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Freight containers — Electronic seals —

Part 2: Application requirements

Conteneurs pour le transport de marchandises — Scellés électroniques —

Partie 2: Exigences d'applications

ICS 55.180.10

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 18185, Part 2 was prepared by Technical Committee 104, Freight Containers, Subcommittee SC 4, Identification and communication, Working Group WG2, Automatic Identification Equipment (AEI) for containers and container related equipment.

Attention is drawn to the possibility that some of the elements of this part of ISO 18185 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 18185 consists of the following parts, under the general title *Freight containers— Electronic seals*:

- *Part 1: Communication protocol*
- *Part 2: Application requirements*
- *Part 3: Environmental characteristics*
- *Part 4: Data protection*
- *Part 5: Sensor interface (Request submitted for withdrawal of Work Item)*
- *Part 6: Messages sets for transfer between seal reader and host computer*
- *Part 7: Physical layer*

Introduction

This International Standard was prepared by ISO Technical Committee 104/Subcommittee 4/Working Group 2, using the drafting conventions of ISO/IEC Directives, Part 2.

This standard provides a system for the identification and presentation of information about freight container electronic seals. The identification system provides an unambiguous unique identification of the container seal, and its status.

The presentation of this information is provided through a radio-communications interface providing seal identification and a method to determine whether a freight container's seal has been opened.

Freight containers — Electronic seals —

Part 2: Application requirements

1 Scope

This International Standard specifies a freight container seal identification system, with an associated system for verifying the accuracy of use, having:

- A seal status identification system;
- A battery status indicator;
- A unique seal identifier including the identification of the manufacturer;
- Seal (tag) type

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 830, *Freight containers – Vocabulary*

ISO 8601, *Data elements and interchange formats - Information interchange - Representation of dates and times*

ISO 10374, *RF automatic identification*

ISO/TS 14816, *Road transport and traffic telematics -- Automatic vehicle and equipment identification – Numbering and data structure*

ISO 17712, *Freight containers – Mechanical seals*

ISO 18185-1, *Freight containers — Electronic seals — Part 1: Communication protocol*

ISO 18185-3, *Freight containers — Electronic seals — Part 3: Environmental characteristics*

ISO 18185-7, *Freight containers — Electronic seals — Part 7: Physical layer*

ISO/IEC 19762, Part 1, *Information Technology, Automatic Identification and Data Capture Techniques – Harmonized vocabulary – Part 1: General terms relating to Automatic Identification and Data Capture (AIDC)*

ISO/IEC 19762, Part 3, *Information Technology, Automatic Identification and Data Capture Techniques – Harmonized vocabulary – Part 3: Radio-Frequency Identification (RFID)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 830, ISO/IEC 19762, Parts 1 and 3, ISO 17712, and the following apply.

3.1 electronic seal eSeal

read-only, non-reusable freight container seal conforming to the high security seal defined in ISO 17712 and conforming to ISO 18185 or revision thereof that electronically evidences tampering or intrusion through the container doors.

3.2 seal identification Seal ID

unique identification of each manufactured seal incorporating serial number (i.e., Tag ID), and manufacturer ID; the combination of which shall be called seal ID.

3.3 interrogator identification Interrogator ID

code used to identify the source address during every communication session originated by the interrogator.

4 Seal application requirements

4.1 General

The seal shall be uniquely identified by the tag manufacturer ID and the tag ID (serial number) combination. This combination shall be called seal ID and shall be used in all point-to-point communication to uniquely identify a source (seal to interrogator) and destination address (interrogator to seal).

This International Standard shall be used in conjunction with the other Parts of ISO 18185.

4.2 Data description

Unique identification of each manufactured seal tag incorporating all necessary information such as seal tag ID, manufacturer ID and seal ID type.

The *seal ID* is permanently programmed into the seal during manufacturing and cannot be modified.

Seal Tag ID: the ID field (serial number) for the seal. The seal number is assigned by the user or the manufacturer and is programmed by the manufacturer. Further, the ID shall be marked on the exterior (casing) of the seal. Until the seal is closed and sealed it will not respond.

Seal Tag type: The manufacturer is responsible for determination of seal tag type, compliance with the high security seal requirements in ISO 17712, and programming (See also 4.7). Further, the seal tag type shall be marked on the exterior (casing) of the seal.

Battery life: The seal shall provide an indication of whether there is sufficient battery power to last for a trip of a duration of 60 days with a minimum of 20 interrogations per trip and minimum remaining battery life. Additionally, the manufacturer shall according to user's specifications to provide for the visual identification of the seal's "use by date" (represented in numeric ISO format, as defined in ISO 8601).

The Seal Status bit: the status bit that indicates the seal having been opened or sealed.

The Seal Tag Manufacture ID: this is the manufacturer identification of the tag. This identification is assigned in accordance with ISO/TS 14816.

The Seal Tag Manufacturer ID of the seal is programmed by the RF Component Manufacturer..

4.3 Date and time of sealing

The seal shall give indication of the date and time when it was sealed in the format CCYYMMDDHHMM (UTC), as defined in ISO 8601. The accuracy of the time compared to actual UTC shall be no worse than ± 5 seconds per day, as defined in ISO 18185-1.

4.4 Date and time of opening

The seal shall give indication of the date and time when it was opened in the format CCYYMMDDHHMM (UTC), as defined in ISO 8601. The accuracy of the time compared to actual UTC shall be no worse than ± 5 seconds per day, as defined in ISO 18185-1.

4.5 RF regulations

The device shall work according to the local radio regulations and ISO 18185-7.

4.6 Non-proprietary devices

The seals shall have the ability to be interrogated by a universal, non-proprietary reading device.

4.7 Environmental characteristics

The seals shall perform reliably in operating environments as defined in ISO 18185-3.

4.8 Mechanical characteristics

The seals shall have minimum mechanical characteristics in accordance with the high security provisions of ISO 17712.

4.9 Reading reliability and accuracy

The seals shall have minimum reading reliability and accuracy in accordance with the provisions of ISO 10374.

4.10 Reading range, speed, and discrimination

The seals shall have minimum reading range, as the electronic seals are moving in front of the reader at the speed and discrimination as follows:

Table 1 – Electronic seal speed, range, and discrimination

Speed	Range	Discrimination
<i>Kilometers per Hour</i>	<i>Meters</i>	<i>Meters</i>
50	1 to 10	3
30	1 to 10	1.5
0	0.1 to 2	1.2
Note: "Discrimination" means distance between two seals on different containers in order for them to be read correctly by the same reader		

Bibliography

- [1] ISO 10374.2, *Freight containers – RF automatic identification* (formerly Freight containers - Automatic Identification)
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- [3] ISO/IEC 18000-7, *Information Technology, Automatic Identification and Data Capture Techniques – Radio Frequency Identification (RFID) for Item Management – Air Interface Part 7: Parameters for an Active RFID Air Interface Communications at 433 MHz*
- [4] ISO 17363, *Supply chain applications of radio frequency identification (RFID) - Freight containers*
- [5] ISO 18185-4, *Freight containers — Electronic seals — Part 4: Data protection*
- [6] ISO 18185-6, *Freight containers — Electronic seals — Part 6: Messages sets for transfer between seal reader and host computer*