"	15-1/2"
• Width	10"	10-1/2"
• Height	10-1/2"	11-1/2"
Board Caliper (Nominal):	0.2480"	
Manufacturer's Joint:	1-1/2" Lap	
Markings (QC Audit):	CAUTION Lithium Batteries Inside	BX151010 2/19

BOX CERTIFICATE

(A) Corrugated Manufacturer:	Label Master	
(B) Structure:	Double Wall	
(C) Bursting Test	275 Lbs. Per Sq. Inch	
(D) Min comb Wt. Facings:	110 Lbs. Per M Sq. Ft	
(E) Size Limit:	95"	
(F) Gross Wt. Lt:	100 Lbs.	
(G) Location:	1-800-621-5808	

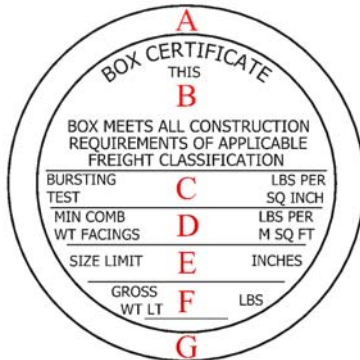
CONFIGURATION #2 SHIPPER (BX956)

Manufacturer: Labelmaster, Chicago, IL	
Description:	Full Overlap Container
Material/Flute (Outer to Inner):	275 Lb. Test Double Wall Natural Kraft, Corrugated Fiberboard, B/C-Flute
Basis Weight (Outer to Inner) Lbs./MSF:	
• Specification	42 / 26 / 26 / 26 / 42
Tare Weight:	217 Grams

DIMENSIONS

	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	9-3/4"	10"
• Width	5"	5-1/2"
• Height	6-3/4"	7-7/8"
Board Caliper (Nominal):	0.2565"	
Manufacturer's Joint:	1-1/4" Lap	
Markings (QC Audit):	None	

CONFIGURATION #3 SHIPPER (BX999)

Manufacturer: Labelmaster, Chicago, IL		
Description:	Regular Slotted Container	
Material/Flute (Outer to Inner):	275 Lb. Test Double Wall Natural Kraft, Corrugated Fiberboard, B/C-Flute	
Basis Weight (Outer to Inner) Lbs./MSF:		
• Specification	42 / 26 / 26 / 26 / 42	
Tare Weight:	426 Grams	
DIMENSIONS		
	Specification Dimensions (Inside)	Measured Dimensions (Outside)
• Length	9"	9-1/2"
• Width	9"	9-1/2"
• Height	9"	10-1/4"
Board Caliper (Nominal):	0.2480"	
Manufacturer's Joint:	1-5/8" Lap	
Markings (QC Audit):	BX999 02/16/22	
BOX CERTIFICATE		
(A) Corrugated Manufacturer:	Label Master	
(B) Structure:	Double Wall	
(C) Bursting Test	275 Lbs. Per Sq. Inch	
(D) Min comb Wt. Facings:	110 Lbs. Per M Sq. Ft	
(E) Size Limit:	95"	
(F) Gross Wt. Lt:	100 Lbs.	
(G) Location:	1-800-621-5808	

SECTION III: TEST PROCEDURES AND RESULTS

STACKING TEST

CONFIGURATION #1

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:	73°F / 50% RH Chamber #215	
TEST LOAD APPLIED:	317.1 Kg (700.0 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
1	0"	PASS
2	0"	PASS
3	0"	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.

STACKING TEST

CONFIGURATION #2

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:	73°F / 50% RH Chamber #215	
TEST LOAD APPLIED:	136.1 Kg (300.0 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
1	0"	PASS
2	0"	PASS
3	1/4"	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.

STACKING TEST

CONFIGURATION #3

TEST INFORMATION		TEST CRITERIA
TEST CONTENTS:	Simulated Article	<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:	73°F / 50% RH Chamber #215	
TEST LOAD APPLIED:	317.1 Kg (700.0 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
1	0"	PASS
2	1/4"	PASS
3	0"	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.

REGULATORY AND INDUSTRY STANDARD REFERENCES

REGULATORY REFERENCES

TEST	49 CFR ^①	UN ^②
	October 2021 Edition	22 nd Edition
Stacking:	178.606	6.1.5.6

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)

INDUSTRY STANDARD REFERENCES

Stacking:	ASTM ^③ D8409	Standard Guide for Conducting Stacking Tests on UN Packagings Using Guided or Unguided Loads
	ASTM ^③ D4577:	Standard Test Method for Compression Resistance of a Container Under Constant Load
	ISO ^④ 2234:	Packaging – Complete, Filled Transport Packages – Stacking Test using Static Load

③ American Society for Testing and Materials (ASTM)

④ International Organization for Standardization (ISO)

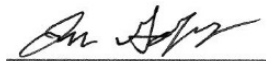
EQUIPMENT

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.

DISCLAIMER OF WARRANTIES

TEN-E PACKAGING SERVICES, INC. certifies that the previously described testing services have been performed in accordance with standard good laboratory practices and under the guidelines of Title 49 CFR § 178.606. The results included within this test report relate only to the items tested. **ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY WARRANTY THAT THE PACKAGING TESTED IS MERCHANTABLE, FIT FOR A PARTICULAR PURPOSE OR IN COMPLIANCE WITH ANY FEDERAL OR STATE REGULATIONS, ARE DISCLAIMED.** In no event shall TEN-E Packaging Services, Inc. liability exceed the total amount paid by **LABELMASTER** for services rendered.

In the event of future changes to the above referenced test standard, it is the responsibility of **LABELMASTER** 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.



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