

## DEPARTMENT OF TRANSPORTATION PERFORMANCE ORIENTED PACKAGING TESTING CERTIFICATION

**Performed by:**

Packaging Design & Testing LLC  
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(860) 653-8086

**Performed for:**

Flexipack SA  
Centro Vedeggio 2 Stabile 1  
6814 Lamone, Switzerland

**Contact:**

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Design Qualification Testing of a  
4G Fiberboard Box with  
a Plastic Bag

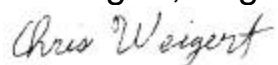
u 4G/Y12.3/S/\*\*  
n USA/+AV2241

\*\* is to be replaced by the  
year of manufacture

**This package is certified for shipment by air.**

**Certified by:**

Chris Weigert, Engineer



## **Section 1 – Package Description**

A plastic bag is filled with up to ten liters of product. This is put into the 4G fiberboard box. The 4G box is closed and tape sealed as per the box closure diagram (see Section 3).

### **Package Identification:**

#### 4G Fiberboard Box

<b>Manufacturer</b>	<b>Name</b>	StoraEnso Packaging AB
	<b>Address</b>	Jönköping, Sweden
<b>Material</b>	<b>Style</b>	4G Box, 0201
	<b>Type</b>	32 ECT
	<b>Wall/Flute</b>	SW, C
	<b>Tested Basis Weight</b>	37.6·27.4·38.0
	<b>Nominal Basis Weight</b>	186KL·140HC·186KL
	<b>Combined Weight</b>	114.4 lbs/Mft <sup>2</sup>
	<b>Caliper</b>	0.155"
<b>Manufacturer's Joint</b>	<b>Flap Size</b>	1"
	<b>Location</b>	Inside Glued
<b>External Dimensions</b>	<b>Length</b>	10.25"
	<b>Width</b>	8.5"
	<b>Height</b>	10"
<b>Internal Dimensions</b>	<b>Length</b>	9.94"
	<b>Width</b>	8.19"
	<b>Height</b>	9.38"
<b>Top Flap Inner Gap</b>		1.5"
<b>Top Flap Outer Overlap or Meet</b>		Meet
<b>Bottom Flap Inner Gap</b>		1.5"
<b>Bottom Flap Outer Overlap or Meet</b>		Meet
<b>Stacking Height</b>		10"
<b>Tare Weight</b>		240g

Plastic Bag

<b>Manufacturer</b>	<b>Name</b>	Flexipack SA
	<b>Address</b>	Lamone, Switzerland
<b>Material</b>	LLDPE and LLDPE/PA (Laminated)	
<b>Construction</b>	Gussetted and Sealed on all Sides	
<b>Style</b>	Quad Bag	
<b>Capacity</b>	10 Liters	
<b>Length</b>	18"	
<b>Width</b>	9.75"	
<b>Gusset Width</b>	4.25"	
<b>Inlet Diameter</b>	1.21"	
<b>Number of Plies</b>	1	
<b>Tare Weight</b>	69g	

Cap for Plastic Bag

<b>Manufacturer</b>	<b>Name</b>	Conro Precision Ltd
	<b>Address</b>	Eppindust, South Africa
<b>Material</b>	HDPE	
<b>Diameter</b>	1.625"	
<b>Tare Weight</b>	4g	

Closure Methods

<b>4G Fiberboard Box</b>	50mm Wide Clear Plastic Tesa Tape.
<b>Plastic Bag</b>	Cap Tightened with 12 in lbs of Torque

Additional Package Information

<b>Overall Tare Weight</b>	0.7 lbs
<b>Test Contents</b>	Water/Antifreeze
<b>Specific Gravity</b>	Up to 1.2
<b>Weight of Test Package</b>	22.8 lbs
<b>Max Gross Shippable Weight</b>	27.2 lbs

## **Section 2 – Testing**

### **Drop Test**

**Test Method:** 49CFR§178.603 – The packages were free fall dropped from the following height.

**Number of Samples Tested:** 5

**Drop Height:** 4 feet

Testing was conducted to certify the package for **PGII liquids** with a specific gravity of up to **1.2**.

#### **Conditioning:**

The packages were conditioned to -18°C as per 49CFR§178.602.

Test was conducted within 2 minutes of removing the packages from the conditioning chamber.

#### **Results:**

<b>Sample Number</b>	<b>Orientation</b>	<b>Result</b>
1	Top	Pass
2	Bottom	Pass
3	Side	Pass
4	Adjacent Side	Pass
5	Jointed Corner	Pass

#### **Pass/Fail Criteria:**

A package is considered to successfully pass the drop tests if for each sample tested: There is no damage to the outer packaging likely to adversely affect safety during transport, and there is 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.

## Hydrostatic Pressure Test

**Test Method:** 49CFR§178.605

**Pressure Applied:** 95 kPa

**Container #:** 1

**Container Type:** 10 Liter Plastic Bag

**Number of Samples Tested:** 3

**Length of Test:** 30 minutes

**Results:**

Sample #	Result
1	Pass
2	Pass
3	Pass

**Pass/Fail Criteria:**

A package passes the hydrostatic test if for each sample tested there is no leakage of liquid from the package.

## Stacking Test

**Test Method:** 49CFR§178.606 – Weight was applied using a wooden board as a load spreader.

**Number of Packages Tested:** 3

**Stack Weight:** 300 lbs

**Length of Test:** 24 hours

**Results:** Pass

**Pass/Fail Criteria:**

A package is considered to successfully pass the stacking test if for each sample tested: There is no leakage of the filling substance from the inner receptacle or inner packaging; No test sample shows any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

## Vibration Test

**Test Method:** 49CFR§178.608 – A rotary motion vibration table with one inch fixed displacement was used to perform this test.

**Number of Packages Tested:** 3

**Duration:** 1 hour

**Frequency:** 220 cpm

**Results:** Pass

### Pass/Fail Criteria:

A packaging passes the vibration test if for each sample tested 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.

## Cobb Test

**Test Method:** ISO 535 as required by 49CFR§178.516

**Number of Samples Tested:** 5

### Results:

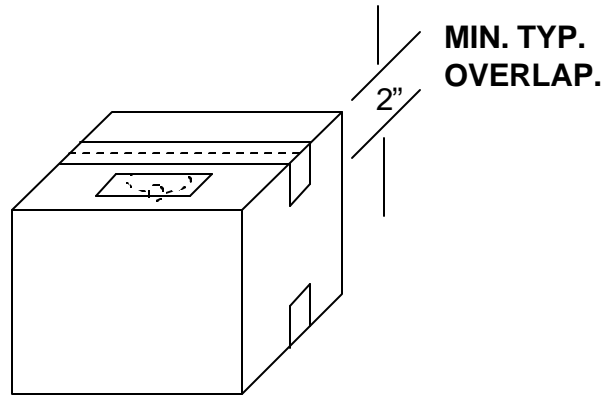
Sample #	Absorption (g/m <sup>2</sup> )	Result
1	119	Pass
2	121	Pass
3	117	Pass
4	118	Pass
5	123	Pass
Average	119.6	Pass

### Pass/Fail Criteria:

A packaging passes the cobb test if for each sample tested the water absorbed is less than 155 g/m<sup>2</sup>.

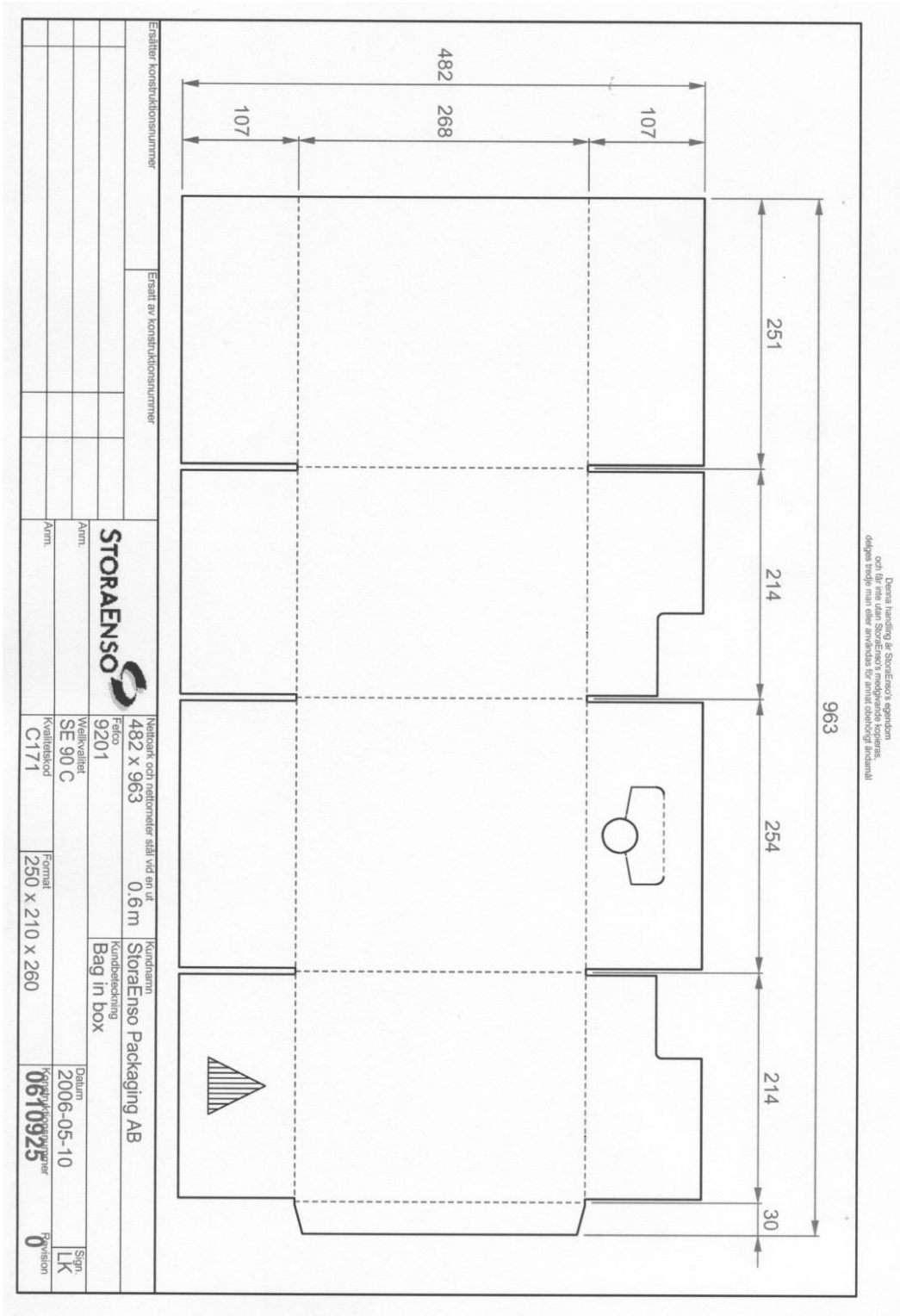
**Section 3 – Drawings & Images**

**BOX CLOSURE**



**50 MM CLEAR PLASTIC TESA TAPE.**

Drawing for 4G Fiberboard Box



## Section 4 – Calculations

### Package Weight & Fillable Limits

Tare Weight of 4G Fiberboard Box 240 g

Tare Weight of Plastic Bag with Cap 73 g

**Overall Tare Weight = 313 g \* 0.002205 lbs/g = 0.7 lbs**

Water Weight = Number of Liters \* 2.2045 lbs/L

Water Weight = 10 L \* 2.2045 lbs/L

**Water Weight = 22.1 lbs**

Specific Gravity Up to 1.2

Product Weight = Water Weight \* Specific Gravity

Product Weight = 22.1 lbs \* 1.2

**Product Weight = 26.5 lbs**

Test Weight = Overall Tare Weight + Water Weight

Test Weight = 0.7 lbs + 22.1 lbs

**Test Weight = 22.8 lbs**

Max Gross Shippable Weight = Overall Tare Weight + Product Weight

Max Gross Shippable Weight = 0.7 lbs + 26.5 lbs

**Max Gross Shippable Weight = 27.2 lbs**

### Drop Height

PGII Liquid with a Specific Gravity of up to 1.2

**Drop Height = 4 feet**

### Marked Weight

W = Max Gross Shippable Weight 27.2 lbs

Marked Weight = W \* 0.4536 kg/lb

Marked Weight = 27.2 lbs \* 0.4536 kg/lb

**Marked Weight = 12.3 kg**

### Stack Weight

W = Max Gross Shippable Weight 27.2 lbs

H = Stacking Height of one package 10 in

Stack Weight = ((120/H)-1)\*W

Stack Weight = ((120"/10")-1)\*27.2 lbs

Stack Weight = (12-1)\*27.2 lbs

Stack Weight = 11\*27.2 lbs

Stack Weight = 299.2 lbs

**Stack Weight used for testing = 300 lbs**

## **Section 5 – Responsibility Disclosure**

Usage of the marking of this certification mandates that it is to be used for the described package only. Validity of the certification is good only up to the recertification date. The certified party understands that use of the marking for any variations, without further testing by PDT, as allowed under 49CFR-178.601, will be at the complete responsibility of the shipper, eliminating Packaging Design & Testing LLC from any liability. Any changes of suppliers, or any part of the package as identified as the certified pack, will also render this certification invalid.