

REUSABLE TRANSPORT ITEMS (RTI) - ORGANISATIONAL RECOMMENDATIONS

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Executive Summary

Reusable Transport Items (RTI), crates, pallets and roll cages, represent the “Nuts and Bolts” of the European Fast Moving Consumer Goods (FMCG) Supply Chain. This recommendation may apply to other industries or other regions.

At the end of the previous millennium we saw an increasing variety of equipment, managed in a variety of different ways, being used to handle an expanding catalogue of products, all with the aim of reducing Supply Chain Costs for individual elements within the Total Supply Chain.

But different incompatible management systems for RTI claim for standardised methods to organise their distribution and returning.

In fact RTI are considered to be assets which need to be tracked & traced through the supply chain to enable their efficient use for all involved parties. RTI may have commercial implications if they are subjected to deposits or fees related to their use. For invoicing purposes RTI have to be accounted separately.

To do this, a unique identification of RTI and standardised communication of the related information is required. In the following it is explained how the EAN.UCC-system should be used for this purpose.

This application guideline is designed to provide more precise guidance on the use of the EAN.UCC-system for RTI-management.

Note

Under no circumstances should this application guide be considered as stand alone document or a replacement for the full EANCOM[®]-manual as well as for the General EAN.UCC Specifications. To implement the EAN.UCC-system effectively these recommendations of IC-RTI must always be used in conjunction with the mentioned guidelines.

This recommendation reflects the current state of the art regarding communication and identification technologies. It should be considered that technological developments may cause changes or amendments of the contents of this recommendation.

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INTERNATIONAL COUNCIL FOR REUSABLE TRANSPORT ITEMS (IC-RTI)

1. International Council for Reusable Transport Items (IC-RTI)

The International Council for Reusable Transport Items (IC-RTI) is established under the umbrella of ECR Europe and is supported by EAN International Association, Brussels. The IC-RTI coordinates all national and international RTI-working groups to avoid double work and initiate convergent developments in this field.

The IC-RTI consists of a steering committee and working parties for specific topics bringing together companies and organisations representing the whole RTI-Supply Chain: Brand manufactures, growers, retailers, RTI manufactures, logistical service providers (LSP) and pool operators. The secretariat is provided by CCG in Cologne a member of EAN.

The mission of IC-RTI is:

- to enable and facilitate efficient business processes that support the use of RTI in the international flow of goods,
- to define and establish the necessary criteria for the technical and organisational compatibility of RTI,
- to facilitate competition in the use of RTI by developing and promoting these criteria as standards within the European Fast Moving Consumer Goods (FMCG) industry,
- to remove the barriers that both prevent the adoption of these initiatives and reduce the existing inefficiencies within the supply chain.

ACKNOWLEDGEMENTS

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We would also like to thank [Centrale für Coorganisation \(CCG\)](#) and [EAN International](#), who continue to provide valuable support and assistance to the RTI-Council and its activities.

ORGANISATIONAL COMPATABILITY

3. Organisational Compatability

Organisational Compatability is a basic requirement for increased efficiency throughout the Supply Chain. The current RTI-market situation shows the growing use of RTI applications areas as well as a growing diversity of RTI.

With organisational compatibility an effective control system can be created by all business partners for their own needs. The aim is to have simple, cost effective, compatible administrative procedures including deposit reimbursement and efficient logistics of full and empty RTI also including the possibility of combined collection. This guideline consists of the definition of terms, analysis of the business processes and transactions.

3.1. Objectives and scope

The implementation of reusable or non-reusable transport items is based on the user's decision. Depending on individual situations, a RTI-application costs or a disposable packaging system may prove to be more cost efficient. If a RTI application is preferred, the IC-RTI can demonstrate how to do it efficiently. Relevant work items are

- Defining relevant terminology
- Analysing and describing business processes
- Specification of Enabling Technologies (identification with the EAN numbering systems of EAN.UCC, EDI with EANCOM®)
- Development of Key Performance Indicators (KPI) for a RTI use
- Evaluating the impact of new technologies (RFID) and
- new business requirements (Tracking & Tracing)

3.2. Types of RTI

Definition of Reusable Transport Items (RTI)

RTI are all means to assemble goods for transportation, storage, handling and product protection in the supply chain which are returned for further usage, including for example pallets as well as all forms of reusable crates, trays, boxes, roll pallets, barrels, trolleys, pallet collars and lids with and without cash deposits.

The term RTI is usually allocated to secondary and tertiary packaging. But in certain circumstances also primary packaging may be considered as a form of RTI. Freight containers, trailers and other similar enclosed modules are not covered by the terminology

There are two "Main-streams" existing in managing RTI-systems

- Directly exchanged RTI e.g. white pallet, food load carriers (FLC)
- Pool organisation controlled

Both applications should be tailored in the most efficient way, including identification of the RTI with a minimum of costs, respectively a maximum of performance. Therefore the EAN.UCC system for identification of RTI is used for each of the RTI-systems in its appropriate way.

3.3. Criteria for Assessing the Impact of RTI

The following list is intended for use in considering the advantages and disadvantages of options for disposable, recyclable or reusable packaging. This is a complex subject, so this list is not exhaustive. The final decision about the usage of the type of transport items is based on the user's individual requirements. The direct costs of the packaging options appear at the bottom of the list

Class	Criteria	Explanation/Clarification/Examples
General	Regulation	Legislation, Directives, Regulation, Codes of Practice
	Standardisation	Space utilisation, modularity, automation, inter-operability, simplicity
	Comprehensiveness	Is each option suitable for the whole range of products? Cost of maintaining two systems (RTI, oneway)
	Availability	Time of year, geography
Transport	Aspects of Change	ROI, Disruption, speed of benefit delivery, project resources
	Weight / Volume	Impact on transport capacity
Handling & Storage	Load / Unload	Time, equipment, product damage impact on the cost of loading & unloading
	Automation	Need for certainty in dimension, weight, rigidity & stability
	Manual Handling	Impact on manual handling process
	Material handling equipment	Impact on material handling equipment like forklifter or conveyor belt
Protection	Packing & Emptying	Assembly of packaging; tear-down process for placing product on display
	Storage	Stackability & Rackability: space utilisation, stability, safety, product damage, access
	Information / RFID	Capability to display or carry information, compatibility with tracking systems
	Process Compatibility	With regard to moisture absorption, temperature tolerance
Environmental impact	Robustness	Protection against impact
	Access Control / Indication	Prevention / detection of unauthorised access, theft protection
	Cooling Efficiency	Airflow for temperature control, Chill-down, Insulation
	Hygiene	Need for cleanliness, avoidance of contamination
Display	Other Packaging	Need for additional protection
	Used Materials	What kind of resources are used for the production of the packaging
	Recycling capability	Can the packaging (RTI/One way) be recycled easily, Does the life cycle of the packaging influence the recycling capability?
Packaging Costs	Brand Awareness	Sales impact - Highlighting product presence
	Appearance	Impact of display, background colour
	Image	Emotional Impact, Environmental
	Special Messages	Packaging as message board, promotion, dangerous goods notices
Packaging Costs	Quantity Required	Stock Rotation, so how many uses per year? Consider seasonality, promotions etc
	Acquisition	Cost of purchase, expected life of RTI
	Disposal	Cost of disposal, environmental obligations, re-sale value
	Risk	Deposits, hire rates, loss charges
	Recovery & Refurbishment	Transport, administration, wash & repair, recycling, fluctuation
	Storage Costs of Empties	Troughs in demand, space efficiency when empty

4. Advantages of Asset Management

The efficient management of RTI requires the transparency of the supply chain. The most important condition is the coordination of information and the corresponding movement of the RTI. The following table shows some advantages that can be realised by optimising the management of RTI.

Supplier	Retailer	Pool Organisation Logistic Service Provider
<ul style="list-style-type: none"> ■ Avoidance of "RTI out" ■ Standardised RTI solution reduces entrance barriers 	<ul style="list-style-type: none"> ■ simplify the receiving of goods of stock" situations ■ Standardisation increases partnership potential 	<ul style="list-style-type: none"> ■ Higher servicelevel ■ Lower fluctuations in demand ■ Standardisation reduces cost (e.g. sorting)
<ul style="list-style-type: none"> ■ Reduction of asset stock 		
<ul style="list-style-type: none"> ■ Cost transparency 		
<ul style="list-style-type: none"> ■ Standardised RTI simplify the supply chain design (e.g. administration, logistical processes, shop design) 		
<ul style="list-style-type: none"> ■ Facilitate the tracking and tracing of individual RTI's 		
<ul style="list-style-type: none"> ■ Reducing the dwell time of RTI, thus reducing the total costs within the supply chain 		
<ul style="list-style-type: none"> ■ Loss of RTI is reduced leading to lower cost for refilling the pool 		
<ul style="list-style-type: none"> ■ Increasing the partnership between companies 		
<ul style="list-style-type: none"> ■ Higher transparency of the supply chain facilitating the analysis of critical points within the supply chain 		

The realisation of these advantages depends on the level of partnership as well as on the organisational and technical conditions.

5. Process Modelling

For the efficient management of RTI the IC-RTI has defined a basic process for the physical flow as well as for the informational flow. A functional approach has been chosen to describe the relevant aspects of a RTI supply chain.

5.1. Functions in RTI-Logistic

The relevant functions in RTI Management and RTI Logistics are RTI Supplier, RTI Pool Organiser, Supplier (RTI Despatcher), Retailer (RTI Receiver) and Logistical Service Provider:

- RTI Suppliers produce the RTI and sell the RTI to the Pool Organiser. The RTI Supplier is not in the main focus of this recommendation.
- The RTI Pool Organiser controls a RTI pool and makes them available to the supply chain.
- A Supplier (RTI-Despatcher) uses RTI in the distribution of his goods. Suppliers fill empty RTI with goods and hand over filled RTI to retailers. A supplier can be fillers, brand manufacturers, distribution centres, consolidation points etc.
- Retailers (RTI-Receiver) receive RTI from suppliers and make the RTI available for collection. RTI Receivers can be retailers, distribution centres, consolidation points etc.
- Logistical service providers (LSP) collect RTI from retailers and might offer additional services (cleaning and repair of the RTI). The LSP can be integrated in the information exchange.

A company can fulfil more than one of these functions: Please find below some examples:

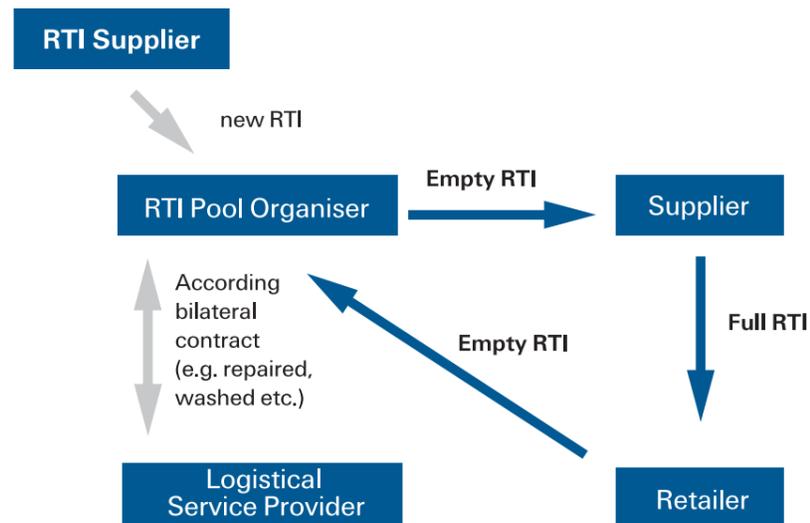
- A beverage producer can use his own crates for bottles, in this case he acts as a supplier and a pool organiser.
- A retail distribution centre (RDC) sends received units to its outlets, in this case the RDC acts as a RTI-receiver as well as a RTI-despatcher.
- A RDC can sort and collect empty crates after use, in this case the RDC acts as a RTI-receiver and a logistical service provider.

5.2. Process Description "Physical Flow"

The RTI supplier sends RTI into the pool. From this pool the pool organiser distributes empty RTI's to the supplier. The supplier sends the RTI with products to the retailer (back hauling and direct exchange is also possible, but not mentioned in the diagram), who sends back the empty RTI to the pool organiser.

On behalf of the RTI pool organiser a logistical service provider can be responsible for collecting and distributing the RTI as well as for the repair and the cleaning. On behalf of the RTI pool organiser a logistical service provider can be responsible for collecting and distributing the RTI as well as for the repair and the cleaning.

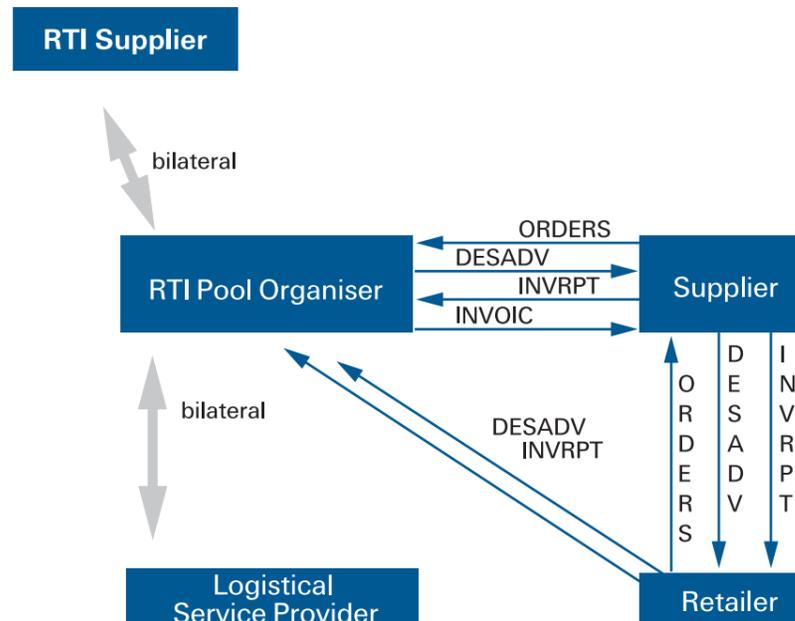
Figure 1
process description "physical flow"



5.3. Process Description "Informational Flow"

Emphasis has been made on the informational flow. The basic process for the informational flow includes a proposal for the allocation of EANCOM®-messages covering each step in the process. It reduces complex supply chain processes down to simple business process model.

Figure 2
process description "informational flow"



The supplier orders the RTI. Therefore a GTIN (Global Trade Item Number) for the RTI is needed. The RTI is handled like a regular product. As a consequence the standardised EANCOM messages (ORDERS; DESADV, INVOIC) are used. The inventory report is used to give a detailed report about the current stock of RTI. It can be also used for tracking and tracing of the RTI via the GRAI (Global Returnable Asset Identifier).

The EANCOM messages ORDERS and DESADV exchanged between the supplier and the retailer contain all essential information linked with the product traded between the partners. There can be a reference to the asset as a transport unit. The message INVRPT provides detailed information for the management of RTI.

5.4. Key Performance Indicators

The use of key performance indicators (KPI) will increase the efficiency of the management of RTI. The following key performance indicators have been defined by the IC-RTI:

RTI utilisation KPI:	$\frac{\text{total number of ordered articles}}{\text{total number of issued RTI}}$
This KPI indicates how efficient RTI are used by the supplier.	
Out of stock situation KPI:	$\frac{\text{total number of out of stock situations}}{\text{total number of orders}}$
This KPI can be used by any party of the supply chain.	
Product Quality KPI 1:	$\frac{\text{total number of damaged products within one way packaging}}{\text{total number of delivered products}}$
Product Quality KPI 2:	$\frac{\text{total number of damaged products within RTI}}{\text{total number of delivered products}}$
Product Quality KPI 3:	$\frac{\text{total number of damaged products within RTI}}{\text{total number of damaged products}}$
These KPI measure the performance of RTI compared to one way packaging.	
Efficiency KPI:	$\frac{\text{total number of RTI rotations}}{\text{total number of issued RTI}}$
This KPI is strongly affected by the dwell time at the retailer.	
RTI Quality KPI:	$\frac{\text{total number of damaged RTI}}{\text{total number of RTI}}$
This KPI is used mainly by the pool organiser to assess the quality of the RTI within the pool.	
Activity Based Costing KPI:	$\frac{\text{cost per RTI}}{\text{delivered SKU (stock keeping unit)}}$
This KPI measures the cost efficiency for the use of RTI to bring the SKU to the point of sale.	

6.1. Global Returnable Asset Identifier (GRAI) and Global Trade Item Number (GTIN)

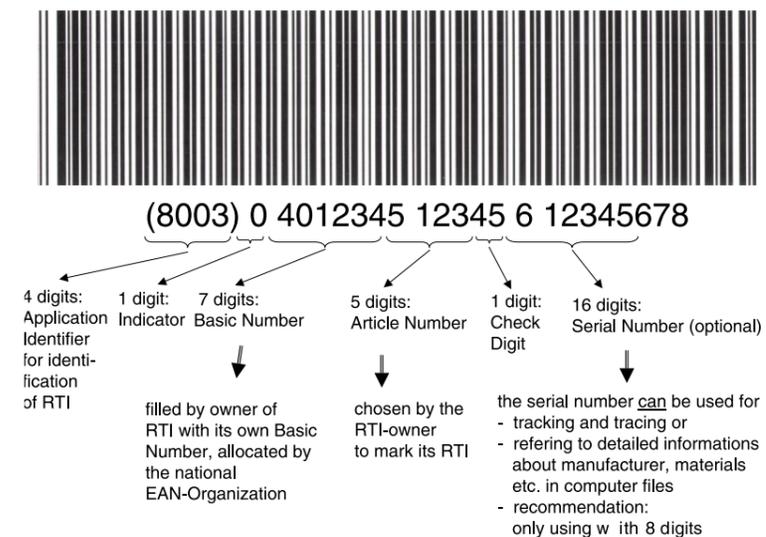
The identification of RTI depends on the application. In case of trading RTI, i.e. selling of a RTI to a buyer in connection with change of ownership, the RTI has to be identified by a GTIN. For RTI the GTIN is characterised as a virtual number used in Merchandise Information Systems but not labelled on or embed in the RTI. Relevant Processes are forecasting, ordering, buying, renting and reporting of inventories. Therefore the GTIN is used for the messages DELFOR, ORDERS, INVRPT.

In case of tracking & tracing RTI, the RTI must be identified by a GRAI. Application Identifier AI 8003 (= GRAI) gives computer application systems the task to interpret the first 14 digits as the GTIN of the returnable asset. In EANCOM® an asset is broadly defined as anything that is owned and not traded. The GRAI could be expanded by the addition of an optional serial number to enable a unique identification. The GRAI is physically labelled on or embedded in RTI and used for DESADV, INVRPT and RECADV.

The IC-RTI recommends: GRAI = 8003+ GTIN + serial number (optional). Although RTI and article information are different, the IC-RTI recommendation to use a GTIN allows to store the data in one database.

6.2. Barcoding According to EAN 128 Standard

Figure 3
Barcoding of the GRAI



note:
Meanwhile EAN International offers users the possibility to issue GTIN's and GRAI's with 8 and 9 digits company prefix. As consequence the article-number part is reduced down to 4 respectively 3 digits.

6.3. Issuing of Basic Number

6.3.1 Directly Exchanged RTI

Is a RTI once distributed the legal ownership and ownership changes do not matter during processing in the supply chain. (e.g. euro pallet, food load carriers (FLC)).

A dispatcher exchanges the loaded one standardised RTI for one empty RTI. The dispatcher does not expect or want the same RTI returned, it is sufficient to receive just one RTI of the same kind. It does not matter who originally brought in this RTI into the supply chain. What is just necessary for the RTI user as dispatcher is a balance of all dispatched and received RTI and the information who received the RTI (for RTI-receiver et vice versa).

Appropriate procedure for allocation of basic number:

The RTI Manufacturer is responsible for issuing the number for each RTI he manufactures:

The seven digit "Basic Number" identifies the RTI Manufacturer, the five digit "Article Number" is the number that identifies the product being manufactured.

Advantages

- Identical RTI will always have the same identification number in case that a serial number is not used
- Change of ownership will not require a change of number
- Attaching "numbers" during manufacture is the least expensive operation
- Additionally: Complete audit trail for material used in manufacture / recycling of RTI
- Normally when using this form of issuing the basic number the RTI-owners would have to identify their RTI by means of a combination of "Basic Number" + "Article Number" + the individual serial number in order to establish ownership of the RTI. But - as explained above - the ownership is not crucial for the direct exchange systems, therefore these procedures are not necessary

6.3.2. Pool Operator Controlled RTI

The pool-operators are the owners of the RTI. They control as a service provider the flow of RTI. Therefore each pool-operator find it easier to identify his equipment by using or scanning the GRAI based on his own basic number.

Appropriate procedure for allocation of basic number

The pool-operator as RTI owner is responsible for determining the RTI number of each item that he purchases. The seven digit "Basic Number" identifies the RTI owner, the five digit "Article Number" is the number allocated by the owner that identifies the product in the owners inventory.

Advantages

- pool-operators does not need to match different identification numbers when using the equipment of different RTI-manufacturers

Disadvantages

- It would have to be linked to the Manufacturers records to provide an audit trail for recycling etc
- If the ownership of the RTI changed, the numbers would have to be changed but to maintain data integrity the old history would have to be retained
- All changes in ownership must be traced and maintained in a central data base providing open access to all involved parties

6.4. Serial Number

The optional "Serial Number", used to identify the unique identity of a particular RTI, may in fact become the norm in either 8 or 16 digit format. These three options should be specified as the only possible options i.e. no serial number, an 8 digit number or a 16 digit number.

The addition of the "Serial Number" will provide the unique identity of the particular RTI and can be used in the following ways:

- Tracking & tracing of specific RTI (s. below)
- determining time of circulation for a specific RTI
- enabling a complete audit trail for material used in manufacture / recycling of RTI
- enabling a complete audit trail of products used with a specific RTI to fulfill requirements resulting from hygienic + health regulationsTI
- Logging responsibility for damage
- Accurate deposit reimbursement, both by value and to the right party, this could remove the need for deposit harmonisation. It would also simplify the return of RTI by home delivery customers as you could directly credit their account, wherever the RTI was returned
- RTI could be charged accurately on a daily basis to either Supplier or Retailer as they move through a Supply chain

7. Communication Standards for RTI-Management

Like all other goods or industry sectors the main preoccupation in RTI-management is how to optimise the RTI-movement and the related information flow between the business partners. Facing this challenge the using EANCOM® standard messages for RTI-management leads to the following benefits.

Optimised control of RTI-flow

- reliable goods-inward processing for goods and RTI
- reducing RTI inventories (minimising the pipeline effect)
- increasing the round trip speed of RTI
- Reducing shrinkage and “third-party-benefit-effect”
- Better collection of empty RTI
- wherever possible, replacing the settlement of deposits by accurate inventory tracking
- Giving RTI-suppliers a better survey on RTI-flows
 - Localising the RTI inventories
 - information on RTI-quantity
 - information on availability of RTI
- support of paperless processing of operations
- Better data quality, i.e.
 - Accelerated information flow between all business partners in RTI-management
 - unique identification of RTI, goods, locations and participants using EAN-UCC numbering system
 - minimising of manual operations and therefore Error-free invoicing / settlement
 - standardised data profiles also for remaining paper documents like delivery notes for a truck driver

8. Tracking & Tracing in RTI Applications

Whilst tracking and tracing the individual RTI asset the business partners can also track and trace the product being carried, the GRAI will provide a physical identification that can link to data records such as the Serial Shipping Container Code (SSCC). By doing this it will be possible to track the history of individual RTI and for example, establish any possible contaminants that may have been previously carried by particular RTI.

The unique identification is only guaranteed if the supplier use the serial number as mandatory part of the GRAI.

Additionally the DESADV message must be changed in case that the GRAI is used as a unique reference key for tracking & tracing. With other words: In an ideal world of “best practice” processes the GRAI is then an alternative key (beside the SSCC) to “open” the part of the DESADV message informing on the products and the used RTI:

The GRAI must be stored in a separate database to avoid a collision of numbers with the SSCC. To get an overall report of the flow of goods and logistical processes both databases must be consulted.

In case that only one database is used a collision of GRAI and SSCC can only be avoided when the serial number does not consist of 5 digits, example:
- SSCC = 3 40 25700 101360009 9
- GRAI = 3402570 01013 60009 9

9. Future Development - The Challenge of RFID

Radio Frequency Identification (RFID) is seen as one of the major, fast growing new technologies with high commercial impact. RFID provides solutions for applications which can only be covered insufficiently with conventional identification methods. Radio Frequency for Identification (RFID) is equal to the bar code a data carrier, but has different qualities. Major difference is the contactless transfer of data via electromagnetic waves and the possibility to capture several data carriers in one reading process. Due to these specific qualities RFID is seen as a supplementary solution to existing EAN-UCC Standards. It will not replace established bar code solutions.

Applications identified for a sensible employment of RFID are especially Reusable Transport Items and logistics in general.

Here RFID can efficiently fulfil long-life identification, Tracking & Tracing, stock management and more flexible service. RFID offers new possibilities and opportunities for the management of RTI: Now it becomes possible to capture the data of several RTI at once speeding up the time necessary for the receiving of e.g. empty RTI.

These application areas are characterised by the integration of many different, international participants along the supply chain. Therefore only a RFID standard which can be recognised by everyone unmistakably all over the world can bring the full benefit of RFID to open applications.

EAN.UCC offers concepts for such a standard. These concepts concern the data content as well as the air interface of RFID systems.

The key requirements on RFID systems users have also in the RTI "environment" are:

- development of ideally one single standardised EANoUCC air interface
- compatibility with already implemented infrastructure and internal computer systems
- this implies compatibility with EANoUCC numbering system
- and the transfer of the UCC/EAN 128 Application Identifier (AI) concept to the transponder technology

Altogether these user requirements lead to an RFID standard which can be achieved on a timely and straightforward basis by keeping the necessary investments as low as possible.

The IC-RTI has developed a separate document summarises the requirements defined by the IC-RTI to fulfil an efficient application of RFID-systems in the management of RTI. It is based on the results of G-TAG, the global tagging working group led by EAN International and UCC.

The IC-RTI supports the G-TAG. Additional requirements in RTI-management which requests for a higher performance of a RFID-system should be fulfilled by a combination of the G-Tag together with an appropriate reading/writing device, antenna system etc.

