BS EN ISO 21007-2:2015

BSI Standards Publication

Gas cylinders — Identification and marking using radio frequency identification technology

Part 2: Numbering schemes for radio frequency identification

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN ISO 21007-2:2015. It supersedes BS EN ISO 21007-2:2013 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PVE/3/7, Gas containers - Gas cylinder (receptacle) operations.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2016

ISBN 978 0 580 82555 2

ICS 23.020.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 January 2016.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN ISO 21007-2

December 2015

ICS 23.020.30

Supersedes EN ISO 21007-2:2013

English Version

Gas cylinders - Identification and marking using radio frequency identification technology - Part 2: Numbering schemes for radio frequency identification (ISO 21007-2:2015)

Bouteilles à gaz - Identification et marquage à l'aide de la technologie d'identification par radiofréquences - Partie 2: Schémas de numérotage pour identification par radiofréquences (ISO 21007-2:2015)

Gasflaschen - Identifizierung und Kennzeichnung mittels Hochfrequenzidentifizierungstechnologie - Teil 2: Nummerierungssysteme für die Hochfrequenzidentifizierung (ISO 21007-2:2015)

This European Standard was approved by CEN on 1 April 2016.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 21007-2:2015) has been prepared by Technical Committee ISO/TC 58 "Gas cylinders" in collaboration with Technical Committee CEN/TC 23 “Transportable gas cylinders” the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2016, and conflicting national standards shall be withdrawn at the latest by June 2016.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 21007-2:2013.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 21007-2:2015 has been approved by CEN as EN ISO 21007-2:2015 without any modification.

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 58, *Gas cylinders*, Subcommittee SC 4, *Operational requirements for gas cylinders*.

This third edition cancels and replaces the second edition (ISO 21007-2:2013), which has been technically revised with the following changes:

— a new registration body has been added to Annex B;

— a new Annex E has been added;

— the former Annex C, which provided a list of RFID codes, as well as marks for gas cylinder manufacturers, has been removed from this part of ISO 21007 and will be published in a separate document, ISO/TR 17329.

ISO 21007 consists of the following parts, under the general title *Gas cylinders — Identification and marking using radio frequency identification technology*:

— *Part 1: Reference architecture and terminology*

— *Part 2: Numbering schemes for radio frequency identification*

Introduction

Cylinders can contain a wide variety of gases, and identification is of paramount importance. It could be desirable to identify not only the type of gas or liquid contained in the GC, but also such details as the filling station where the cylinder was filled, the batch of cylinders filled and the date the cylinder was filled.

Various methods and technologies such as physical identification through indentation; paper, card, metal and plastic labelling; colour code identification; bar coding and, in some circumstances, vision systems are already used to make or assist such identifications.

The technology of radio frequency identification (RFID) involves a reader/interrogator station that transmits a predetermined signal of inductive, radio or microwave energy to one or many transponders located within a read zone. The transponder returns the signal in a modified form to the reader/interrogator and the data are decoded. The data component in a portable gas or liquid cylinder environment provides the basis for unambiguous identification of the transponder and also can provide a medium for a bi-directional interactive exchange of data between the reader/interrogator and transponder. The signal can be modulated or unmodulated according to architecture of the system.

Recently, RFID has started using new, higher frequencies called ultra high frequency (UHF). These higher frequencies facilitate a faster reading and writing process and deliver longer reading/writing distances. Therefore, the UHF band frequency has been included in this part of ISO 21007. The aim of this part of ISO 21007 is to provide the data structure respectively suitable for all frequency bands including UHF.

In many cases, it is necessary or desirable to use one air carrier frequency and protocol; however, this will not always be the case. Within a global market, different applications could require different solutions for the carrier frequency (e.g. reading distance and velocity) and protocols (e.g. security, company rule).

However, there is benefit in using a standard common core data structure that is capable of upwards integration and expandable from the simplest low-cost cylinder identification system to more complex functions. Such a structure will have to be flexible and enabling rather than prescriptive, thus enabling different systems degrees of interoperability within and between their host systems.

The use of Abstract Syntax Notation One (ASN.1, as defined in the ISO/IEC 8824 series) from ISO/IEC 8824-1 as a notation to specify data and its associated Packed Encoding Rules (PER) from ISO/IEC 8825-2 is widely used and gaining popularity. Its usage will provide maximum interoperability and conformance to existing standards and will meet the specifically defined requirements for a generic standard model for gas cylinder identification in that it

— enables and uses existing standard coding,

— is adaptable and expandable,

— does not include unnecessary information for a specific application, and

— has a minimum of overhead in storage and transmission.

RFID standards other than ASN.1, for definition of frequencies and protocols, have been developed within recent years [see ISO/IEC 18000 (all parts)].

ISO 21007-1 provides a framework reference architecture for such systems. This part of ISO 21007 is a supporting part to ISO 21007-1 and provides a standardized yet flexible and interoperable framework for numbering schemes. This part of ISO 21007 details individual numbering schemes within the framework for the automatic identification of gas cylinders.

Central to the effective use of many of the constructs is a structure to provide unambiguous identification. This part of ISO 21007 provides a standardized data element construct for the automatic identification of gas cylinders.

The inconvenience of such a flexible concept is that a large storage memory is needed, particularly if a large amount of information has to be stored and read directly from the RFID tag.

The following two alternatives could be used to address this issue:

— limit the information directly accessible on the RFID tag and obtain the additional information from the host (ERP system);

— use a fixed data structure and length as shown in Annex E, as this can minimize the storage demand.

This part of ISO 21007 is intended to be used under a variety of national regulatory regimes, but has been written so that it is suitable for the application of the UN Model Regulations.[1] Attention is drawn to requirements in the relevant national regulations of the country (countries) where the cylinders are intended to be used that might override the requirements given in this part of ISO 21007. Where there is any conflict between this part of ISO 21007 and any applicable regulation, the regulation always takes precedence.

INTERNATIONAL STANDARD ISO 21007-2:2015(E)

Gas cylinders — Identification and marking using radio frequency identification technology —

Part 2: Numbering schemes for radio frequency identification

1 Scope

This part of ISO 21007 establishes a common flexible framework for data structure to enable the unambiguous identification in gas cylinder (GC) applications and for other common data elements in this sector.

This part of ISO 21007 enables a structure to allow some harmonization between different systems. However, it does not prescribe any one system and has been written in a non-mandatory style so as not to make it obsolete as technology changes.

The main body of this part of ISO 21007 excludes any data elements that form any part of transmission or storage protocols such as headers and checksums.

For details on cylinder/tag operations, see Annex A.

2 Normative references

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

ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country codes*

ISO 13769, *Gas cylinders — Stamp marking*

ISO/TR 17329, *Gas cylinders — Identification of gas cylinder manufacturer marks and their assigned radio frequency identification (RFID) codes*

ISO 21007-1:2005, *Gas cylinders — Identification and marking using radio frequency identification technology — Part 1: Reference architecture and terminology*

ISO/IEC 8824-1:2008, *Information technology — Abstract Syntax Notation One (ASN.1): Specification of basic notation — Part 1*

ISO/IEC 8825-2, *Information technology — ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*

ISO/IEC 18000-6, *Information technology — Radio frequency identification for item management — Part 6: Parameters for air interface communications at 860 MHz to 960 MHz General*

3 Terms, definitions and numerical notations

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 21007-1 and the following apply.