## Setting the Standard

## UNITED NATIONS <br> PERFORMANCE CERTIFICATION

4GV PERIODIC RETEST
Corrugated fibreboard box ( $\mathbf{4 2 5} \times 425 \times 390 \mathrm{~mm}$ )
containing $4 \times 2.5$ Litre Glass Bottle packed in
vermiculite within a plastics liner bag
PACKAGE ID: "Code 2 Medium, 4GV"
TEST REPORT: 17-16145


* Insert Year the packaging is Manufactured (last two digits)


## TESTING PERFORMED FOR:



Hazpak Trainaid cc
Unit 2, Mzimkhulu Drive, Tradezone, Dubetradeport,
King Shaka International Airport
PO Box 354, Umbogintwini, 4120

Attention: Mr. Bryan Fallis

## TESTING PERFORMED BY:

TEN-E Packaging Services, SA (Pty) Ltd
138 Edison Crescent, Hennopspark, Centurion
PO Box 11544
Wierdapark South, South Africa, 0057
Phone: (012) 6538897
Fax: (012) 6538308

TEN-E Packaging Services SA (Pty) Ltd
8 November 2017
138 Edison Crescent, Hennopspark, Centurion
P.O. Box 11544, Wierdapark South, 0057
phone: 012653 8897, cell 0833363365
e-mail: info@ten-e.co.za

Reg no. 1997/003087/07 Directors: R.J. TenEyck. I.E. Erlank

## TABLE OF CONTENTS

Objective ..... 3-4- Brief overview of the report content and reference to regulatory sourcesTest Sample Description / Quality Control Audit Results
$\qquad$5-7

- Specification for the tested package provided by the client
- Complete audit of the package compiled by TEN-E Packaging Services, SA (Pty) Ltd.
$\qquad$
Test Sample Preparation 8
Summary of sample preparation and conditioning
$\qquad$
Test Procedures and Results 9-12
- Results of UN testing performed on the specified package by TEN-E Packaging Services, SA (Pty) Ltd.
UN Package Certification $\qquad$ 13
- Summary of UN Certification for the specified package
Appendix I 14
Regulatory and Industry Standard References


## REPORT \& SAMPLE INFORMATION

DATE LAST SAMPLES RECEIVED:

TEST COMPLETED ON:

30 October 2017

6 November 2017

SAMPLES:

- The samples tested arrived in good condition at TEN-E Packaging Services, SA (Pty) Ltd.
- The following results are based solely on the product samples provided by the manufacturer.

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL WITHOUT THE WRITTEN PERMISSION OF TEN-E PACKAGING SERVICES, SA (PTY) LTD.

## OBJECTIVE

To certify the Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass Bottle packed in vermiculite within a plastics liner bag to the Periodic Retest performance requirements outlined in Chapter 6 of the UN Recommendations on the Transport of Dangerous Goods; $19^{\text {th }}$ Revised Edition.

| PACKAGING CODE DESIGNATION | PACKING GROUP | $\begin{aligned} & \hline \hline \text { GROSS } \\ & \text { MASS } \\ & \hline \end{aligned}$ | INTERNAL PRESSURE |
| :---: | :---: | :---: | :---: |
| 4GV <br> Fibreboard Boxes | $\begin{gathered} \hline \text { I } \\ \text { High Danger } \\ \text { Hazardous Materials } \end{gathered}$ | Not Exceeding 34 kg | 95 kPa |

This package is also certified for shipment under the International Regulatory Codes referenced in Appendix I. However, it is the responsibility of the shipper (end user) to determined package authorization for use under these Dangerous Goods Regulations. Appendix I also references Industry Standard used in conducting this certification.

## OBJECTIVE

Note: This packaging was tested to the criteria outlined in paragraph 6.1.5.1.7 of the UN Recommendations on the Transport of Dangerous Goods; $19^{\text {th }}$ Revised Edition.
ñArticles or inner packaging $\hat{Q}$ of any type for solids or liquids may be assembled and transported without testing in an outer packaging under the following conditions:ò
a) The outer packaging shall have been successfully tested in accordance with 6.1.5.3 with fragile (e.g. glass) inner packaging containing liquids using the packing group I drop height;
b) The total combined gross mass of inner packaging shall not exceed one half the gross mass of inner packaging $\hat{Q}$ used for the drop test in (a) above;
c) The thickness of cushioning material between inner packaging $\hat{\alpha}$ and between inner packaging $\hat{\alpha}$ and the outside of the packaging shall not be reduced below the corresponding thickness in the originally tested packaging; and if a single inner packaging was used in the original test, the thickness of cushioning between inner packaging $\hat{Q}$ shall not be less than thickness of cushioning between the outside of the packaging and the inner packaging in the original test. If either fewer or smaller inner packaginĝ̂ are used (as compared to the inner packagingố used in the drop test), sufficient additional cushioning material shall be used to take up void spaces;
d) The outer packaging shall have passed successfully the stacking test in 6.1.5.6 while empty. The total mass of identical packages shall be based on the combined mass of inner packaging $\hat{Q}$ used for the drop test in (a) above;
e) Inner packaging $\hat{Q}$ containing liquids shall be completely surrounded with a sufficient quantity of absorbent material to absorb the entire liquid contents of the inner packaging $\hat{\alpha}$;
f) If the outer packaging is intended to contain inner packaging $\hat{Q}$ for liquid and is not leak proof, or is intended to contain inner packaging $\hat{Q}$ for solids and is not sift proof, a means of containing and liquid or solid contents in the event of leakage shall be provided in the form of a leak proof liner, plastics bag or other equally efficient means of containment. For packagingê containing liquids, the absorbent material required in (e) above shall be placed inside the means of containing the liquid contents;
g) For air transport, packagingố shall comply with 4.1.1.4.1;
h) Packaging $\hat{\varrho}$ shall be marked in accordance with 6.1.3 as having been tested to packing group I performance for combination packaging $\hat{Q}$. The marked gross mass in kilograms shall be the sum of the mass of the outer packaging plus one half of the mass of the inner packaging(s) as used for the drop test referred to in (a) above. Such a packaging mark shall also contain a letter ñVò as described in 6.1.2.4.ò

## TEST SAMPLE DESCRIPTION / QUALITY CONTROL AUDIT RESULTS

Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass Bottle packed in vermiculite within a plastics liner bag

| OUTER PACKAGING (SHIPPER) |  |  |
| :--- | :--- | :--- |
| Style: | RSC DWB 4 Code 2 | 4 GV Corrugated fibreboard box |
|  | $4 \mathrm{GV}+4 \times 2.5$ litre glass bottle | FEFCO 0204 |
| Material Basis Mass or |  |  |
| Grammage |  | $254 \mathrm{~g} / \mathrm{m}^{2}$ Virgin |
| - Outer Facing: | $225 \mathrm{~g} / \mathrm{m}^{2}$ Nominal | $173 \mathrm{~g} / \mathrm{m}^{2}$ |
| - Fluting: | $160 \mathrm{~g} / \mathrm{m}^{2}$ Nominal | $278 \mathrm{~g} / \mathrm{m}^{2}$ Recycled |
| - Center Liner (DWB): | $225 \mathrm{~g} / \mathrm{m}^{2}$ Nominal | $175 \mathrm{~g} / \mathrm{m}^{2}$ |
| - Fluting: | $160 \mathrm{~g} / \mathrm{m}^{2}$ Nominal | $251 \mathrm{~g} / \mathrm{m}^{2}$ Virgin |
| - Inner Facing | $225 \mathrm{~g} / \mathrm{m}^{2}$ Nominal | $1189 \mathrm{~g} / \mathrm{m}^{2}$ |
| Combined grammage: | Not supplied | B/C-Flute |
| Flute Contour: | B/C Flute | $1,570 \mathrm{~kg}$ |
| Tare Mass: | Not supplied | $6,74 \mathrm{~mm}$ |
| Board Caliper: | Not supplied | $(\mathrm{O} . \mathrm{D}) 425 \times .425 \times 390 \mathrm{~mm}$ |
| Box/Shipper Dimensions: | (I.D.) $410 \times 410 \times 367 \mathrm{~mm}$ | $38 \mathrm{~mm} 8 \times$ Staples |
| Manufacturer's Joint: | Stapled |  |
| Sealing Mechanism: | 48 mm Reinforced Tape | 48 mm Reinforced Clear tape on edges |
| - Top: |  | and 3 strips on center |
| - Bottom: | 48 mm Reinforced Tape | 48 mm Reinforced Clear tape on edges |
| and 3 strips on center |  |  |
| Supplier / Markings: | Right Corrugated/UN Markings | Code 2 |



Note: The bottles were completely covered with vermiculite for testing.

## TEST SAMPLE DESCRIPTION / QUALITY CONTROL AUDIT RESULTS

Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass Bottle packed in vermiculite within a plastics liner bag

| CLIENT | SPECIFICATION INFORMATION | QC AUDIT RESULTS |
| :---: | :---: | :---: |
| INNER PACKGING - GLASS BOTTLE |  |  |
| Description: <br> Material/Grade/Pigment: <br> Tare Mass: <br> Capacity <br> - Overflow <br> (Brimful): <br> - 98\% of Overflow: <br> Overall Dimensions: <br> - Height: <br> - Diameter: <br> Supplier/Markings: | 2,5 Litre Glass bottle, 04144902 Glass/Amber 1380 g 2500 ml <br> Not supplied <br> 256 mm <br> 155 mm <br> Consol Glass | 2,5 Litre glass bottle Glass/Brown $1,405 \mathrm{~kg}$ <br> $2,753 \mathrm{~kg}$ <br> $2,697 \mathrm{~kg}$ <br> 255 mm <br> 154 mm <br> None |


| CLOSURE |  |  |
| :--- | :--- | :--- |
| Description: | Screw cap | Screw cap |
| Material/Grade/Pigment: | Plastics/Black | Plastics/Black |
| Tare Mass: | Not supplied | 13 g |
| Overall Dimensions: |  |  |
| $\bullet \quad$ Height: | Not supplied | $31,76 \mathrm{~mm}$ |
| $\bullet \quad$ Diameter: | Not supplied | $54,96 \mathrm{~mm}$ |
| Finish Dimensions: |  |  |
| $\bullet \quad$ T: | Not supplied | $37,63 \mathrm{~mm}$ |
| $\bullet \quad$ E: | Not supplied | $40,48 \mathrm{~mm}$ |
| Closure Tape: | N/A | N/A |
| Markings: | Not supplied | None |
| Liner: |  |  |
| $\bullet \quad$ Material: | N/A | N/A |
| $\bullet \quad$ Tare Mass: | N/A | N/A |
| $\bullet \quad$ Thickness: | N/A | N/A |
| Supplier/Markings: | Consol Glass | None |



## TEST SAMPLE DESCRIPTION / QUALITY CONTROL AUDIT RESULTS

Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass Bottle packed in vermiculite within a plastics liner bag

| CLIENT SPECIFICATION INFORMATION | QC AUDIT RESULTS |  |
| :--- | :--- | :--- |
| INTERMEDIATE PACKAGING - PLASTICS BAG |  |  |
| Description: | Plastics bag | Plastics liner bag |
| Quantity or number: | 2 | 1 |
| Material: | LDPE | Plastics/Natural |
| Tare Mass: | Not supplied | $0,200 \mathrm{~kg}$ |
| Overall Dimensions: |  |  |
| $\bullet \quad$ Length: | 800 mm | 1540 mm |
| $\bullet$ Width: | 500 mm | 955 mm |
| Nominal thickness: | 125 micron | 60 micron |
| Supplier/Markings: | Not supplied | None |



## SAMPLE PREPARATION

Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass Bottle packed in vermiculite within a plastics liner bag

| SAMPLE PREPARATION AND PACKAGE MASS INFORMATION |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: |
| OVERALL OUTER PACKAGE TARE MASS: |  |  | - 15 kg |  |
| AUTHORIZED PACKAGE GROSS MASS: |  |  | - 34 kg |  |
| INNER PACKAGING TEST MASS: |  |  | - 38 kg |  |
| INNER PACKAGING GROSS MASS ALLOWED Refer to page 4, paragraph 6.1.5.1.7 (b) |  |  | - 19 kg |  |
| OVERFLOW CAPACITY: |  |  | - $2,753 \mathrm{~kg}$ |  |
| FILL CAPACITY: <br> (98\% of Maximum Capacity) |  |  | - $2,697 \mathrm{~kg}$ |  |
| PACKAGE TEST MASS: |  |  | - $\quad 53 \mathrm{~kg}$ |  |
| INNER PACKAGING CLOSING/SEALING METHOD: |  |  | - Screw on cap, Hand tight |  |
| TEST | SAMPLE ID: | FIL | ING SUBSTANCE: | CONDITIONING: |
| Drop | 1,2,3,4,5 |  | Water/Lead shot | $23^{\circ} \mathrm{C}$ and 50\% RH |
| Stack | 6,7,8 |  | Empty | $23^{\circ} \mathrm{C}$ and 50\% RH |
| Pressure Differential | 1,2,3 |  | Water | Ambient |

## TEST PROCEDURES AND RESULTS - DROP TESTS

## SAMPLE PREPARATION/CONDITIONING:

- Refer to Sample Preparation Page


## DROP HEIGHT:

- 1.8 meters


## REGULATORY REFERENCES:

- Refer to Appendix I

DROP TEST EQUIPMENT:

- Hoist Drop Tester


## DROP HEIGHT CALCULATION:

- Packing Group I Materials


## INDUSTRY STANDARD REFERENCE:

- Refer to Appendix I




## CRITERIA FOR PASSING THE TEST

There can be no damage to the outer packaging likely to adversely affect safety during transport. Momentary leakage, which is slight and ceases immediately after impact with no further leakage is acceptable.
No rupture is permitted in packaging for goods of Class 1 which would permit the spillage of loose explosive substances or articles from the outer packaging.

[^0]
## TEST PROCEDURES AND RESULTS - STACK TESTS

## SAMPLE PREPARATION/CONDITIONING:

- Refer to Sample Preparation Page


## STACK TEST DURATION:

- 24 Hours


## REGULATORY REFERENCES:

- Refer to Appendix I


## STACK TEST EQUIPMENT:

- Pressure Test Apparatus


## TEST LOAD APPLIED:

- 355 kg

INDUSTRY STANDARD REFERENCE:

- Refer to Appendix I

| STACK TEST LOAD CALCULATION |  |
| :---: | :---: |
| - Height of one package: <br> - Number of packages in a 3 meter high stack (-1): <br> - Package gross test mass: | $\begin{aligned} & \hline 390 \mathrm{~mm} \\ & 6,692 \text { Packages } \\ & 53 \mathrm{~kg} \end{aligned}$ |
| \# of Packages in 3m High Stack (-1) x Package Gross Mass = Minimum Required Load Per Case $6,692 \times 53 \mathrm{~kg}=354,676 \mathrm{~kg}$ <br> Each sample tested individually using the unguided method <br> 355 kg Total Minimum Load Required |  |

STACK \& STABILITY TEST RESULTS

| 24-Hour Stack Test Setup |  |  |  | One-Hour Stack Stability Test Setup |
| :---: | :---: | :---: | :---: | :---: |
|  | Sample \# | Maximum Deflection After 24 Hours | Results | Not conducted Unguided method |
|  | 6 | 6 mm | Pass |  |
|  | 7 | 6 mm | Pass |  |
|  | 8 | 6 mm | Pass |  |

## CRITERIA FOR PASSING THE TEST

No test sample may leak from the inner packaging(s). There can be no deterioration that could adversely affect transport safety or any distortion liable to reduce the package $\hat{Q}$ strength or cause instability in stacks of packages. In guided load tests, stacking stability must be assessed after completion of the test; two filled packagings of the same type must be placed on the test sample. The stacked packages must maintain their position for 1 hour.

## ICAO - PRESSURE DIFFERENTIAL TESTS

## SAMPLE PREPARATION/CONDITIONING:

- Refer to Sample Preparation Page

TEST PRESSURE:

- 95 kPa


## PRESSURE TEST EQUIPMENT:

- Hydraulic Pressure Tester
- Hydraulic Pressure Gauge


## REGULATORY REFERENCES:

- Refer to Appendix I


## AREA OF PRESSURIZATION:

- Through closure

CLOSURE APPLICATION TORQUE:

- Hand tight


## TEST DURATION:

- 5 minutes


## INDUSTRY STANDARD REFERENCE:

- Refer to Appendix I

PRESSURE DIFFERENTIAL TEST SET-UP \& RESULTS

|  | Sample \# | Results | Comments / Observations |
| :---: | :---: | :---: | :---: |
|  | 1 | Pass | All three samples maintained the 95 kPa test pressure for 5 minutes without leakage. |
|  | 2 | Pass |  |
|  | 3 | Pass |  |

## CRITERIA FOR PASSING THE TEST

Packaging for which retention of liquid is a basic function must be able to withstand, without leakage, the prescribed test pressure.

## TEST PROCEDURES AND RESULTS - COBB WATER ABSORPTION TESTS

## SAMPLE SIZE:

(5) $130 \times 130 \mathrm{~mm}$ Outside Container Surfaces

WATER APPLIED:

- 100 ml / Sample


## TEST EQUIPMENT:

- Cobb Tester
- Sartoruis Scale A200S


## REGULATORY REFERENCES:

- Refer to Appendix I


## CONDITIONING:

- $23{ }^{\circ} \mathrm{C} \pm 2$ and $50 \%$ R.H. $\pm 5$


## TEST DURATION:

- 30 Minutes / Sample


## INDUSTRY STANDARD REFERENCE:

- Refer to Appendix I

| COBB WATER ABSORPTION TEST RESULTS |  |  |
| :---: | :---: | :---: |
| Sample \# | Water Absorbed $\left(\mathbf{g} / \mathbf{m}^{2}\right)$ | Results |
| 1 | 118,7 | Pass |
| 2 | 112,8 | Pass |
| 3 | 125,1 | Pass |
| 4 | 128,6 | Pass |
| 5 | 121,8 | Pass |



## CRITERIA FOR PASSING THE TEST

An increase in mass greater than $155 \mathrm{~g} / \mathrm{m}^{2}$ over the 30 minute duration represents an unacceptable level of water resistance.

## Setting the Standard

## UN PACKAGING CERTIFICATION PERIODIC RETEST

## PACKAGE DESCRIPTION: Corrugated fibreboard box ( $425 \times 425 \times 390 \mathrm{~mm}$ ) containing $4 \times 2.5$ Litre Glass

 Bottle packed in vermiculite within a plastics liner bagTEN-E PACKAGING SERVICES, SA (PTY) LTD certifies that the Hazpak Trainaid cc packaging referenced above has passed the Performance Oriented Packaging Standards outlined in the UN Recommendations on the Transport of Dangerous Goods. This package is also certified under IMDG, ICAO and IATA Regulations. 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 / TEST | $\begin{gathered} \hline \text { UN } \\ \text { REFERENCE } \end{gathered}$ | $\begin{gathered} \hline \text { TEST } \\ \text { LEVEL } \end{gathered}$ | $\begin{gathered} \hline \text { TEST } \\ \text { CONTENTS } \end{gathered}$ | $\begin{aligned} & \hline \text { TEST } \\ & \text { DATE } \end{aligned}$ | $\begin{gathered} \text { TEST } \\ \text { RESULTS } \end{gathered}$ |
| Drop | 6.1.5.3 | 1.8 m | Water/Lead shot | 6 November 2017 | PASS |
| Stack | 6.1.5.6 | 355 kg ï 24 Hrs. | Empty | 4 November 2017 | PASS |
| Pressure Differential | $\begin{gathered} \text { 3.1.1.6.1 } \\ \text { (ICAO) } \\ \hline \end{gathered}$ | 95 kPa ï 30 min . | Water | 2 November 2017 | PASS |
| Cobb | 6.1.4.12 | 30 minutes | --- | 2 November 2017 | PASS |
| TEST REPORT NUMBER: |  |  | 17-16145 |  |  |
| UN MARKING: |  |  | un $\quad \begin{aligned} & 4 \mathrm{GV} / \mathrm{X} 34 / \mathrm{S} / * \\ & \mathrm{ZA} /+\mathrm{AA} 4940\end{aligned}$ |  |  |
| PACKAGING IDENTIFICATION CODE: |  |  | 4GV - Fiberboard Box (paragraph 6.1.5.1.7) |  |  |
| PERMORMACE STANDARD: |  |  | Packaging meets Packing Group I, II and III tests |  |  |
| AUTHORIZED GROSS MASS: |  |  | 34 kg |  |  |
| "S" DESIGNATION: |  |  | Denotes Inner Packagings |  |  |
| YEAR OF MANUFACTURE: <br> (Apply to packaging manufactured while this certificate is valid) |  |  | *Insert Year the packaging is Manufactured <br> (last two digits) |  |  |
| COUNTRY AUTHORIZING ALLOCATION OF THE MARK: |  |  | South Africa (ZA) |  |  |
| THIRD PARTY PACKAGE IDENTIFICATION: |  |  | +AA4940 |  |  |
| PACKAGING CERTIFICATION AGENCY: |  |  | TEN-E Packaging Services, SA (Pty) Ltd |  |  |
| PERIODIC RETEST DATE: |  |  | 22 November 2018 |  |  |

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, SA (Pty) Ltd liability exceed the total amount paid by Hazpak Trainaid cc for services rendered. In the event of future changes to the above referenced test standard, it is the responsibility of Hazpak Trainaid cc 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.

## APPLICANT: Mr. Bryan Fallis <br> Hazpak Trainaid ce

Unit 2, Mzimkhulu Drive, Tradezone,
Dubetradeport, King Shaka International Airport
PO Box 354, Umbogintwini, 4120

TEN-E Packaging Services SA (Pły) Ltd
138 Edison Crescent, Hennopspark, Centurion
P.O. Box 11544, Wierdapark South, 0057

## Issie Erlank

## SANAS Approved Signatory

## Managing Director

TEN-E Packaging Services, SA (Pty) Ltd
138 Edison Crescent, Hennopspark, Centurion
PO Box 11544
Wierdapark South, South Africa, 0057

## APPENDIX I: REGULATORY AND INDUSTRY STANDARD REFERENCES

| REGULATORY REFERENCES |  |  |  |  |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
| TEST | $\begin{gathered} \text { UN }{ }^{2} \\ \mathbf{1 9}^{\text {th }} \\ \text { Edition } \end{gathered}$ | $\begin{gathered} \hline \text { IMDG(3) } \\ 2016 \\ \text { Edition } \end{gathered}$ | $\begin{gathered} \hline \text { ICAO }{ }^{4} \\ \text { 17-18 } \\ \text { Edition } \end{gathered}$ | $\begin{gathered} \hline \text { IATA(5) } \\ 58^{\text {th }} \\ \text { Edition } \end{gathered}$ | $\begin{gathered} \hline \text { SANS 10229-1 © } \\ 2010 \\ \text { Edition } \end{gathered}$ |
| Drop: | $\begin{gathered} \hline 6.1 .5 .3 \& \\ \text { 6.1.5.1.7(a) } \end{gathered}$ | $\begin{gathered} \hline 6.1 .5 .3 \& \\ \text { 6.1.5.1.7.1 } \\ \hline \end{gathered}$ | $\begin{gathered} 6 ; 4.3 \& \\ 6 ; 4.1 .7(\mathrm{a}) \\ \hline \end{gathered}$ | $\begin{array}{r} \hline 6.3 .3 \& \\ \text { 6.3.1.2.1 } \\ \hline \end{array}$ | 12.3.1 |
| Stacking: | $\begin{gathered} \text { 6.1.5.6 \& } \\ \text { 6.1.5.1.7(d) } \end{gathered}$ | $\begin{gathered} \hline 6.1 .5 .6 \& \\ \text { 6.1.5.1.7.4 } \end{gathered}$ | $\begin{gathered} 6 ; 4.6 \& \\ 6 ; 4.1 .7(\mathrm{~d}) \end{gathered}$ | $\begin{gathered} 6.3 .6 \& \\ \text { 6.3.1.2.4 } \end{gathered}$ | 12.3.5 |
| Pressure: | 4.1.1.4.1 | 4.1.1.4.1 | 4; 1.1.6 | 5.0.2.9 | --- |
| Vibration: | --- | --- | 4; 1.1.1 | 5.0.2.7 | --- |
| Cobb: | 6.1.4.12.1 | 6.1.4.12.1 | 6; 3.1.11.1 | 6.2.12.2 | --- |

(1) The United Nations Recommendations on the Transport of Dangerous Goods ð Model Regulations (UN ï Orange Book)
(2) International Maritime Dangerous Goods Code (IMDG)
(3) Technical Instructions for the Safe Transport of Dangerous Goods by Air (ICAO)
(4) International Air Transport Association (IATA) Dangerous Goods Regulations
(5) South African Bureau of Standards Code of Practice ï SANS 10229-1:2010

| INDUSTRY STANDARD REFERENCES |  |  |
| :---: | :---: | :---: |
| Drop: | ASTM D5276: | Standard Test Method for Drop Test of Loaded Containers by Free Fall |
|  | ISO(7) 2248: | Packaging ï Complete, Filled Transport Packages ï Vertical Impact Test By Dropping |
| Stacking: | ASTM® D4577: | Standard Test Method for Compression Resistance of a Container Under Constant Load |
|  | ISO(7) 2234: | Packaging ï Complete, Filled Transport Packages ï Stacking Tests using Static Load |
| Vibration: | ASTM® D999: | Standard Test Method for Vibration Testing of Shipping Containers |
|  | ISO(7) 2247: | Packaging ï Complete, Filled transport Packages ï Vibration Test at Fixed Low Frequency |
| Cobb: | ISO® 535: | Paper and Board - Determination of Water Absorption - Cobb Method |
| Test <br> Methods: | ISO® 16104: | Packaging ï Transport packaging for dangerous goods ï Test Method |

(6)American Society For Testing and Materials (ASTM)
(7) International Organization For Standardization (ISO)


[^0]:    *Sample used for Flat on Bottom Drop is also used for the Top Corner Drop

