



# **TECHNICAL SPECIFICATION AND MARKING MANUAL**

FOR METAL AND PLASTIC CONTAINERS IN THE SWEDISH DEPOSIT RETURN SYSTEM

## **APPENDIX 2**

VERSION 2023-02-01



**RETURPACK**  
pantamera

# TABLE OF CONTENTS

<b>1 INTRODUCTION</b> .....	<b>3</b>
<b>2 SHAPE</b> .....	<b>3</b>
<b>3 DIMENSIONS</b> .....	<b>3</b>
<b>4 MATERIAL THICKNESS</b> .....	<b>4</b>
<b>5 BARCODE MARKING</b> .....	<b>4</b>
5.1 Barcode format.....	5
5.2 Light margin.....	5
5.3 Barcode placement.....	6
5.4 Barcode colours.....	6
<b>6 DEPOSIT MARKING</b> .....	<b>6</b>
<b>7 RULES FOR DEPOSIT AND BARCODE MARKINGS</b> .....	<b>7</b>
7.1. Marking of export products.....	7
7.2 Exemptions for low-volume products sold in Sweden and Norway.....	7
<b>8 BARCODE LABELS</b> .....	<b>7</b>
<b>9 REGISTRATION</b> .....	<b>8</b>
9.1. Changes to shape, size, label, design or material .....	9
<b>10 MATERIAL REQUIREMENTS FOR METAL PACKAGES</b> .....	<b>9</b>
<b>11 MATERIAL REQUIREMENTS FOR PLASTIC PACKAGES</b> .....	<b>9</b>
11.1 Bottle material.....	10
11.1.1 Recycled PET.....	10
11.2 Colour .....	11
11.2.1 Limit values for clear and light blue bottles.....	11
11.3 Barrier.....	11
11.4 Label and sleeve .....	11
11.5 Printing ink.....	12
11.6 Adhesive.....	12
11.7 Cap and liner.....	12
11.2.1 Attached caps.....	13
<b>ACRONYMS</b> .....	<b>14</b>
<b>VERSION HISTORY</b> .....	<b>14</b>

# 1 INTRODUCTION

This document describes the necessary requirements for a package to be included in the return system. The requirements shall ensure that the package functions optimally throughout the recycling process, from collection through materials recovery to new product. The requirements also apply to voluntarily included products, such as dairy. For more information about which product types are included in Returpack's deposit system, please refer to Swedish ordinance 2022:1274, which regulates the return system for plastic bottles and metal cans, and [pantamera.nu](https://www.pantamera.nu).

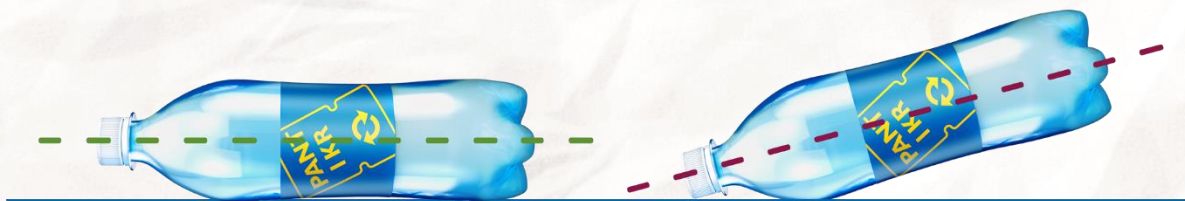
Returpack reserves the right to amend the stipulations of this document in accordance with Section 4.2 of the General Terms and Conditions of the Agreement.

## 2 PACKAGE SHAPE

The optimal package shape is cylindrical, symmetrical and stable (not top heavy). If a package deviates from this, Returpack and the RVM supplier need to further evaluate the package before approval can be provided.

### Test for top-heavy package

Place the package with the cap attached on a flat surface. If the upper part of the package tips and touches the surface, or it balances on the shoulder, there is a risk that the package cannot be approved. Contact Returpack for evaluation.



## 3 DIMENSIONS

The following package dimensions are permitted:

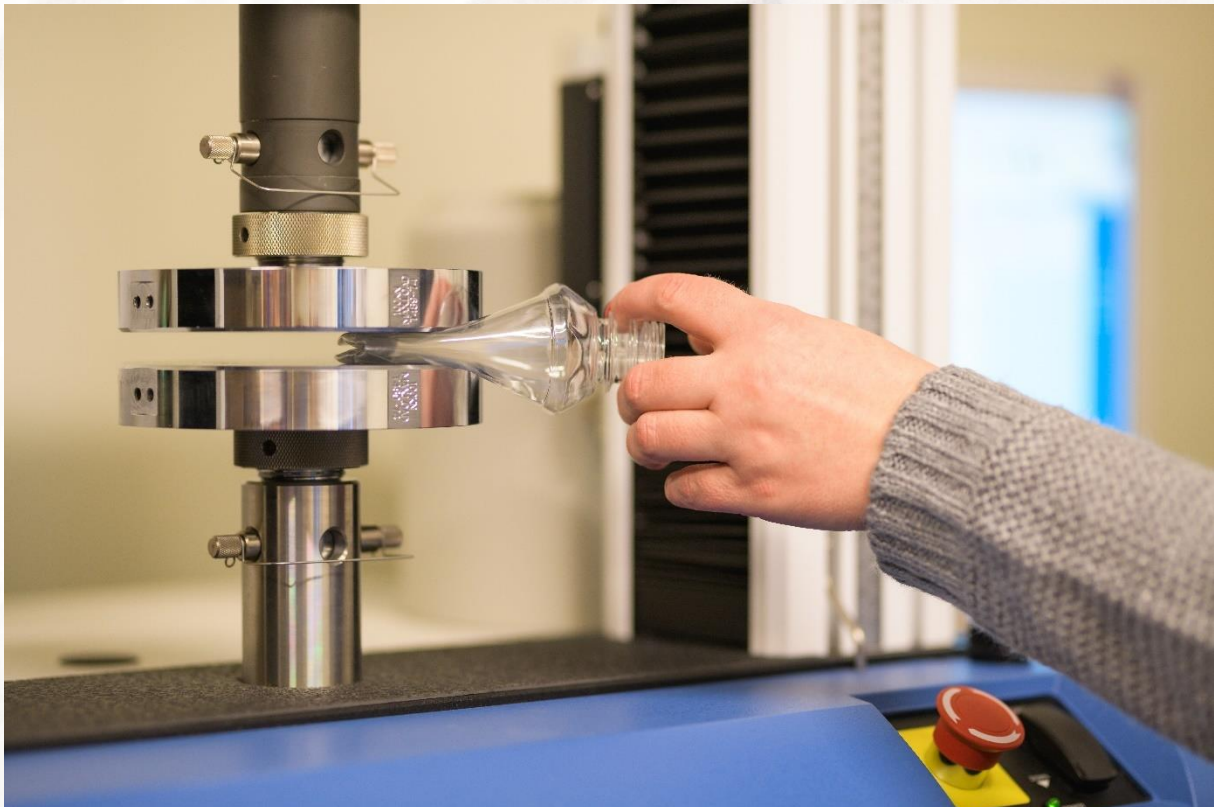
	<b>Min. measurement</b>	<b>Max. measurement</b>
<b>Outer diameter</b>	50 mm	120 mm
<b>Height</b>	85 mm	360 mm (including cap)



## 4 MATERIAL THICKNESS

The hardness of the package is an important parameter when approving a new package. This is most relevant for packages with a considerably larger material thickness and/or base compared to more traditional designs. Thicker packages can cause problems when being compressed in the reverse vending machine. There is a risk of hard parts fastening in the compactor, blocking the machine and causing parts of the compactor to fail.

The material thickness is evaluated in compression tests. The force required to compress the package to 15 mm is measured and shall not exceed 2 kN.



## 5 BARCODE MARKING

The package shall be marked with a barcode in compliance with the EAN-13, EAN-8, UPC-A or UPC-E standard (ISO 15420). According to the standard, the barcode must be of sufficient quality to achieve "Grade 1.5", as defined in ISO 15416, when read throughout the life of the package.

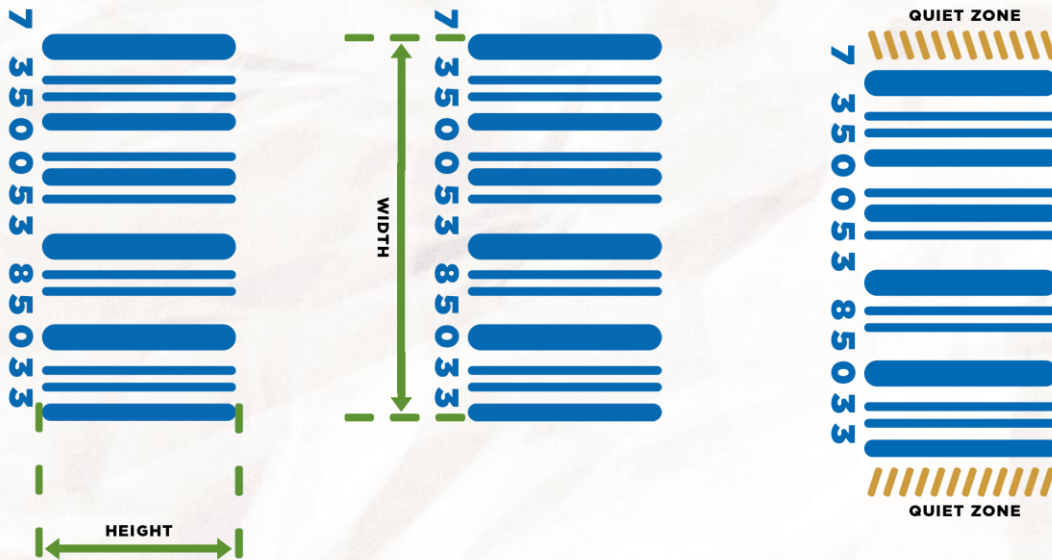
## 5.1 BARCODE FORMAT

The barcode shall have the following format. Returnpack's recommendation is to use recommended (Rec.) sizes only. The module width, also known as the X dimension, is the width of the narrowest line in the barcode.

Barcode	EAN-13		EAN-8		UPC-A	UPC-E
	Module width (mm)	Width x height (mm)	Module width (mm)	Width x height (mm)	Width x height (mm)	Width x height (mm)
<b>Min.</b>	0.264	29.8 x 18.3	0.264	21.4 x 14.6	29.8 x 20.7	21.4 x 17.0
<b>Rec.*</b>	0.330	37.3 x 22.9	0.330	26.7 x 18.2	37.3 x 25.9	26.7 x 21.3

## 5.2 LIGHT MARGIN

There shall always be a light margin (silent zone) on either side of the barcode. The light margin is an empty space which is required to prevent adjacent information, such as the package decoration, from interfering with the barcode being read. The light margin shall be 11 times larger than the barcode's module width.



## 5.3 PLACEMENT

The barcode shall be printed upright (vertically), that is, like a ladder in the direction of the height of the package. The barcode label shall be placed on the flattest part of the package surface possible to avoid deforming the barcode, which can make the barcode more difficult to read.

For cans, the barcode shall be placed vertically and at least 10 mm from the lower and upper edges of the package.

For bottles, the barcode shall be placed vertically on the bottle's main label and never on a smaller label around the bottleneck.

## 5.4 COLOURS

The barcode's readability is dependent on the contrast between the dark lines on a light-coloured background. Black lines on a white background provide the best contrast, although other colour combinations can work. Never use a transparent background for the barcode. The barcode's readability is checked when registering all new products.

For more information about possible colour combinations, please refer to [www.gs1.se](http://www.gs1.se).

# 6 DEPOSIT MARKING

A deposit marking, as illustrated here, shall be printed close to the barcode. The minimum permitted size is 10 x 15 mm. Black text on a white background is recommended. Other combinations may also be used if approved by Returpack beforehand. Only Returpack's original format may be used.

Deposit mark 1 SEK for all metal containers and plastic containers up to 1 litre.

Deposit mark 2 SEK for all plastic containers over 1 litre.





# 7 RULES FOR DEPOSIT AND BARCODE MARKINGS

All producers and importers are liable to Returpack for the barcodes which they include in the return system and for the deposits collected using those codes. Accordingly, it is important that the barcode used on the package is unique, to both the producer or importer and the return system. A product which has previously been sold without a deposit in Sweden shall be issued with a new barcode if the product is now to be sold with a deposit.

The producers and importers are directly responsible for procuring barcodes through GS1 Sweden.

Read more at [GS1.se](https://www.gs1.se).

## 7.1. MARKING OF EXPORT PRODUCTS

Duty-free and export items, which are only to be sold outside Sweden, shall not have a visible Swedish deposit mark and nor should they use a barcode which is included in Returpack's system.

The sale of all items with a Swedish deposit mark shall be reported to Returpack (and deposits, administration fees and any sorting fees paid) even if they are exported and sold outside Sweden.

## 7.2. EXEMPTIONS FOR LOW-VOLUME PRODUCTS SOLD IN SWEDEN AND NORWAY

For products with a sales volume of less than 600,000 items per calendar year, it is possible in exceptional cases to sell the products with both Swedish and Norwegian deposit markings and to report only sales made in the Swedish market to Returpack (and sales made in the Norwegian market to Infinitum). A producer who sells a product with dual deposit markings accepts responsibility for and is obliged to pay for all packages for which a deposit is collected in Sweden from Returpack, even if this exceeds the number of products sold in the Swedish market.

# 8 BARCODE LABELS

If it is not possible to alter the package's original label so that it meets Returpack's marking requirements, the marking requirements shall be met with an adhesive label. Adhesive labels are ordered from Returpack.

**Proprietary adhesive labels to meet the marking requirements are not permitted.**

## 9 REGISTRATION

The registration of a new product shall be submitted to Returpack for approval no later than six weeks before the planned launch. Products are registered in *My Pages* at [pantamera.nu](https://www.pantamera.nu). When registering plastic bottles, specifications describing the material compositions of the bottle material, the label, the adhesive and the cap shall be included. These specifications are usually available from the package manufacturer. All applications are handled confidentially.

Once a product has been registered, **three sample packages** are to be sent to:

**Returpack AB**  
**Attn: Product Registration**  
**Hanholmsvägen 67**  
**602 38 Norrköping**  
**Sweden**

The package is checked against the requirements set out in this document. The shape of the package and the quality and readability of the barcode are tested in a reverse vending machine as well as in ISO-certified control equipment. The material thickness is measured in compression tests. If further evaluation is required, the package is sent to automation suppliers or material recovery facilities in consultation with the RVM supplier.

Following approval, the barcode is registered in Returpack's product database. The reverse vending machines are updated at least once a week with new codes.





## **9.1. CHANGES TO SHAPE, SIZE, LABEL, DESIGN OR MATERIAL**

All changes to products already included in the return system must be approved by Returpack before they can be introduced. Significant changes to shape and size may entail a risk that the package can no longer be identified by the reverse vending machines. New sample packages and material specifications are to be submitted to Returpack for approval.

# **10 MATERIAL REQUIREMENTS FOR METAL PACKAGES**

Metal packages shall be made from aluminium or steel. Packages made from a combination of aluminium or steel and plastic are not permitted. The exception is metal packages with plastic labels and sleeves. Following an assessment, Returpack can allow an exception and approve small plastic details on a metal package. PVC is not permitted under any circumstances.

Packages with designs or materials which do not meet the material thickness requirements of Chapter 4 are not permitted. This can include, for example, hard bottles and packages comprised of three components of thicker material which are welded together.

Some gas cartridges risk damaging the compactors in the deposit machines. Packages with a small gas cartridge, a so-called widget, containing N<sub>2</sub>, CO<sub>2</sub> or a mixture of gases, shall be assessed by Returpack before they can be approved.

# **11 MATERIAL REQUIREMENTS FOR PLASTIC PACKAGES**

Plastic packages are sorted into three fractions: bottles in clear PET, coloured PET, and caps in HDPE/PP. The material fractions are sorted and separated using various techniques, including NIR spectroscopy and swim-sink separators. To enable high-quality materials recovery, well-separated fractions are a must, which in turn necessitates package design requirements.

Specifications of all materials used in the package shall always be submitted when registering a new product or changes to products already included in the return system.

The list on the next page describes which materials are approved for each fraction, and which materials are not permitted in any of the fractions. All materials in the package must be approved. If the product contains a material which is not permitted in that fraction, the product cannot be included in the return system.

If the product contains a material which is not listed, Returpack shall be contacted for an evaluation and approval. When introducing a package, which in its design, shape or material composition (for example, a non-cylindrical shape or increased share of recycled content) differs significantly from previously connected packages in the return system, a more comprehensive evaluation process is required to investigate any effects and consequences on collection and recycling. It is then important that Returpack is contacted

at an early stage in the development process. This applies also, to the introduction of bottle materials other than PET, such as bottles of HDPE, PP or bio-polymer. Returnpack handles all product matters with confidentiality.

All materials used in the package shall comply with the applicable food safety regulations and legal requirements.

<b>Fraction:</b>	<b>Clear PET</b>	<b>Coloured PET</b>	<b>Prohibited materials</b>
<b>Bottle material</b>	PET	PET	PLA, PVC, PS, PET-G, PEN, PEF
<b>Colour</b>	Uncoloured and transparent light blue, $L^* \geq 93$	All colours	Metallic colours, opaque bottles with addition of titanium dioxide (TiO <sub>2</sub> ) or carbon black.
<b>Barrier</b>	Not permitted	Permitted	EVOH, PVDC, PEN
<b>Label</b>	Paper, PP, PE, TPE (material with density <1 g/cm <sup>3</sup> )	Paper, PP, PE, TPE, PET	PVC, metal foil, OPS, PS, PLA
<b>Full-size label, sleeve</b>	PET, PP, PE (sorting fee applies)	PET, PP, PE	PVC, metal foil, OPS, PS, PLA
<b>Printing ink</b>	As per EuPIA Guideline	As per EuPIA Guideline	Water-soluble inks, substances on EuPIA Exclusion List.
<b>Adhesive</b>	Water/alkali soluble at 65°C and not reactivated	Water/alkali soluble at 65°C and not reactivated	
<b>Cap</b>	PE, PP, crown cap	PE, PP, PET, crown cap	Metal screw cap
<b>Liner</b>	PE, EVA, TPE	PE, EVA, TPE	PVC, silicone, metal

## 11.1 BOTTLE MATERIAL

### 11.1.1 RECYCLED PET

Recycled PET (rPET) shall meet the following conditions:

- EU Regulation 282/2008 on recycled plastic materials and articles intended to come into contact with foods shall be fulfilled
- The recycling process used to produce the material shall be recommended by EFSA (European Food Safety Authority)
- The plastic used in the process shall come from a collection system capable of ensuring the food safety of the collected packages

Confirmation that the above requirements are fulfilled shall be included when registering new bottles containing rPET.



## 11.2 COLOUR

Opaque bottles in black or white are difficult to sort. Dyes used to create opaque bottles containing titanium dioxide and carbon black are not permitted due to the discolouration caused by these substances.

### 11.2.1 LIMIT VALUES FOR CLEAR AND LIGHT BLUE BOTTLES

Limited colour values for clear and light blue bottles will be introduced from 1 January 2022 on existing and new products.

To measure the colour of the bottle, a transmittance measurement is performed in a spectrophotometer and the result is presented in the CIELAB colour space, expressed as three values;  $L^*$ ,  $a^*$  and  $b^*$ .

$L^*$  represent lightness from black/opaque at 0 to white/transparent at 100.  
 $a^*$  value describes green/red and  $b^*$  blue/yellow.

Bottles in the clear PET fraction (transparent and light blue) shall have a  $L^*$  value of at least 93 ( $L^* \geq 93$ ).

Bottles in the clear fraction should also not have an  $a^*$  value below -2 or a  $b^*$  value over 2 ( $a^* > -2$  and  $b^* < 2$ ).

Bottles with an  $a^*$  value between -2 to -0,7 will be classified as light blue.

## 11.3 BARRIER

Barriers are not permitted for use in clear PET bottles. Exceptions are made for a few barriers and UV blockers which have been approved by Retourpack following extensive testing. For information about these and barrier testing, please contact Retourpack.

Barriers can be permitted to a greater extent in packages in the coloured PET fraction. If the package contains a barrier, this must be presented in the material specification.

## 11.4 LABEL AND SLEEVE

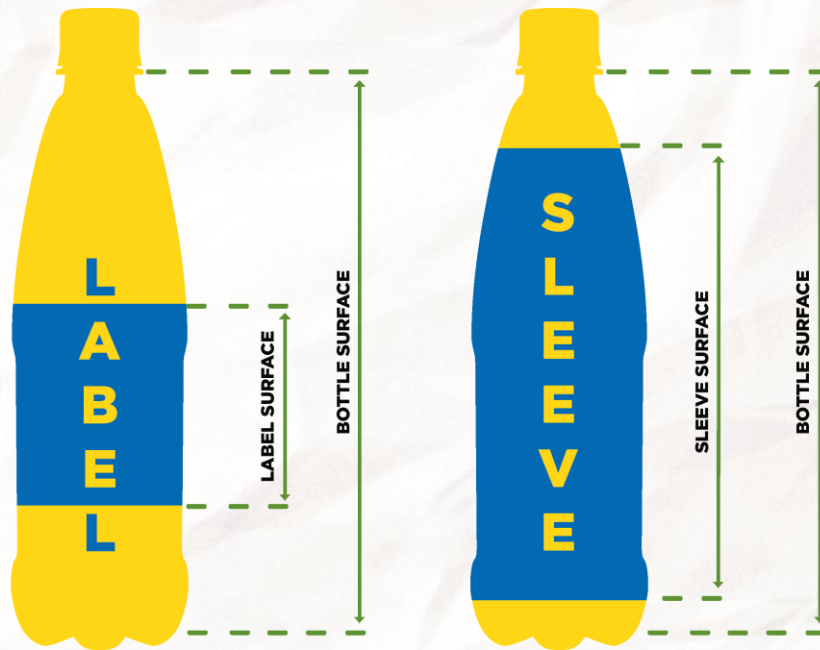
A full-size label, a so-called sleeve, shall cover at least 75% of the bottle surface and be coloured.

A label should cover a maximum of 40% of the package surface to function optimally in the recycling process.

The requirement for a full-size label is to ensure that a clear bottle with a barrier or a PET sleeve will be sorted as coloured and not discolour the clear PET fraction. If a full-size label is used on a clear PET, it is classed as coloured and a sorting fee applies.

The ratio between the surface areas of the label and the bottle is most easily calculated by dividing the height of the label by the height of the bottle, as illustrated below.





### **Label**

Label height / Bottle height  $\leq 0.40$  (40%)

### **Sleeve**

Label height / Bottle height  $\geq 0.75$  (75%)

## **11.5 PRINTING INK**

Printing inks used for the label shall not be water soluble as the ink may contaminate the material during the washing step in the recycling.

Substances included in EuPIA's *Exclusion policy for printing inks and related products* shall not be used in the printing ink. More information can be found at [eupia.org](http://eupia.org).

## **11.6 ADHESIVE**

The adhesive shall be washable or soluble in 65°C water containing an 1% alkali solution.

The adhesive shall not be reactivated at lower temperatures. No adhesive or label residue shall be left on the plastic after washing, and any loose pieces of label shall not be sticky.

Hotmelt and other adhesives can work in the recycling process but need to be tested. Contact Returpack for information about approved adhesive types and adhesive testing.

## **11.7 CAP AND LINER**

Except for crown caps, metal screw tops and caps are not permitted on plastic packages. Screw tops made of PET are not permitted on clear PET.

Liner refers to the seal which is sometimes used on the inside of the cap to ensure a tight seal.

### **11.7.1 ATTACHED CAPS**

Directive (EU) 2019/904 “on the reduction of the impact of certain plastic products on the environment” introduces the requirement that plastic caps and lids of plastic beverage containers up to 3l capacity shall remain attached to the container during the intended use stage. The requirement enters into force on 3 July 2024.

Returpack evaluates different design options and has identified the following design guidelines as important from a collection and recycling perspective:

- The length of the attachment feature, a longer attachment will affect the handling in RVM more than a short one.
- Use the same plastic for the attachment feature as the cap is made of, additional polymer types make sorting difficult.
- The cap with attachment must be able to separate from the bottle after grinding. Avoid welding the attachment on the bottleneck.

## 12 ACRONYMS

EFSA	European Food Safety Authority
EuPIA	European Printing Ink Association
EVA	Ethylene-vinyl acetate
EVOH	Ethylene vinyl alcohol
HDPE	High-density polyethylene
ISO	International Organization for Standardization
NIR	Near infrared
OPP	Oriented polypropylene
OPS	Oriented polystyrene
PA	Polyamide nylon
PE	Polyethylene
PEF	Polyethylene furanoate
PEN	Polyethylene naphthalate
PET	Polyethylene terephthalate
PET-G	Polyethylene terephthalate glycol
PLA	Polylactic acid
PP	Polypropylene
PS	Polystyrene
PVC	Polyvinyl chloride
PVDC	Polyvinylidene chloride
rPET	Recycled PET
TPE	Thermoplastic elastomers
RVM	Reverse vending machine

VERSION/DATE	CHANGE
2016-05-01	New template and structure, new Chapter 6.1, changes to 11.4
2016-05-04	Clarification regarding definition of heavy metals in 11.5
2018-02-05	Changes to Chapter 3 of permitted dimensions, reworking of Chapter 10, new requirements in Chapter 11 regarding adhesive and labels. Changed wording.
2018-11-13	Corrected a mistake in the barcode format table in Chapter 5
2019-06-26	Changes to Chapter 11.6.1, extension of transition period
2020-05-28	Chapter 5 Barcode marking, added X dimension, changed rules on placement Chapter 7.2 new requirement, use of multiple deposit symbols Chapter 11.1.1, new requirements concerning recycled PET New layout
2021-10-01	Chapter 11, removal of requirements for HDPE and PP bottles in the table and updates in the text Chapter 11.2.1 addition of requirements for colour on clear PET-bottles Chapter 11.6.1 removal of transition period for non-approved adhesives Chapter 11.7.1 addition of guidelines for attached caps
2023-02-01	Chapter 1 Adjustments to the new ordinance 2022:1274 and reference to the general terms