



European Rail  
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## EIM POSITION PAPER ON RFID STANDARDS



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## Introduction:

In the Commission's decision 2006/861/EU of 28th July 2006 concerning the technical specification of interoperability (TSI) relating to the subsystem rolling stock, there is a section on RFID; Section 4.2.5.2 specifies that when RFID is used, it shall conform to ISO 18000-6 A and that it shall be possible to read the tags at a speed not exceeding 30 km/h.

The document further specifies that the reader shall provide unambiguous identification of the tag reader, unique identification of each wagon passing, and the time and date when the wagon passed.

In order to fulfil these requirements and be able to utilize the RFID technology in the best way there is a need to upgrade the chosen standard and information structure.

## Summary:

A study on standards conducted by the Swedish Railway Authority at the end of 2008 showed that ISO 18000-6 A is outdated. With limited products (ie. tags/transponders and readers) and few suppliers the system is limited in its use. It is therefore needed with an update of the standards to ISO18000-6 C as it fulfils the functional requirements better and is a well established RFID standard.

The standard is commonly known as EPC GEN 2 Class 1.

Disadvantages of ISO 18000-6 type A

- can only handle reading at low speed, approximately 30 km/h
- limited product availability (both tags and readers)
- few suppliers (low competition)
- can handle higher speeds
- large selection of suppliers and products
- standard used in other transport systems

The standard, ISO 18000-6 A, only defines the air interface between the transponder and the reader and does not specify the information structure in the transponder nor the format in which information is sent to the reading station. This means that apart from an upgrade of the air interface to ISO 18000-6 C, there is a need for the standardization of transponder data and the information protocol from the reader, so as to meet TSI requirements for unambiguous identification of the reader, unique identification of the rolling stock unit including time and date.

In specifying the requirements for the automatic rolling stock identification both the railroad system and the whole chain of transportation should be considered as one: it is advisable to have this in mind when the contents of an RFID message are defined. Identifying rolling stock units other than wagons such as locomotives and OTM'S is clearly an advantage.

## The importance of identification

A quick and accurate way of identifying rolling stock units is necessary to be able to link information from rolling stock monitoring equipment to the right unit at a relatively high speed. The experience shows that RFID is the best solution.

The implementation of RFID based on European standards will essentially result in increased competitiveness for railways as it will enable the infrastructure managers, rolling stock holders and operators to track and follow rolling stock units. It makes it

possible to identify problems with units at an early stage so that their maintenance can be planned in a proactive way in connection with rolling stock monitoring equipment, for example hot axle box detectors. By doing this deterioration and maintenance costs of the tracks and embankments will be reduced. This in turn will have a positive effect on traffic delays and the costs for infrastructure and rolling stock maintenance as well as its utilization.

Other benefits include a more efficient way of formatting the train, accurate information for rescue and safety agencies, and a better charging system for track fees based on actual use – mileage and weight. Track fees will in a short future increase in importance since that will be the only way for IMs to regulate vehicles wear on the track.

### **Effective use of the ISO18000-6 C**

ISO 18000 is the air interface between the tag and the reader and only defines the physical interaction between these units, so that products from different suppliers can understand each other. However, the standard does not define the data structure nor does it describe how to handle information from the reader. This means that even if ISO18000-6C is followed, standards to define the rolling stock unit identity, location of the reader, time and date are still needed.

Independent studies carried out in Sweden and Finland came to the conclusion that the use of open standards would be suitable in railway applications. For the tag data, an open standard similar to the one being used for container marking could be used. The standards also have open infrastructure solutions that would meet TSI's requirements for unique identification of rolling stock units, unambiguous identification of the reader, plus time and date. This would also enable cooperative interaction with other activities such as customs.

The benefits of introducing passive technology with standardization would lead to a more efficient and cost effective system, that is environmental friendly, competitive and can be used throughout Europe.

Within the EU sponsored Freight wise project that focuses on intermodal transport, there is a subproject A2 focusing on railway activities "train on time", that is also looking at the use of ISO18000-6 C standards.

### **Conclusion:**

In order to get the best utilization of RFID within the railway sector there is a need to upgrade the data transferring requirements mentioned in the TSI. Proposed changes to be done in TSI chapter 4.2.5.2.2 are as follows:

- Upgrade the air protocol from ISO 18000-6 type A to ISO 18000-6 type C
- Increase speed demands from 30 to at least the design speed of the rolling stock.
- Exclude demand on where to install reader equipment
- Standardized RFID message shall be included (minimum contents)

The requirement of the placing of the tags on the rolling stock shall remain.