



<b>Title</b>	Carrying capacity test of carrier bags
<b>Test item</b>	Plastic carrier bag Biodolomer Pouch
<b>Customer</b>	GAIA BioMaterials AB
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<b>Order</b>	
<b>Project no.</b>	280452

Stockholm, 2017-03-16

Innventia AB

Packaging Solutions

Responsible for the test:

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## 1. General

### 1.1 Background/purpose

GAIA BioMaterials AB has contacted Innventia AB to carry out a verification test of a carrier bag. The test will be done in accordance with the standard for carrying case testing.

### 1.2 Goals

The goal of the test is to verify the carrying case's volume as well as its durability as described in the standard.

### 1.3 Time and place

The test was carried out on 2017-03-15 in Innventia's laboratories in Kista.

## 2 Test material

### 2.1 Product (measured values)

Variety:	Plastic carrying case
Type:	Hinged carrier bag
Dimensions:	320 x 200 x 587 mm
Thickness:	33 microns
	22 grams (average value of 5 weighed bags)
Weight: Other:	ICA Compostable biomaterial
Material	Biodolomer®

## 3 Test method

The testing method describes volume determination and determining the carrying capacity of carrier bags.

The method described is established by the "Bärkasse group" at Innventia AB and is based on the standard *SS-EN 13590 - Packaging, flexible carrier bags for the transport of various retail goods. General characteristics and test methods for the determination of volume and carrying capacity.*

### 3.1 Test climate

All tests have been performed at controlled temperature, 23°C and 50% RH.

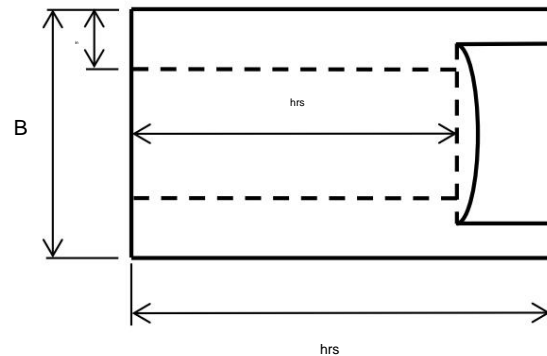
### 3.2 Determination of volume and weight

- The dimensions of the bag are measured according to the sketch below, after which the volume of the box is calculated according to the formula.

$$B (2 \times i) \times (h - i) = \text{Volume in liters}$$

Where:

B	=	Width of the bag
i	=	Bag's fold
h	=	Height of the bag to the handle



- 5 bags are measured in a similar way, after which the volume is determined
- The weight for which the crate is to be tested is calculated by multiplying the determined volume by a constant (0.56)
- The weight is given in kg and rounded to the nearest whole number

### 3.3 Determining the elongation of the handle for plastic carrier bags

- The length of the handle is measured by Hh.
- A tensile test is carried out by filling 1 bag with the calculated weight, after which it is suspended in the handle holder for 5 minutes.
- After this, the bag is emptied and the length of the handle is measured again.
- The elongation is stated as a percentage.

### 3.4 Determination of bearing capacity

#### 3.4.1 Testing for acceptance

- Bags for approval marking are tested at the measured average weight
- The bag is placed on a scale and filled with plastic cylinders to the measured average weight
- The bag is lifted from the scale by both handles and suspended in the handle holder of the testing machine
- The lifting bar with the filled bag is placed in its upper position and allowed to hang for a few seconds, after which the machine is started and the bag is lowered and lifted at a speed of 0.65 m/s until cassation damage occurs or 20 lifts are completed

### 3.5 Severity

- 20 bags are tested in a series to determine the carrying capacity
- Hole damage < 30 mm is approved
- Hole damage > 30 mm is not approved
- Approved carrying capacity (weight) is when 19 out of 20 cases pass the entire test

## 4 Test results

### 4.1 Volume

The volume was calculated as  $320(2 \times 100) \times (444 - 100) = 22.01$  liters

### 4.2 Weight

The test weight of the boxes was calculated as  $22.01 \times 0.56 = 12.32$  kg, which is rounded to the nearest whole number = 12 kg.

Cash register no	Test weight	Quantity lift	Injuries	Comments
1	12 kg	20		ua (without remark)
2		20		u.a
3		20		u.a
4		20		u.a
5		20		u.a
6		20		u.a
7		20		u.a
8		20		u.a
9		20		u.a
10		20		u.a
11		20		u.a
12		20		u.a
13		20		u.a
14		20		u.a
15		20		u.a
16		20		u.a
17		20		u.a
18		20		u.a
19		20		u.a
20		20		u.a

#### 4.3 Elongation of the handle

- The elongation of the handles was measured and calculated to 5%.

#### 4.4 Conclusion

- The volume of the bag was determined to be  $(22.01) = 22$  liters
- The weight that the bag must carry was set at 12 kg
- 20 out of 20 tested bags passed the tests without problems. No damage to any of the boxes.
- Since 19 out of 20 tested bags must be able to be tested without problems, it was determined that the tested bag passed the tests according to established standards.
- The bag may therefore be marked with load capacity 12 kg, year of approval 17, company code 32 and approval number 0452 according to the bearing capacity symbol below.

#### Sign for approved plastic carrier bag, symbol in kg

