SPECIFICATIONS AND REQUIREMENTS FOR
REVERSE VENDING MACHINES (RVM)

For suppliers of such equipment to RetuRO and to 3rd parties involved.

This document is a general guideline to specifications for RVMs designed to handle single use and recyclable metal containers, plastic bottles, and single use glass bottles belonging to the DRS.

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INTRODUCTION

This document's main purpose is to provide guidelines for retailers regarding Reverse Vending Machines (RVMs) specifications in order to assure the functionality of DRS System. Secondly, it is meant as a purchase guideline for retailers who are customers / potential buyers of RVM equipment.

All RVMs used in the Romanian DRS must comply with the regulations laid out in this document and its enclosures. RetuRO may, through cooperation with involved parties and with appropriate notice periods, introduce changes to these regulations. The regulations include the retailer's obligation to follow this document's guidelines and requirements when ordering an RVM.

Only RVM Suppliers that complete a self-certification process and provide this documented proof to RetuRO, will be included in the DRS.

The specifications and requirements in this document only regulate use in the non-reusable DRS beverage packaging.
This document is referring to certain enclosures or other RetuRO documents. The content of enclosures may change independently of changes and revisions of this document with prior notification and in alignment with the applicable legislation.

The regulations laid out in this document and the enclosures will be valid from the date of publication on RetuRO's website. Introduction of future requirements will be documented as outlined in chapter 14. For the start-up of the DRS system the RVMs already placed in the market must follow the standards set out in this document. considering its alignment with the applicable legislation. A buffer period of 6 months from the go live of DRS system momentum is allowed in order for the RVM's already ordered or placed in the market to be upgraded to the standards set out in this document.

These standards do not cover the requirements for Refillable Containers (e.g., RGB bottles).

Any questions or comments to this document, or any of its enclosures, can be directed to RetuRO at office@returosgr.ro.

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1. Recognition and classification of objects

1.1. Purpose

The purpose of this document is to ensure that a very high proportion of beverage packaging is recognized and verified by the RVM, enabling the RVM to handle objects and deposit payments in the correct manner and safeguard against frauds.

1.2. Performance Targets

DRS's overall performance target is that at least 99% of all beverage packaging in the DRS should be recognized by the RVM when returned by the consumer. For detailed performance targets for each of the various identification methods, refer to the Regulations below.

1.3. Regulations

1.3.1. Packaging shape and dimensions

The legislation covers beverage packaging from 0.1L to 3L in size. All RVM's must be able to collect beverage packaging with the dimensions in the range given below.

- External diameter of the packaging: min 40 mm – max 130 mm
- Packaging height including closure: min 75 mm – max 360 mm
- Packaging weight (without content/beverage): max 1 kg

Width should not exceed the height of the packaging.

Dimensions of non-round objects are measured at their maximum, i.e., using the dimensions for a virtual cylinder that fits outside the non-cylinder object when it is lying on its side. Height is measured with closure/cap.

DRS beverage packaging that does not follow the above dimensions may not be able to be redeemed via the automated RVMs and will need individual testing to determine acceptance or non-acceptance.

Packaging below the minimum have a risk of becoming jammed inside the machine and causing stoppages.

DRS packaging outside of the dimensions set out in this document may be collected manually.

1.3.2. Identification

The identification and classification of beverage packaging should be done according to the following methods:

A. Barcode reading (scanning):

The RVM must be able to read the barcode and must hold an up-to-date valid barcode file containing information that instructs the machine how a package with a specific barcode should be handled, (obtained from DRS Packaging Register) and if it is entitled to deposit or not and the amount of the deposit. The barcode may be presented at an angle (as described in chapter 2). The barcode scanner should be capable of recognizing at least 99% of undamaged barcodes, including when the object has maximum tilt. The barcode scanner can use 3 reading trials to achieve the 99% target.

The RVM must be able to read a barcode specified under the standards of ISO15416 and EAN 13 / EAN 8 symbology. The RVM must also be able to read the magnification factor between 80% and 120%.

The RVM must be upgradeable to read 2D Data Matrix or QR codes.

B. Shape recognition:
The RVM must have the minimum capability of basic shape and silhouette recognition.

Basic shape recognition is included to check that the object is within defined limits of length and diameter as defined in the DRS Packaging Register Bar Code Identification (GTIN) file. Silhouette shape is used to determine that the object matches more detailed shape characteristics than just length and diameter if required.

When using shape recognition, the RVM should also attempt to read the barcode and include the barcode in the data record stored.

B.1. Basic shape recognition:

"Basic shape" data are found in the DRS Packaging Register file. "Basic shape" has information about the packaging length and diameter i.e., the closest cylinder fit. Basic shape recognition is used on all objects and is used in combination with barcode reading. Basic shape recognition should achieve at least 99% accuracy, meaning that:

- At least 99% of undamaged approved objects with the given length and diameter should be recognized and accepted, i.e., < 1% of otherwise acceptable objects can be rejected.
- At least 99% of objects with length and/or diameter outside the specified dimensions should be recognized and rejected (this could be fraud attempts), i.e., < 1% of objects with wrong length and/or diameter can be accepted.

The tolerance should be within 5% of the length and 10% of the width of Plastic, Metal and Glass packaging.

B.2. Silhouette shape recognition:

"Silhouette shape" data has information about the package silhouette profile (e.g., neck and shoulder shape, bottom rounding, and other detailed shape information).

RVM suppliers are required to maintain their own recognition logic and their own database with silhouette shape data and will be used in conjunction with other methods of recognition.
Silhouette shape recognition is mandatory to be included in the machine specifications.

Silhouette shape recognition should achieve at least 99% accuracy, meaning that:

- At least 99% of undamaged objects with the given silhouette shape definition should be recognised and accepted, i.e., at most 1 % of otherwise acceptable objects can be rejected.
- At least 99 % of objects with silhouette shape definition outside the specified bounds should be recognised and rejected (this could be fraud attempts), i.e., < 1% of objects with wrong silhouette shape can be accepted.

B.3. Metal detection:

RVMs must be equipped with metal detectors for aluminium and steel. The RVM must be able to determine if the object is made of such metals with 99% average certainty. The metal detector can accept up to 1% of objects with deviating metal properties. Multiple trials are allowed to increase accuracy. The metal detector needs to distinguish between non-ferrous (aluminum) and ferrous (steel). Material properties for objects are included by RetuRO in the DRS Packaging Register.

B.4. Weight detection:

The RVM must be able to recognize weight. Weight will primarily be used to reject full or partly filled containers (as described in section 0). Weighing accuracy is not specified on its own, but the RVM must be able to separate relevant objects, such as bottles with above-limit residual liquid, by weight with 99% success rate. RVM suppliers must use weight to check correlation between actual weight and weight data for a specific object as specified in the DRS Packaging Register.

1.3.3. Combination of recognition methods

The RVM must be able to simultaneously use the above-mentioned recognition methods to determine accepted recognition or non-recognition and determine handling options in the RVM. There is only one recognition combination that will lead to the acceptance of a beverage package and deposit payment (according to deposit amount in the DRS packaging register) and the correct physical sorting by the machine, or rejection.

A. Barcode, basic and silhouette shape, weight, and metal recognition.

This is the standard mode of recognition. The RVM reads barcode and must also check that basic shape, silhouette, weight, and metal properties are acceptable according to the corresponding data for this barcode entry in the DRS Packaging Register. These properties can be checked in any sequence, combination, or exclusivity to achieve RetuRO's overall performance target. If recognized, the object is handled according to its DRS Packaging Register information (deposit and handling information).

Units recognized according to this step are classified according to their barcode identifier (GTIN number) in the DRS Packaging Register.

The RVM must be programmable to enable changes in how the various recognition methods are combined and used to determine handling in the RVM.

B. No recognition

If the object is not recognized according to the described method, it must be returned to the consumer, and the consumer informed correspondingly, and the appropriate error codes/reasons are displayed on the screen. No deposit will be paid.

C. Fraud detection

Several of the regulations in this chapter will help detect and prevent fraud (attempting to collect deposit unlawfully). To further prevent fraud, the RVM must ensure that barcode, shape, silhouette, weight, and metal recognition are done for the same physical object without tampering. This means that the barcode, shape, silhouette, weight, and metal properties must be related through the one object being handled by the RVM. For example, this can be done by checking that there are no physical objects connecting user and the beverage package barcode (e.g., using a string or pin to retrieve the package), and/or detect if (even small) objects move in the wrong direction.

99% of fraud attempts using tampering as described above must be detected, and the transaction rejected.

Generally, RetuRO encourages RVM suppliers to minimize the possibility of fraud.

D. Performance target assessment

The above-mentioned regulations and corresponding performance targets are measured using testing of objects.

Technical and design requirements for barcodes used on beverage packages, are described in" "Barcode and Logo specifications" available on the RetuRO website at www.returosgr.ro.

2. Requirements for properties of beverage packages

2.1. Purpose

The purpose of this document is to ensure that the beverage packages used in the DRS system are compatible with the capabilities of the RVMs, as well as with DRS collection and sorting process.

2.2. Performance Targets

The RVM should be able to accept all packaging that have been checked and authorized for the collection via an RVM. Those packages that have dimensions that do not match those outlined above will not be able to be accepted through the RVM.

2.3. Regulations

The RVM must be able to recognize and handle all DRS beverage packages that conform, to the size standard as described section 1 which are included in the DRS system. Producers and importers must adhere to the requirements specified by RetuRO, and hence the RVMs must be capable of handling the same packages.

RetuRO involves RVM suppliers in the approval procedure, to ensure that products/ packages being reviewed will be handled satisfactorily by the RVMs.

Beverage packages need not to be round and need to be easily rotated inside the RVM. The RVM must be able to read the barcode and recognize the package type as described in chapter 1, without depending on the object being round. Similarly, when an object rests on its surface, the barcode on the object must be presented with a tilt angle relative to this surface plane of maximum 30 degrees. All RVMs should perform 360-degree bar code reading, this also gives a tolerance for objects being partly deformed.

a) Bar codes must be registered with the entity/entities issuing barcodes in the EAN 13 / EAN 8/ EAN-13/ EAN-8 symbology based on the SR ISO/CEI 15420:2013 standard and approved by them. The packaging must have a single barcode applied to it, to avoid possible confusion when reading multiple barcodes.

3. Volume reduction and compacting in the RVM (Compactor device)

3.1. Purpose

The purpose of volume reduction and compacting (flattening and invalidating) of specified object types of plastic bottles and metal packages and the breaking of glass as per the requirements below is to enable cost-effective handling, efficient sorting in DRS central sorting and counting facilities, and protection against fraud (claiming multiple deposit payments). By volume reduction and invalidation, we mean that the package is flattened (Plastic and Metal) or broken (Glass) as outlined below to avoid presenting the same package again for return.

3.2. Performance Targets

Refer to metrics under "Regulations" below.

3.3. Regulations

3.3.1. Compacting of cans and plastic bottles

Active compacting is required for cans and plastic bottles (see below for single use glass bottles). The performance requirements outlined below are generally best achieved using separate or combined compactors for cans and plastic bottles, if requirements are met.

The compactor should:

- Deform the beverage package in such a manner that it is not possible to place the package into the RVM again to claim multiple deposit refunds for the same package.
  - Deformation must be such that, on average, 99% or more of the beverage packages will be rejected for deposit payment by the RVM after compacting.
- Reduce the volume of the beverage packages to make subsequent transport cost-effective.
  - Volume should be reduced by at least 50% versus non-compacted packaging. Volume reduction is measured by the number of objects that can be filled in a defined bag before compaction, and after. (Divided between cans and plastic)
- Compacting the beverage package to facilitate sorting in later stages of the recycling process by preventing it from rolling.
  - The degree of compacting should be at least 2:1 for Plastic. For Cans this should be at least 3:1 i.e., thickness after compacting should be at least ½ of thickness before compacting for Plastic and 1/3 for Cans. This is measured as an average over the full length of the package, i.e., allowing parts of the package to achieve less compacting (and other parts more).
  - For comingled cans and plastic, the degree of compacting must be at least 2:1 in order to prevent cross-contamination.

- Avoid shredding or fragmenting of the beverage package, to facilitate sorting and material separation, and avoid contamination, in later stages. The following detailed regulations are used:
  - Shredding is defined as follows: A piece of material is any continuous piece, where the thinnest section between larger sections is allowed to be minimum 15 mm. If it is less, each section should count as a separate and smaller section. Fragmentation occurs when a section of material is so small that a circular area of at least 10 cm2 cannot be placed on the section. Any section of material which is too small according to this rule, is regarded as a fragment.
  - At most 0,5% of the material weight is accepted as fragments. This is calculated within each material group, i.e., of cans and plastic bottles separately.
  - Tear-off rings, caps and closures parts of containers are not included in the fragment measurement and calculation.

- Keep the beverage package as one object, separated and not attached to other objects in the collection container. This is to facilitate sorting in later stages and avoid containers connecting to other containers which may affect the color or Plastic/Metal sorting.

  - A maximum of 0,5% of beverage packages by number can be attached to each other in such a manner that they will not separate if dropped from 50 cm height to a concrete floor.

The above-mentioned regulations and corresponding performance targets are measured using test-collection of objects. Hence, all performance metrics are calculated using the mix of objects defined in the test-collection, and the average of the results.

The design and methodology used in compacting devices are not regulated by DRS. The only requirement is that the performance metrics above are met.

3.3.2. No compacting / volume reduction device

Machines without compacting device for cans and plastic bottles are not approved.

3.3.3. Glass Breakage

It is mandatory to have glass breakage mechanisms in the RVM. Glass can be broken using a mechanism that only breaks the glass package into large pieces that facilitate the appropriate sorting in the glass plants to obtain the maximum cullet. This device should break the bottle into some few large pieces. Specifically, it is recommended that less than 5% (as measured in weight) of the fragments are smaller than 5mm in size They are commonly known as break bars, hammer breaks, or similar.

3.3.4. Noise restrictions

Compacting devices may be noisy. It is a requirement that the RVM shall comply with the relevant national work environment regulations according to the measurement methods approved by the work environment authority.

4. RVM - sorting functionality and other features

4.1. Purpose

The purpose of this section is to ensure that the RVM sorts certain categories of beverage packages into different collection (and transport) containers, based on recognition and classification of the object (as described in chapter 1) and the corresponding "handling group" in the DRS Packaging Register. Such sorting must be done to enable efficient segregation, collection, and transportation of beverage packages with different properties.

4.2. Performance Targets

The RVM must be able to sort beverage packages with 99% accuracy.

4.3. Regulations

4.3.1. General

All RVMs must sort beverage packages in at least 2 categories, channeling the 2 categories to different collection positions:

- **Plastic and Cans.** Metal packages and Plastic bottles must be compacted in the RVM and can be stored together. Compacted packages pass through the RVMs compacting device(s) and are routed to a DRS approved collection bin.

- **Single use Glass.** Single use glass bottles must be collected with breakage equipment. Single use glass packages must be channeled to a separate DRS approved collection container and not mixed with Plastic & Cans.

Compacted objects (metal & plastic) will be routed to shared collection containers, if this is the case. Shared containers, if case, will contain both compacted metal packages and plastic packages, but not broken single use glass bottles. Individual containers, if it is the case will contain either compacted metal, compacted plastic or broken single use glass bottles.

The RVM sorts the DRS beverage packages based on its recognition and classification of the object (as described in chapter 1). There must be full compatibility between the recognition and classification methods used, and the sorting options – i.e., recognition and classification method shall not limit the sorting options available.

4.3.2. Packages containing residual product.

The RVM shall reject full or partially full beverage packages back to the consumers. RetuRO encourages consumers to return the beverage containers completely empty of liquid. As a general guide for all DRS packaging, a tolerance of +/- 5% of the material weight of the package is acceptable, when weight is used to determine non-empty packages.

5. RVM collection and transport containers

5.1. Purpose

Collection and transport containers should be traceable, logistically practical, and functional for use in RetuRO's plants.

5.2. Performance Targets

100% of collection and transport containers used must be approved by RetuRO. Each individual transport container must be closed with a seal equipped with a barcode with a valid number structure so it can be identified by RetuRO.

5.3. Regulations

The RVMs shall accumulate compacted cans and plastic bottles in collection bags as defined in this document. All collection and transport units must be approved and will be supplied by RetuRO at cost. The collection bags are used both as collection containers in the RVM and as transport containers when removed from the RVM.

The RVMs should accumulate broken single use glass packages in reusable closed holding boxes/bins or collection bags as defined in this document. All such transport units must be approved by RetuRO. The boxes/bins bags are used both as collection containers in the RVM, and as transport units when removed from the RVM.

5.4. Collection bags for Plastic and Cans packaging

5.4.1. General

The RVM must be equipped with one or more holding bins for metal and plastic designed so that the DRS approved collection bag will fit inside, and the top of the bag can be wrapped around the holding frame opening. RetuRO approved collection bags are of stand-alone design, once filled, and are made with special seams to make the bag square-shaped and stable when full.

The holding frame should consist of sidewalls that will fit on a standard dolly for the machine and should have an opening mechanism or similar which makes it easy to remove a full and closed bag.

RetuRO will provide, at cost, the bags, and the seals (previously marked with unique barcode) to be used in this process which will be reimbursed based on the retail handling fee methodology.

5.4.2. Sizes

Approved collection bags are generally designed to fit ¼ Euro pallet (0.6 m width x 0.4 m long), ½ Euro pallet size (0.60 m width x 0.80 m length) or 1/1 Euro pallet size (0.80 x 1.20 m) boxes. These bags will be adjusted based upon the basic requirements of the machine and the supplier and should be efficient for the collection and emptying of the machines.

The Height of the holding frame should generally be as high as possible to facilitate high filling ratio.

5.4.3. Barcode bag identification.

Seals with uniquely printed barcodes will be sold at cost by RetuRO to the outlets which will be reimbursed based on the retail handling fee methodology. These seals will carry a unique barcode that will be associated with the individual outlet. These seals are used with the bags to track the return of the bags and to associate each bag to individual outlets as well as providing security on the opening of the bags.

5.5. Collection containers for Glass

5.5.1. General

The RVM must be equipped with one or more positions for collection containers specified by the RetuRO, for single use glass bottles.

5.5.2. The Glass Collection Container

It is recommended that the collection containers be of a size that will hold up to 75kg of weight of broken glass.

The weight can be higher in cases where the retailer has a technical solution for handling the collection containers (i.e. mechanized solutions).

Further instructions regarding handling of glass containers will be issued, with prior notice, where it will be the case.

Approved collection bins are generally designed to correspond to ½ Euro pallet size (0.60 m width x 0.80 m length) or 1/1 Euro pallet size (0.80 x 1.20 m) boxes. These bins will be adjusted based upon the basic requirements of the machine and the supplier and should be efficient for the collection and emptying of the machines.

RetuRO will provide in a custody regime the bins/containers for glass handling.

6. Communication with users

6.1. Purpose

The RVM should be easy to use and give useful and relevant information to the user (consumer using the machine). The RVM must as a minimum offer visual display and printed receipt or electronic voucher as communication methods.

6.2. Regulations

6.3.1. Receipt

The RVM shall produce a receipt to the consumer (public user of the machine). The receipt should be printed or electronic voucher by the RVM. In order to focus on an environmentally friendly approach, there are several options to switch from paper receipts to electronic receipts.

- Mobile app & reader on RVM. Not all RVM's are equipped, but the 1D/2D barcodes readers could be retrofitted if needed.
- Keyboard on screen and the customer is introducing its data.
- Scanning a QR code on the screen before or at the end of the deposit session, depending on the RVM type.

The receipt should as a minimum include the store at which the redemption took place, the number of containers deposited of each material type (Plastic, Metal, Glass) at each deposit level, the total deposit to be refunded, time and date and a unique barcode to identify the machine and location at which the return was made.

The receipt can be used by the retailers to refund the money to the consumer.

6.3.2. Display messages.

The RVM shall display relevant messages to the customer. It is specifically required that correct messages are displayed when:

- Containers are accepted and deposit paid (e.g., "Deposit RON 0,50").
- Containers are rejected and returned to the customer due to non-recognition (e.g., "Not recognized shape", "Not recognized silhouette", "Unreadable barcode", "Not approved container").
- Containers with too much residual liquid are rejected and returned (e.g. "Not emptied").

Messages related to other than normal deposit operations, such as electronic money transfers, payment in cash or vouchers (non-paper preferred) should be adjusted to fit the specific purpose.

7. Communication - technical and practical requirements

7.1. Purpose

All RVMs should be available online through a standard digital electronic communication method and aligned with RetuRO's requirements. RetuRO will develop interfaces with the RVM suppliers for the central database.

7.2. Performance Targets

RVMs should be online and ready for communication 99% of the time (based on the opening hours of the outlet). No data should be lost in case of offline conditions (loss of network connection).

7.3. Regulations

All RVMs must store information of all DRS beverage containers handled by the RVM via the DRS Packaging Register and must be able to communicate electronically through a standard communication platform. This functionality is required to install up-dates of barcode and other information through a "DRS Packaging Register" exchange service, and to download deposit and handling data.

The RVM should be capable of operating when there is no internet connection and the required files for the operation in a disconnected state should be saved in the RVM. Upon reconnection to the internet the RVM should automatically upload the data which was collected during the off-line period (queue and send transaction data up until it is back on-line). RVM suppliers will normally also use this communication to monitor the state of the RVM online and do software maintenance.

RVM's operating system and application should be kept up to date with the latest security patches and the latest RVM vendor application software. The RVM should be capable of being updated remotely.

The communication must meet the following requirements:
- Be always available (24/7)
- Meet standard Ethernet protocol requirements IEEE 802.3
- Any firewall or other access-restricting devices or methods must not limit the RVMs ability to communicate to the RVM supplier and Retailer.

It is of high importance to the system that the transfer of data runs as smoothly as possible and that potential error sources are eliminated or reduced to a minimum.

The RVM supplier must check and approve that these requirements are met when the machine is installed. The retailer/RVM owner is responsible to make sure these requirements are fulfilled during day-to-day operation.

The Retailer is responsible for using the communication platform to interact with the RVM. The Retailer must download and upload data to the RVM, and forward and receive data to/from RetuRO. Refer to enclosures (import- and export file structures, referenced) for further specifications.

RetuRO will provide APIs for communicating with RVMs. An RVM must be capable of connecting securely to RetuRO API (using HTTPS).

RetuRO will only connect with an RVM central data collection system and not directly with each individual RVM.

Specific integration security and network requirements will be defined in the RVM Data and Integration Specifications Addendum.

8. Communication with RVM Producer or RetuRO

There may be differences between suppliers of RVMs but as a minimum the following areas should be addressed and easily capable for update. A connection between the RVM Supplier, the Retailer, and RetuRO is required to ensure that the RetuRO files for DRS Packaging Register and the data relating to collected information can pass easily between the 3 parties.

Type of data needed to be reported to the DRS Administrator:
- Near Live Detailed Transaction Data
- RVM Availability Data (Online/Offline and Uptime/Downtime)
- RVM Software Status (Container Masterfile and Up-to-date software)
- RVM Rejected Transactions Data
- RVM Installation and Relocation Data
- RVM Data Integrity Report (changes).

8.1. Purpose

Ensure that data registration and transfer is done in a uniform and approved manner.

All RVM machines, shall be equipped with the capability to transmit comprehensive data pertaining to all transactions, irrespective of their success or failure, to both RetuRO and the corresponding return point responsible for their operation.

Each RVM machine, must possess the capability to transmit pertinent data concerning its operational status, including but not limited to its online/offline status, general health check results, and other critical operational parameters.

RVMs must perform regular updates to their internal SKU database by synchronizing with the "Package Registry" database provided by RetuRO. These updates are the base for handling warranty-related information, determining warranty values for various packages, identifying delisted SKUs, and incorporating other essential package parameters.

RVMs are mandated to provide real-time, on-demand reporting for all transactions, delivering either live data or near-live data as required. This capability ensures immediate access to comprehensive transaction details, enabling timely and informed decision-making.

No associated costs shall be borne by RetuRO for data provided by RVM's.

8.2. Regulations

8.2.1 Conceptual description of the "on-line" system
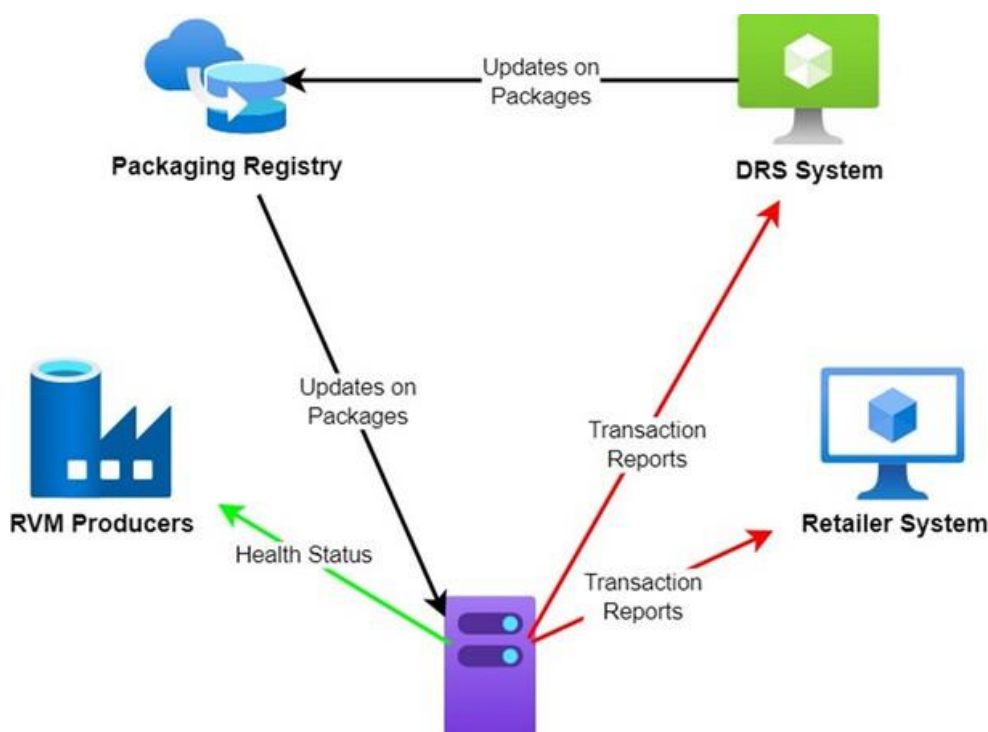
The system must provide a synchronization 24/7 of official Romanian time and date.

A RVM must have a complete and updated database of valid barcodes and other information, as specified in the DRS Packaging Register.

All containers entered in the RVM must be identified and registered by the RVM, and the resulting information stored in the RVM's internal database.

Each entered container represents a transaction which must be registered and reported (including the number of rejected containers). The identified barcode (and corresponding shape, silhouette, weight data and other identification description as outlined earlier) is compared to information in the DRS Packaging Register to check whether the container is entitled to deposit or not, and how the RVM should handle it. Containers not recognized (and e.g., rejected and returned to the customer) also represent a transaction and information is stored accordingly. Each transaction is connected to a deposit group, a material group, and a handling group; and in cases where the container is rejected or handled in a non-normal manner, an exemption group.

The voucher numbers should be immediately made available so they can be interfaced to the retailers' IT system for voucher tracking. Full requirements of the voucher tracking are yet to be determined and will be communicated during the development of the DRS' and Retailers' IT systems.

Based on the information imported into the RetuRO IT system, RetuRO will provide payment to the stores for the handling fee based on a date-to-date calculation of what has been returned, through the RVM. The deposits redeemed will be part of the voucher management system of each retailer. This implies that the data generated by the RVM needs to be accurate and up to date.

Imported information is also used by DRS for statistics and improvement purpose.

8.2.2. Reports

a) Emptying report

The RVM must automatically generate an emptying report every time its being emptied. An emptying report details the contents of a bag taken out of the RVM. This information, in total, should be sent daily.

The Emptying report should contain:

- store ID
- RVM ID
- collection container ID
- Packaging count by deposit value
- Bag weight
- Total value
- Date of issue emptying.

b) Daily financial report

The RVM must automatically generate a report when the machine has been downloaded and the deposit data transferred. The download report shall list:
- store ID
- RVM ID
- date of reporting
- reporting period
- details per customer transaction (including voucher ID, timestamp, value, payment method, quantity accepted per bar code)
- machine grand total per bar code
- no. of containers in each deposit group (deposit groups with activity in the period)
- total deposit paid (by payment method: voucher or others)/total voucher issued.

The report shall be electronically stored in the RVM until the machine is switched to service / maintenance mode by the store personnel. In this mode the receipt shall be available for printout on request. The RVM may offer an electronic version of report printing, in which case the report must be storable on an external electronic medium (not in the RVM), e.g., sent by e-mail, or cloud storage.

RetuRO requires only the last report to be available for printout or electronic storage, which means that the previous receipt, if not already printed or stored, will be over- written by the new one during a download. However, RetuRO recommends that the RVM stores all download reports electronically for the last 12 months.

The report may be deleted from machine memory after printout. The RVM shall log date/time for the printout, and present a printed message e.g. "No download report available. Last report printed on dd.mm.yyyy" when store personal requests a receipt which is not available.

8.2.3. Contents / format of deposit data / information to be transferred

a) Package type:
- Bottle
- Can

b) Deposit code:
- Deposit
- No deposit

c) Material type:
- Plastic
- Metal
- Glass

d) Process result:
- Refundable (articles with deposit)
- Non-Refundable (articles expired or taken off from the Packaging Register)
- Unknown (barcode is readable but the article is not in the Packaging Register)
- Not readable (barcode not readable)

8.2.4. Barcode master file - specification.

RetuRO will administer the DRS Packaging Register. Each new product will be added and marked with "N" (Normal)in the Detail record's Status field. Obsolete or excluded products will be marked with "C".

(Closed). Codes may be removed from the file, but only after they have been distributed once in the master file with the C (closed) mark. The DRS packaging register master file is transferred to all the Retailers daily, however not later than every Friday if not otherwise agreed.

All RVMs must be updated 24 hours after having received the file at the latest. The DRS Packaging Register contains all the barcodes, basic shape, and material data etc., deposit and non-deposit, not only the changes since last update. This is to ensure that information is not lost in case of an unsuccessful previous update or other fault.

The RVM should have memory capacity sufficient to hold data sets for up to 100.000 SKUs. If a higher number is required, this will be informed to suppliers at least 3 months before the limit is passed.

8.2.5. New installations

When a RVM is being installed, the installer must allocate a CP (collection point) id and address to the RVM. The Retailer should report to RetuRO any changes related to RVM location change within 1 working day.

9. Back-up procedures in case of data loss, memory loss etc.

The Retailers are obliged to store detailed deposit data, i.e., on GTIN level, for a period of minimum three (3) months as a backup in case data is lost/corrupted during transfer to, or internal processing in, by RetuRO.

The RVM must as a minimum, store three months of detailed transaction history. This means that detailed deposit data downloaded are still present in the RVM for at least three months after the download.

In case of data loss from the machine, it is the Retailer's responsibility to inform RetuRO as soon as possible, report the discrepancy and reproduce/estimate the deposit data as quick and accurate as possible. The data shall be presented RetuRO in the same format as specified in the regular import file. Should RetuRO discover that the data is corrupt/incorrect or missing, it will notify the Retailer accordingly.

10. Requirements for periodical reporting to RetuRO

10.1. Report frequency and dates

Retailers are obliged to provide importdata covering the period since the previous file was sent to RetuRO. The file should be provided daily to RetuRO for upload into the RetuRO database so as to carry out various checks required regarding returns, potential fraud etc.

This upload frequency may be changed in the future.

10.2. Wrong reporting

If reported data or file is proved invalid (i.e. not readable), the Retailer will be notified and must, without delay and will be required to produce a new and correct report. RetuRO shall not make corrections to files received. If data reported leads to erroneous remittance of deposit and handling fee, the Retailer shall cover a proved financial loss suffered by RetuRO.

10.3. RVMs not reporting

If there are RVMs which, due to technical difficulties or problems with communications, have not transmitted data during a period, the Retailer must report missing stores and RVMs in a separate report. This report shall include at least store no. and name, RVM no. and date when machine was last downloaded. If the same stores are reported in several consecutive reports, the reason why the RVM is without contact must be indicated. The report is yet to be defined.

10.4. Updating the RVMs internal data

DRS Packaging Register update as defined is preferably done at the same moment as the data is downloaded from the RVM. If, for practical reasons, the Retailers introduce other routines, these shall be informed and approved by RetuRO in writing. Specific custom barcode updates, outside the two-week regular updates will be possible if required.

Update of the RVM's internal data must be performed within 24 hours after the DRS Packaging Register has been received from RetuRO. RVMs which are not successfully updated must be reported to RetuRO in a separate report called "DRS Packaging Register update details". This report shall include as a minimum, the stores CP (collection point) id number, store name, RVM no. and type, last updated, and, if unsuccessful update in several consecutive reports, the reason why the RVM is not updated.

11. Authority requirements / audit and formal approvals

11.1. Validation RVM models/suppliers for use

All RVM models intended for the DRS after the issuing of this document must be accompanied by a self-certification proof validated by RetuRO to ensure alignment with the requirements of the present document.

Future suppliers with RVM's adhering to the requirements of this document must complete a self-certification process and provide this documented proof to RetuRO, in order to be validated and included in the DRS.

It is mandatory for the RVM supplier to be certified before any data transfer (daily reports, updates to packaging registry) to/from RetuRO to take place.

11.2. Authority requirements

The equipment to be used must meet the requirements given by the national authorities in the different technical fields.

11.3. Audit requirements

RetuRO is strongly focused on the integrity and the accuracy of the performance of the RVM. Data representing monetary transactions will amount to substantial value, and the fulfilment of the requirements and security of the equipment is essential. RetuRO may demand a statement from a professional IT audit company (appointed by the parties), which focuses on the mentioned issues from an auditor's point of view relating to the security of the data provided by RVM that are held by the Retailer.

RetuRO may develop a set of audit and testing procedures for the compliance of the RVMs to the standards outlined above. RVM providers and Retailers will provide on request the right to be audited on the specifications covered by this document.

It is primarily the responsibility of the RVM provider and the Retailer (collection point) to ensure that these standards are implemented appropriately and to raise any concerns with the RetuRO regarding compliance.

11.4. Accounting and Data System requirements

The Retailer shall prove a safe and secure internal system for handling of deposit data. This applies both to administrative procedures and data systems. Retailers are obliged to present system documentation to a reputable external auditor nominated by the parties on request. If the parties fail to agree on the external auditor, RetuRO has the right to appoint the audit company.

12. Integrity and discretion in handling of sensitive data

RVM suppliers/Retailers are obliged to handle system-data confidentially due to their high sensitivity. They will not be allowed to use the data for any other purposes than what is stated in this document, unless agreed with RetuRO and the Retail party. RetuRO requires a declaration of integrity and discretion in handling of sensitive data and data containing information representing monetary transactions.

All data remains the property of RetuRO, the Retailer, or the producer depending upon the original owner of the data. RetuRO has the right to obtain the return data to be able to operate its business and to review data to identify any fraudulent activity.

13. Other requirements

13.1 Machine identification

An RVM must have a non-removeable 'Product Identification Plate' on the machine showing: serial number; name of vendor; date of manufacture.

13.2 Compliance

All RVM installations must comply with prevailing applicable legislation.

14. Future requirements

This chapter lists RVM properties that will be requirements in the future, and thus has an implementation timeline. Generally, RVMs already being used in the market do not need to fulfil new requirements unless otherwise stated in the legislation or the order of the work environment authority (not applicable for the moment).

No.	Property	Chapter reference	Introduction timeline
1.			
2.			
3.			

15. Record of major changes

For an overview of issues that has been changed relative to older version of RetuRO's RVM specifications, please refer to this table:

Chapter	Amendments	Comments
Generic		
1		
2		
...		