UK DMO

RVM Specifications

DEPOSIT RETURN SCHEME

Introduction

This document sets out the minimum specifications and standards for the Reverse Vending Machine (RVM) infrastructure required to facilitate the automated collection of returned containers. It serves to specify the Reverse Vending Machine minimum criteria for Return Point Operators (RPO) in England, Scotland and Northern Ireland as required by the scheme administrator, the United Kingdom Deposit Management Organisation (UK DMO) acting as the scheme administrator for Scotland.

All Return Point Operators will require of their RVM suppliers to provide appropriate and sufficient evidence (such as technical specifications or tests) that demonstrate how their RVMs adhere to these standards and specifications to support return rates of in scope products that maximise environmental and operational efficiency for the UK DRS Scheme and the relevant legislation.

RVM performance targets and requirements will be reviewed on an ongoing basis to continuously seek improvement and adapt to technological improvements. The UK DMO reserves the right to change the minimum specification should the need arise.

The UK DMO is recommending the following minimum specifications that Return Point Operators should request of Reverse Vending Machine Suppliers to comply with when installing reverse vending machines as return points for consumers in their locations.

The UK DMO is open to new and improved technology in the future, and this document should not be seen as a barrier to the adoption of new and more advanced machines that may be developed in the future. The stated specifications contribute to the proper and reliable functioning of the deposit system and are in no way designed to restrict competition.

Contents

Introduction 1
Container Management 3
Article List 3
Container Scope 3
Container Recognition 3
Barcode Recognition 3
Weight Detection 3
Metal Detection 3
Shape Recognition 4
Recognition Combinations 4
Logo Recognition 4
Fraud 4
Container Processing 4
Connectivity and Availability 4
Integration 5
Consumer Usage and Accessibility 5
Deposit Repayment 5
Data Management 6
Data Integrity 6
Data Processing Agreement 6
Transaction Data 6
Certification 6
Disclaimer 6

Container Management

Article List

The RVM is required to correctly identify all of the in scope beverage containers registered within the scheme. Once identified the RVM should accept and process the container and pay out the appropriate deposit.

The scheme will maintain and provide a product Article List which contains a list of all the in-scope products registered with the scheme. The Article List will also provide the information on the characteristics and barcode of each container, and the associated deposit.

The scheme will make the Article List available to each RVM supplier through an API to enable them to make periodic updates (minimum daily) to their RVM estate. This will ensure that the product list is maintained in a current state on every RVM so that valid products are accepted. Every in-scope container will also have a UK DMO approved logo on it to indicate its inclusion in the scheme. An RVM should store at least 100,000 beverage container records within its local database and the UK DMO will maintain this list. The integrity of the list must be protected, and no changes are permitted outside of those provided by the UK DMO. Any proposed changes, edits or transformations carried out by the RVM Supplier must be communicated and approved by the UK DMO in writing.

Container Scope

Single use beverage containers made from PET, Aluminium and Steel- between 150ml and 3000ml - are within the scope of the scheme. An RVM must be able to accept 100% of in-scope containers that meet the material specification defined within the relevant legislation. RVM's must be capable of accepting products within the following tolerances.

- Minimum width of 50mm.
- Maximum width of 125mm.
- Minimum height of 75mm.
- Maximum height of 360mm.
- Width must not exceed height and height is inclusive of caps.

Non-Scheme Containers

RVMs must not accept non-scheme containers unless agreed in advance with the UK DMO in writing. If approved non-scheme containers will be added to the Article List and these containers will automatically carry a deposit of £0.00.

Container Recognition

Barcode Recognition

Barcode recognition is the primary method of container identification by the RVM and should meet the following criteria, all RVMs should be able to:

- Read the barcodes on both cylindrical and non-cylindrical containers, vertical or horizontal, not on caps or bottom of containers
- Store the product Article List to validate the barcode read.
- Read barcodes at a maximum of 30 degrees tilt. It is expected that RVMs can read and recognise at least 99.5% of undamaged barcodes at maximum tilt.
- Read EAN-8, EAN-13 and UPC barcode formats.
- Read 2D data matrices and QR codes.

Weight Detection

RVMs are only required to accept empty containers. To identify partially filled or fully filled containers, an RVM should use weight detection. This weight detection requires an accuracy of at least 95%. RVMs should be able to detect and reject partially filled in scope containers with a maximum weight no more than 100 grams including any excess liquid. If a container is identified as not empty, the container should be rejected.

Metal Detection

All RVMs must be able to detect metal containers. The metal detection rate is required to have an accuracy level of at least 95%.

Shape Recognition

There are two types of possible shape recognition: Basic Shape Recognition and Silhouette Shape Recognition. All RVMs must have the ability to perform basic shape recognition. The container Article List will include basic information on the dimension (height, width and length) of each container. RVMs require an accuracy level of at least 95% for basic shape recognition.

All RVMs also need to perform Silhouette Shape Recognition. RVM Suppliers will be expected to apply their own recognition logic and maintain their own silhouette database. UK DMO will give adequate notice to RVM Suppliers for when Silhouette Shape Recognition is to be brought into use and what containers will be required to be capable of Silhouette Shape Recognition.

Recognition Combinations

The minimum recognition combination for a container to be accepted by an RVM is:

Barcode Recognition + Basic Shape Recognition + Weight Detection + Metal Detection.

A combined accuracy level of at least 95% is required across this combination.

Logo Recognition

Logo Recognition is not a prerequisite of the scheme at present. UK DMO is looking to reduce the scheme's exposure to fraud and is likely to require Logo Recognition to be installed within one year of the scheme's 'Go Live' date, October 2027. RVM suppliers must demonstrate to RPOs and to the UK DMO that they are actively developing this technology.

Fraud

The RVM suppliers must employ anti-fraud solutions to prevent fraud on the RVM.

- The RVM must recognise if a container moves in the wrong direction and ensure there are no physical objects connecting the user to the drink's container.
- The container that is scanned must be the container that is accepted and processed by the RVM.
- All attempts of fraud such as these must be detected and recorded.

Container Processing

• The compactor must confirm receipt of the same number of packages as returned to the RVM. The system must be designed in such a way that returned packages cannot be removed from the system before compaction. The compactor must compact the returned packages in such a way that they can no longer be used for deposit collection.
• All compacted containers must remain in one piece. Shredding or fragmenting of this material must not occur. When co-mingling, an impalement rate of 0.1% is acceptable whereby the co-mingled material cannot be separated and further processed into either PET or Aluminium/Steel bales.

Compactors must reduce the volume of a PET Beverage Container by at least 55% and the volume of an Aluminium/ Steel Container by at least 75%. RVMs must maintain this level over the duration of their life. The compaction requirement of 55% is required to make the barcode inoperable and all compacted containers should be rejected when attempted to be returned again.

Connectivity and Availability

All registered and operational RVMs must be connected to the UK DMO network at least 99.5% of the time. RVMs will require power and access to the internet to connect to the RVM suppliers and the UK DMO networks. Local power supply and internet connection is the responsibility of the RPO, with the RVM Suppliers then responsible for transferring the data. Connectivity should be tested during installation, tracked and proactively managed with the RPO to ensure minimal downtime.

- RVM software and firmware must be kept up to date with the latest software available, or at a minimum the latest software version minus one.
- The container Article List must be uploaded onto each RVM daily. The RVM must be capable of having these updates done remotely.

- If an RVM goes offline, the data stored on the RVM must not be lost. If the RVM has network issues, then the RVM must be able to queue and send transaction and availability data until the next time it connects.
- The RVM must not be offline for more than two consecutive days, the RVM Supplier must inform the UK DMO and work proactively with the RPO to resolve the issue.
- If the RVM is offline for more than two days, the RVM must be shut down and the RVM Supplier must seek reconnection with the UK DMO.
- The RVM Supplier must provide a report with information relating to the RVM Serial Number and the reason the RVM is offline.
- An RVM must store detailed transaction data for 4 weeks after the transaction data is uploaded to the RVM Supplier as a back-up.
- In the case of data loss at an RVM, UK DMO must be informed within 2 days and the RVM supplier must provide accurately recreated data.
- The UK DMO recognises the exceptional situations that may arise where connectivity may be an issue because of geography and availability of network. Where this arises RPOs must inform the UK DMO in writing to agree a remedy protocol.

Integration

All RVMs must integrate with the UK DMO material specification standard and published APIs for transaction management, status provision and configuration management. This integration will be tested as part of the approval process to ensure full interoperability and data quality. RVM suppliers must maintain currency with any API changes or enhancements.

Consumer Usage and Accessibility

RVM suppliers should advise RPOs of the available accessibility options on their range so that they can ensure compliance with current legislation and the accessibility needs of their customers.

Research has demonstrated that to improve accessibility for consumers, the overwhelming ask is that the location and signage of the RVMs, either within or outside the store for consumers be carefully considered.

RVM Suppliers should consider providing on RVMs a ‘call for assistance’ button with a tactile support.
The RVM Supplier should proactively make the consumer interface intuitive and easy to use to accommodate a range of accessibility needs.
Messaging on the interactive screens should be standardised with use of high contrast and tactile solutions for visually impaired consumers.

The DMO UK will provide a baseline of standard messaging and images including high-contrast colour palettes to be consistent across the screens and branding on all RVM Return Points.

Disability access regulations, primarily governed by the Equality Act 2010, should be complied with when installing reverse vending machines.

Deposit receipts should be generated automatically based on a defined and standardised timeout or available on demand once the transaction has been completed.

The RVM must provide for the placement of the UK DMO branding on both the physical machine and the electronic display in line with the RVM brand asset guidelines provided by the UK DMO’s Marketing and Communications department. (brand asset guidelines to be provided)

Deposit Repayment

As minimum all RVMs must have the option to produce a paper voucher that enables the consumer to redeem their deposit for cash in store. The RVM must be integrated with the RPO’s EPOS system to ensure that the redemption can be processed. Vouchers should be unique and single use to prevent fraud.

In addition to this, the UK DMO does encourage and may introduce alternative payments such as digital payments and donations to charities to provide consumers with choices. The UK DMO will work with Return Point Operators and their RVM suppliers to facilitate and enable these capabilities where possible to be introduced if required. Data protection will not be compromised in considering any alternatives.

Data Management

Data Integrity

All RVM data must be handled confidentially due to its sensitive nature and must be encrypted in flight and at rest. The integrity of this data must be maintained and access restricted. The data on the RVM is owned by the UK DMO and only authorised users should have access to the RVM data. The data must be protected with user access and authorisation controls. All default passwords must be changed immediately. An audit record must be maintained of any changes made to the data on the RVM; any changes must be approved in writing by the UK DMO. Information that must be captured:

- Who made the change.
- What time was the change made at.
- What has changed.
- The reason for the change.

Data Processing Agreement

All RVM Suppliers working with Return Point Operators in the UK will be required to enter a data processing agreement (DPA) with the UK DMO prior to the installation of **ANY** RVMs at return point sites.

Transaction Data

All containers presented at an RVM should be recorded whether successfully accepted or not, the details of these transactions must be provided to the UK DMO synchronously during normal operation or stored and forwarded in the event of a connectivity issue.

The RVMs must store a local record of all transactions, these must be date and time stamped, and the integrity of these transactions must be maintained. The UK DMO requires that the RVM hold a record of its transaction data for at least one month after transferring data to the RVM Supplier's database or the UK DMO's database.

Certification

The RVM Suppliers must provide the required evidence to demonstrate and certify to Return Point Operators that the RVMs meets this required specification. This information must be provided in electronic format or demonstrated and recorded through a series of defined tests and the associated test reports to the RPO before access to UK DMO Ltd.'s Article List. The UK DMO will provide an independent certification process for RVM Suppliers to apply for certification.

Where an RVM or RVM Supplier is not in accordance with the specification at the time of testing, the Return Point Operator will be expected to show the plans for remediation before access to the UK DMO is provided.

Compliance with standards and specifications is made at the discretion of UK DMO.

Disclaimer

The information contained in this specification document is provided for the purpose of advising Return Point Operators of the Reverse Vending Machine minimum specification and standards the reverse vending machines (RVMs) must attain in order to be approved for use in the UK DMO Ltd.'s Article List. Any Reverse Vending Machine installed by a Return Point Operator that does not comply with the minimum specification and standards will not be connected to the UK DMO Article List.

The UK DMO reserves the right to change the RVM specification and standards to improve the operations and efficiency of the scheme.