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Utgåva 1

Gasflaskor – Identifiering och märkning via radiofrekvensteknik –
Del 1: Referensarkitektur och terminologi
(ISO 21007-1:2005)

Gas cylinders – Identification and marking using radio frequency identification technology –
Part 1: Reference architecture and terminology
(ISO 21007-1:2005)

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English Version

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

Bouteilles à gaz - Identification et marquage à l'aide de la technologie d'identification par radiofréquences - Partie 1: Architecture de référence et terminologie (ISO 21007-1:2005)

Gasflaschen - Identifizierung und Kennzeichnung mittels Hochfrequenztechnologie - Teil 1: Referenzarchitektur und Terminologie (ISO 21007-1:2005)

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Contents

Foreword

This document (EN ISO 21007-1:2005) 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of an identical text or by endorsement, at the latest by January 2006, and conflicting national standards shall be withdrawn at the latest by January 2006.

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

Endorsement notice

The text of ISO 21007-1:2005 has been approved by CEN as EN ISO 21007-1:2005 without any modifications.

Introduction

Throughout industry and in commerce, trade and the domestic sector, the employment of gas cylinders to enable the local consumption and use of gases and liquids without the need for *in situ* high-cost permanent pressure vessel installations is an important part of modern practice.

Such cylinders may provide complex gas mixes for medical, industrial or research use.

The cylinders are made and used in a wide variety of shapes and sizes. All are controlled by international, regional or national regulations in respect of safety, and all require clear marking, and periodic safety checks and maintenance under the provisions of regulations for pressure testing. The requirements for testing will vary according to the design of the cylinder and its contents.

Although manufactured to a specific design for a specific content, the life of such cylinders may be long, often exceeding 50 years. During that lifetime, the cylinders may be used to contain different materials at different fill pressures. As a consequence, the amount of material contained in the cylinders may also vary. It is possible that during this lifetime the regulatory framework permitting and controlling their use may also change.

As the cylinders may contain a wide variety of gases, identification is of paramount importance. It is often mandatory to be able to uniquely identify each cylinder. As many contents are of limited life, and for product quality and liability tracking and tracing, in some circumstances it may be necessary or desirable to identify not only the type of gas or liquid, but also such details as filling station, batch and date of fill.

Various methods and technologies such as physical identification of cylinder characteristics through stamp marking (for information, see ISO 13769); paint (for information, see ISO 32), paper (for information, see ISO 7225), card, metal, and plastic labelling; colour code identification; bar coding and, in some circumstances, other means 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 signal is returned in a modified form to the reader/interrogator and the data are decoded. The data component in a gas cylinder's environment provides the basis for unambiguous identification of the transponder and may also provide a medium for a bi-directional interactive exchange of data between the host and transponder. The signal may be modulated or unmodulated according to the architecture of the system.

In many cases, it will be necessary or desirable to use one air carrier frequency and protocol, but this will not always be possible or even desirable in all situations, and it may be useful to separate fundamentally different cylinders by the response frequency.

However, there is benefit in using a standard common core data structure that is capable of upwards integration and is expandable from the simplest low-cost cylinder identification system to the 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) from ISO/IEC 8824 and ISO/IEC 8825 as a data identifier structure 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 portable gas container identification in that it

— enables and uses existing standard codings,

— is adaptable and expandable,

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

— has a minimum of overhead in storage and transmission.

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

Part 1: Reference architecture and terminology

1 Scope

This part of ISO 21007 establishes a common framework for data structure for unambiguous identification of single or manifolded gas cylinders and for other common data elements in this sector. It also serves as a terminology document in the area of radio frequency identification (RFID) technology.

The scheme and reference model architecture proposed is designed to be an enabling structure to allow some harmonization between different commercial systems and not prescriptive in determining any one system. It is not frequency or air interface protocol specific, provides maximum interoperability, has a high population capability and provides the possibility of upwards migration to more capable systems.

This part of ISO 21007 provides a reference structure within which the key core elements of the data structure form an unambiguous identification that may be used to identify the message as a message from a gas cylinder within an electronic data interchange (EDI) environment and provides an application reference identifying that different data structure is contained in the message. A wide variety of such systems can be supported within the structure determined in this part of ISO 21007 such as identification of specialty gases and different gas applications. Each such system may range from individual simple identification to identification of such factors as content, fill date, history of use, etc.

This part of ISO 21007 does not include the air interface or any aspect of the equipment, solely the data element structure. Subsequent parts of ISO 21007 will define the data structures for gas cylinders and for specific sectors of application.

The numbering scheme views the Identification (ID) as a data element, and the common basic data structure is defined as a data identifier code. The adoption of the Abstract Syntax Notification (ASN.1) structure in a form to meet the requirements of this and subsequent subordinate parts of ISO 21007 enables the ISO 21007 series of standards to meet its objectives of

— being adaptable and expandable,

— providing a migration path to enhancement and future developments,

— avoiding carrying unnecessary information for irrelevant applications in any data construct,

— using existing standard codings wherever possible, and

— carrying a minimum of overhead in storage and transmission.

2 Terms, definitions and abbreviated terms

For the purposes of this document, the following terms, definitions and abbreviated terms apply.

2.1
address
character or sequence of characters designating the originating source or destination of data being transmitted

2.2
air interface
conductor-free medium, usually air, between a transponder and the reader/interrogator through which the linking of the transponder to the reader/interrogator is achieved by means of a signal of radio, microwave or inductive frequencies

2.3
antenna
structure for transmitting/receiving electromagnetic or radio signals

2.4
ASCII
American Standard Code for Information Exchange
standard form of bit encoding providing the identification of 128 standard keyboard characters

NOTE The standard ASCII character set is of 7 bits separated by 1 or 2 stop bits.

cf. **extended ASCII**

2.5
ASN.1
Abstract Syntax Notation One
International Standard for representing data types and structures

NOTE CCITT published the first version of the standard as x.409 in 1984. A newer version of ASN.1 resulting from a cooperative venture of CCITT and ISO was specified in x.208 (1988) of CCITT and ISO/IEC :1990. The latest version is specified in ISO/IEC 8824-1:2002 to ISO/IEC 8824-4:2002.

2.6
automatic equipment identification
system of identification for equipment that uses the surface transportation infrastructures by means of transponders and interrogators combined with the unambiguous data structure defined in this part of ISO 21007

2.7
automatic identification system
system for achieving accurate and unambiguous identification of a data bearing label, tag, transponder or a natural/prescribed feature, the data or feature being interrogated by means of a system-appropriate source

2.8
bit
binary digit, which can take the value 0 or 1

2.9
bits per second
bps
measure of the information transfer rate of a data channel