

# **Quality and testing regulations**

## **Resource PET-Getränkeverpackungen (beverage containers)**

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## Preamble

This quality assurance represents, in conjunction with the listed technical requirements, the fundamentals for the process levels of the resource chain of PET beverage containers.

In case of Germany, the PET quantity brought into circulation in the form of one-way PET by beverage bottlers is currently at the level of approximately 400 kt/p.a. Manufacturers of PET recyclates, preform manufacturers and beverage bottlers have launched an initiative in order to secure, within the framework of current and future quality assurance processes, a closed cycle of materials (refer to figure 1). This involves returning recycled material into the cycle in a manner characterised by adherence to the pre-defined quality standards. The quality association thus intends to promote the ecological evolution of PET beverage bottles in a sustainable manner, in addition to making a contribution to the efficient use of resources, environmental protection and climate protection.

The members intend to integrate other relevant elements of the resource chain into the quality association (RAL Gütegemeinschaft). The quality association knows that the multi-level chain associated with the quality and testing regulations cannot currently be mapped with regard to all the levels and systems. However, it often comes into contact with innovations, and is ready to update the quality assurance process with the help of the respective economic system and commercial intercourse.

The goal of the quality association is to eventually cover the entire value-added chain associated with PET beverage containers.

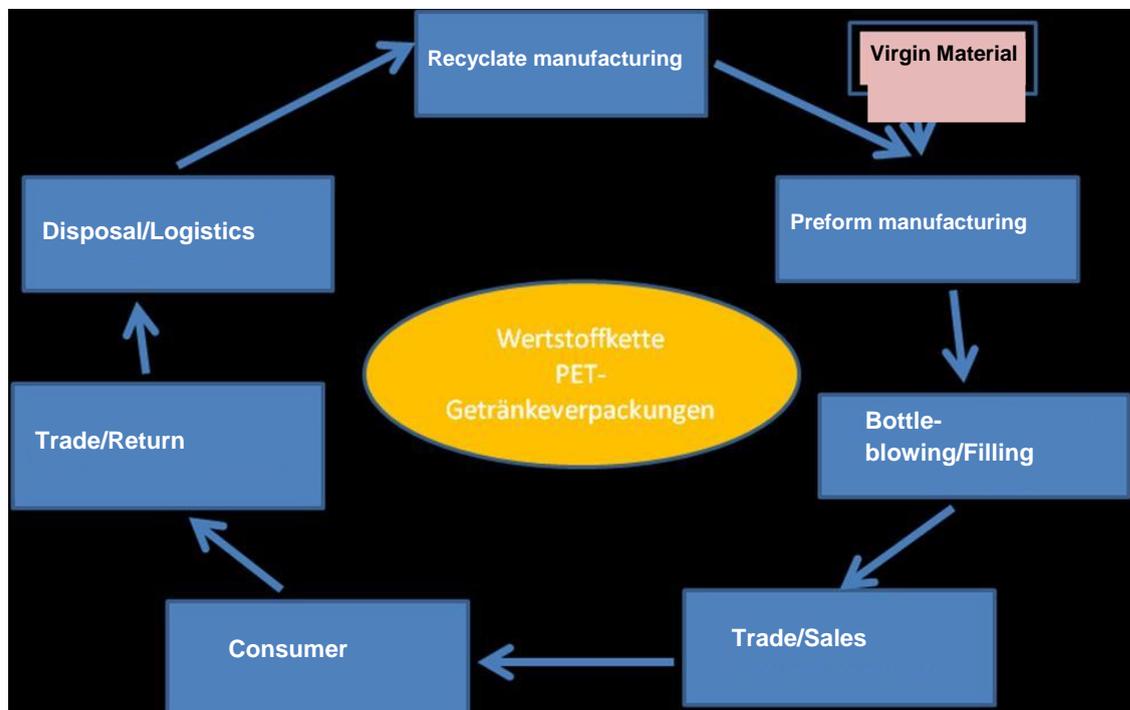


Figure 1: Resource chain – PET beverage containers

## 1 Scope

The criteria listed in these quality and testing regulations apply to the technical requirements associated with the respective levels of the resource cycle of PET beverage containers.

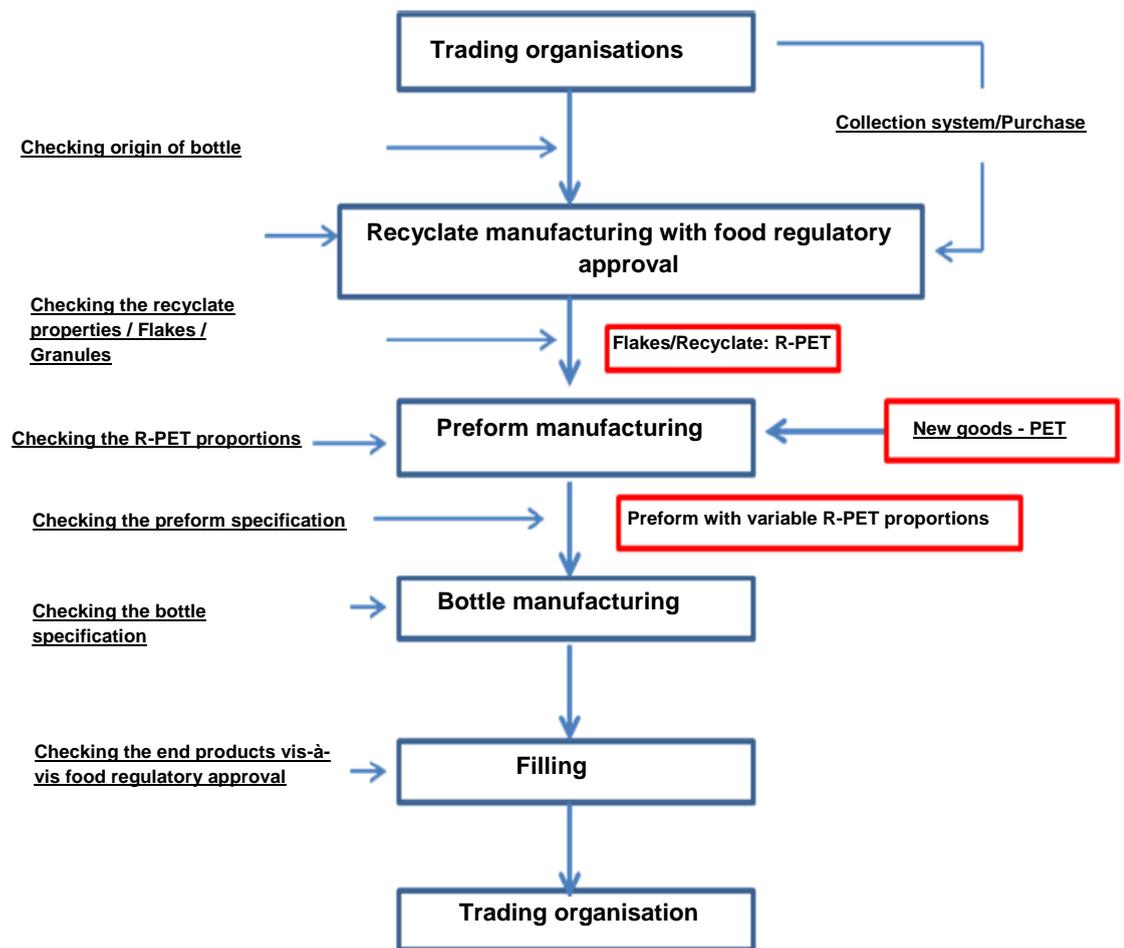


Figure 2: Schematic representation of the utilisation chain

The schematic depicts the process levels of utilisation. The 'Wertstoffkette PET-Getränkeverpackungen e.V.' (resource chain - PET beverage containers) quality association defines the testing specifications, procedures and release criteria within the framework of the individual process levels. The listed statutory provisions and regulations for putting foodstuffs and their packaging into circulation are applicable.

The certification mark is awarded for adherence to the input and output parameters in the levels of utilisation which safeguard reproducible qualities associated with pre-defined tolerances over a continuous period of time.

The members of the 'Wertstoffkette PET-Getränkeverpackungen e.V.' (resource chain - PET beverage containers) quality association are active throughout Europe. This leads to various collection systems for the provision of input material for processing. The utilisation/recycling procedures associated with the manufacture of suitable-for-foodstuff R-PET and flakes are listed and approved by the EFSA.

The scope of application encompasses all the beverage containers made of PET. In addition to bottle packs, it also includes other beverage containers such as tins or barrels made of PET. The scope of application also covers the entire container associated with the primary package (including labels, seals, etc.). Packages for other foodstuffs or products are excluded.

The quality and testing regulations encompass the following process stages/modules in the first development phase:

- Recyclate manufacturing,
- Preform manufacturing and
- Bottle-blowing/Filling.

Other process stages/modules of the resource chain of PET beverage containers can be incorporated into the certification mark in the future.

The requirements specified in the modules have been developed specially for the respective quality-certified levels of the resource cycle in accordance with the special quality and testing regulations.

### 1.1 List of abbreviations and terminology

PET	Polyethylene terephthalate
PE	Polyethylene
HDPE	Polyethylene High Density
PP	Polypropylene
PVC	Polyvinyl chloride
VOC	Volatile Organic Compounds
SSP	Solid state polycondensation
AA	Acetaldehyde
EFSA	European Food Safety Authority
IV	Intrinsic viscosity
R-PET	Recyclate made of PET, in the form of granules or flakes
NaOH	Sodium hydroxide
PA	Polyamide
Polyolefins	Collective term for polymers such as polyethylene and polypropylene that are produced from alkanes such as ethylene, propylene, I-butene and isobutene through the process of polymerisation

### 1.2 Co-applicable norms

The quality and testing regulations are only applicable in connection with the following provisions and guidelines, with respect to the phases that relate to the scope of application of these basic quality-related principles. With respect to the latest version, the following is - if applicable - to be adhered to:

- For compliance associated with law for articles of daily use
  - Directive (EC) no. 1935/2004 regarding materials and objects that are intended to come into contact with foodstuffs.
  - Directive (EC) no. 282/2008 regarding materials and objects made of recycled plastic that are intended to come into contact with foodstuffs.
  - Directive (EU) no. 10/2011 regarding materials and objects made of plastic that are intended to come into contact with foodstuffs.

- For test methods
  - DIN EN ISO 1628-5: Determination of the viscosity of polymers in a diluted solution through the use of a capillary viscosimeter - Part 5: Thermoplastic polyester (TP) - Homopolymers and Copolymers,
  - DIN EN ISO 585, plastics – plasticiser-free cellulose acetate – determination of moisture content, Published Fraunhofer IVV method,
  - DIN 5033 T 1-9: Colour measurement
  - DIN EN ISO 11664 T 1-5: Colourimetry
  - DIN EN ISO 294: Injection moulding of test specimens made of thermoplastics,
  - DIN EN ISO 15348- A,C,D, all annexes: plastic recyclates- Characterisation of Polyethylene terephthalate (PET)-recyclates
  - DIN EN ISO 60: Plastics - Determination of the apparent density of moulding materials which can be discharged through a standardised funnel (bulk density)
  - DIN EN ISO 11357: Plastics – Dynamic differential thermal analysis (DSC),
  - ASTM F 2013: Standard Test Method for Determination of Residual Acetaldehyde in Polyethylene Terephthalate Bottle Polymer Using an Automated Static Head-Space Sampling Device and a Capillary GC with a Flame Ionisation Detector
  - ASTM D 4710: Standard Specification for Acetaldehyde

## **2 General quality regulations**

### **2.1 General requirements**

The 'Wertstoffkette PET-Getränkeverpackungen e.V.' (resource chain - PET beverage containers) quality association facilitates the monitoring (with regard to quality) of the adherence to the input and output parameters on the basis of the following quality and testing regulations. The quality monitoring process is based on the initial test, self-monitoring and monitoring by an external entity. The following parameters and product qualities form the basis for the awarding of the 'Wertstoff PET' (PET resource) certification mark.

## **3 Monitoring**

These quality regulations form the basis for the subsequent monitoring regulations. The testing of the requirements associated with adherence to input and output parameters in the levels of the resource chain is described in the corresponding chapters. The monitoring process is divided into:

### **3.1 Initial test**

The initial test must be cleared for the 'Wertstoff PET' (PET resource) certification mark to be awarded and retained. The contents of the initial test can be found in the corresponding sections of the respective quality and testing regulations. In accordance with the implementing rules, an application for the initial test is filed with the 'Wertstoffkette PET-Getränkeverpackungen e.V.' (resource chain - PET beverage containers) quality association. Within the framework of the initial test, it must be determined whether the quality-certified parameters and the product qualities seamlessly fulfil the requirements specified in the quality and testing regulations.

At the behest of the quality committee, the applicant entrusts the task of performing the test to an external tester who is recognised by the quality committee of the 'Wertstoffkette PET-Getränkeverpackungen e.V.' (resource chain - PET beverage containers) quality association. The external test can also be performed by a neutral testing institute that is recognised by the 'Wertstoffkette PET-Getränkeverpackungen e.V.' quality association. The initial test is performed in accordance with the testing regulations specified in the respective sections of the special quality and testing regulations for the corresponding levels of the resource chain.

Apart from this, the initial test also serves to determine whether the applicant has fulfilled the pre-requisites for orderly compliance with the quality and testing regulations. When it comes to the initial test, the applicant is obligated to provide the external tester with the existing records of the internal tests upon request.

### **3.2 Self-monitoring (internal production control)**

Each user of the certification mark must, in order to comply with the quality and testing regulations, execute a routine, reproducible self-monitoring procedure at least once a month. This self-monitoring procedure must be documented in writing, and it must be based on the quality and testing regulations. Deviations from this particular provision are regulated in the respective special quality and testing regulations. The records of the self-test are to be depicted in a suitable form. They are to be stored for at least 5 years, and they should be made available to the external tester upon request. The user of the certification mark must possess the suitable equipment, devices and professional staff. If necessary, the user of the certification mark can assign the task of performing certain resource tests to a testing centre that is equipped to carry out this task.

### **3.3 External monitoring**

The external monitoring process involves a test that is run by an external entity in order to determine whether the user of the certification mark has fulfilled the respective requirements in accordance with the corresponding sections of the special quality and testing regulations. The material characteristics are determined on the basis of material and delivery specifications. This data must be made available to the external monitoring centre. The quality association selects an external tester/neutral testing centre for the execution. Unless specified otherwise in the specific quality and testing regulations, the external monitoring procedure takes place at least twice a year. It is to take place at the establishment of the user of the certification mark. If the external monitoring procedure that is carried out for the user of the certification mark generates no complaints in the first two years, an external monitoring procedure is subsequently carried out at least once a year, whereby the quality committee draws up a corresponding test schedule for the scope of the external monitoring procedures.

The sections of the corresponding specific quality and testing regulations form the basis for the monitoring process. Within the framework of the external monitoring procedure, the external tester/neutral testing centre carries out spot-checks for the requirements associated with the parameters of the resource-chain level of the user of the certification mark. The test results are to be recorded and handed over to the quality committee for further processing. The quality committee is responsible for evaluating and assessing the tests that have been carried out.

### **3.4 Repeat test**

If defects are detected in the quality assurance system of the user of the certification mark, the quality committee can decree that another external monitoring process be carried out. The type, extent and schedule of the repeat test are determined by the quality committee.

### 3.5 Test reports

A test report is to be created for each test and/or monitoring process that is carried out by an external tester/neutral testing centre. The user of the certification mark and the quality committee of the quality association, each receive one copy of the test report.

### 3.6 Testing costs

The costs of each test/monitoring process that is carried out are to be borne by the applicant or, as the case may be, the user of the certification mark.

### 3.7 Labelling

Products of 'Wertstoffkette PET Getränkeverpackungen' (resource chain - PET beverage containers) that are manufactured in accordance with these quality and testing regulations and which have been tagged with the certification mark of the quality association may be labelled as follows:



A product-oriented or service-oriented subscript is to be provided under the certification mark. This subscript should identify the specific part of the quality assurance process that is being complied with.

When it comes to awarding and retaining the certification mark, only the implementing rules for awarding and retaining the 'Wertstoff PET' certification mark shall apply.

In order to ensure that the manufacturer of the product in question can be contacted easily in case of the emergence of quality-related problems, all quality-certified products should be tagged with a label (RAL-GZ no. and manufacturer's identification number). If this is not possible, the user of the certification mark must ensure that the delivery note contains the corresponding information. The manufacturer's identification number is assigned by the quality association, and can be retrieved from it.

#### **4 Changes**

The quality and testing regulations are complemented and developed further in accordance with technological advancements. Changes made to these quality and testing regulations (including changes of an editorial nature) are only valid if they have been approved in writing in advance by 'RAL, Deutsches Institut für Gütesicherung und Kennzeichnung e.V.' (German institute for quality assurance and labelling). They enter into force after the passage of a suitable period of time, and after they have been announced to the users of the certification mark by the executive board of the quality association.