

# INTERNATIONAL STANDARD

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**28219**

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## **Packaging — Labelling and direct product marking with linear bar code and two-dimensional symbols**

*Emballage — Étiquetage et marquage direct sur le produit avec un  
code à barres et des symboles bidimensionnels*



Reference number  
ISO 28219:2017(E)

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## ISO 28219:2017(E)



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## ISO 28219:2017(E)

### 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](http://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](http://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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by Technical Committee ISO/TC 122, *Packaging*.

This second edition cancels and replaces the first edition (ISO 28219:2009), which has been technically revised.

## Introduction

Today, global industries widely use machine-readable markings on products for inventory control, quality control, and product life cycle management. Common technologies, data structures, conformance, and applications standards are necessary to enable all trading partners to use such markings internally and throughout the supply chain.

A number of different product labelling and marking standards exist, each designed to meet the requirements of the specific industry sector. For effective and economic use within and between industry sectors, one common multi-industry standard is a necessity.

A standard linear bar code or two-dimensional symbol marked on a product or part will facilitate the automation of inventory control, quality control, and product life cycle management. The linear bar code or two-dimensional symbol information on the product can be used as a key to access the appropriate database that contains detailed information about the product, including information transmitted via EDI. In addition, a product mark can contain other information as agreed between the trading partners.

This document does not supersede or replace any applicable safety or regulatory marking or labelling requirements. This document is meant to satisfy the minimum product package requirements of numerous applications and industry groups. As such, its applicability is to a wide range of industries, each of which can have specific implementation guidelines for this document. This document is intended to be applied in addition to any other mandated labelling requirements.

This document supersedes and replaces ANS MH10.8.7.

This document supersedes and replaces CEA-802.

This document supersedes and replaces CEA-621-A.



# Packaging — Labelling and direct product marking with linear bar code and two-dimensional symbols

## 1 Scope

This document

- defines minimum requirements for identifying items,
- provides guidelines for item marking with machine-readable symbols,
- covers both labels and direct marking of items,
- includes testing procedures for label adhesive characteristics and mark durability,
- provides guidance for the formatting on the label of data presented in linear bar code, two-dimensional symbol or human-readable form,
- is intended for applications which include, but are not limited to, support of systems that automate the control of items during the processes of:
  - production,
  - inventory,
  - distribution,
  - field service,
  - point of sale,
  - point of care,
  - repair, and
- is intended to include, but it is not limited to, multiple industries including:
  - automotive,
  - aerospace,
  - chemical,
  - consumer items,
  - electronics,
  - health care,
  - marine,
  - rail,
  - telecommunications.

The location and application method of the marking are not defined (these will be reviewed and agreed upon by suppliers and manufacturers and their trading partners before implementing this document).

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This document does not supersede or replace any applicable safety or regulatory marking or labelling requirements. This document is meant to satisfy the minimum item marking requirements of numerous applications and industry groups and as such its applicability is to a wide range of industries, each of which may have specific implementation guidelines for it. This document is to be applied in addition to any other mandated labelling direct-marking requirements.

The labelling and direct marking requirement of this document and other standards can be combined into one label or marking area or appear as separate labels or marking areas.

This document uses the terms “part marking” and “item marking” interchangeably. Unless otherwise stated, this document will use the term “item marking” to describe both the labelling and direct part marking (DPM) of an item, where DPM includes, but is not limited to, altering (e.g. dot peen, laser etch, chemical etch), as well as additive type processes (e.g. ink jet, vacuum deposition).

The purpose of this document is to establish the machine-readable (linear, two-dimensional, and composite symbols) and human-readable content for direct marking and labelling of items, parts, and components.

This document provides a means for items, parts and components to be marked, and read in either fixtured or hand-held scanning environments at any manufacturer’s facility and then read by customers purchasing items for subsequent manufacturing operations or for final end use. Intended applications include, but are not limited to, supply chain applications, e.g. inventory, distribution, manufacturing, quality control, acquisition, transportation, supply, repair, and disposal.

The figures are illustrative and not necessarily to scale or to the quality requirements specified in this document.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 21067, *Packaging — Vocabulary*

ISO/IEC 646, *Information technology — ISO 7-bit coded character set for information interchange*

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

ISO/IEC 15415, *Information technology — Automatic identification and data capture techniques — Bar code symbol print quality test specification — Two-dimensional symbols*

ISO/IEC 15416, *Automatic identification and data capture techniques — Bar code print quality test specification — Linear symbols*

ISO/IEC 15417, *Information technology — Automatic identification and data capture techniques — Code 128 bar code symbology specification*

ISO/IEC 15434, *Information technology — Automatic identification and data capture techniques — Syntax for high-capacity ADC media*

ISO/IEC 15438, *Information technology — Automatic identification and data capture techniques — PDF417 bar code symbology specification*

ISO/IEC 15459-2, *Information technology — Automatic identification and data capture techniques — Unique identification — Part 2: Registration procedures*

ISO/IEC 16022, *Information technology — Automatic identification and data capture techniques — Data Matrix bar code symbology specification*

ISO/IEC 16388, *Information technology — Automatic identification and data capture techniques — Code 39 bar code symbology specification*

ISO/IEC 18004, *Information technology — Automatic identification and data capture techniques — QR Code bar code symbology specification*

ISO/IEC 19762, *Information technology — Automatic identification and data capture (AIDC) techniques — Harmonized vocabulary*

ISO/IEC 24723, *Information technology — Automatic identification and data capture techniques — GS1 Composite bar code symbology specification*

ISO/IEC 24728, *Information technology — Automatic identification and data capture techniques — MicroPDF417 bar code symbology specification*

ANS ATIS-0300213, *American National Standard for Telecommunication — Coded Identification of Equipment Entities of the North American Telecommunications System for Information Exchange*

ANS MH10.8.2, *Data Application Identifier Standard*

Dun & Bradstreet (D&B), *DUNS®<sup>1</sup>Number*

GS1, *General Specifications*

NAMSA, *ACodP-1(D)*, Chapter 2, Subsection 242-243, (NCAGE)

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/IEC 19762 and ISO 21067 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

#### 3.1

##### **cell**

smallest element of a two-dimensional matrix symbol

#### 3.2

##### **CLEI<sup>TM2</sup> code**

coding structure maintained by Telcordia d.b.a. iconectiv that identifies communications equipment and describes product type, features, source document and associated drawings and vintages per ANS ATIS-0300213

#### 3.3

##### **components**

parts (bare printed circuit board, integrated circuits, capacitor, diodes, switch, valve, spring, bearing, bracket, bolt, etc.) of a *first level/modular assembly* (3.6)

#### 3.4

##### **data element separator**

specified character used to delimit discrete fields of data

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1) DUNS® Number is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

2) CLEI<sup>TM</sup> coder is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

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### 3.5

#### **DUNS®<sup>3)</sup> Number**

nine-digit number, issued by D&B, assigned to each business location in the D&B database, having a unique, separate, and distinct operation for the purpose of identifying them

### 3.6

#### **first level**

#### **modular assembly**

manufactured item (3.8) (populated printed circuit board, hydraulic pump, starter, dashboard assembly, door assembly, etc.) made up of *components* (3.3)

### 3.7

#### **Global Trade Item Number**

#### **GTIN**

GS1 identification key used to identify trade items

Note 1 to entry: The key comprises a GS1 Company Prefix, an item reference and a check digit.

### 3.8

#### **item**

#### **product**

first level or higher assembly that is sold in a complete end-usable configuration

### 3.9

#### **label**

adhesive backed media capable of being marked with information in machine-readable and/or human-readable form

Note 1 to entry: Both labels and direct marking methods are referred to in this document under the term "label".

### 3.10

#### **manufacturer**

actual producer or fabricator of an *item* (3.8), not necessarily the *supplier* (3.11) in a transaction

### 3.11

#### **supplier**

party that produces, provides, or furnishes an *item* (3.8) or service

### 3.12

#### **traceability identification**

string of characters assigned to identify or trace an entity or a unique group of entities (e.g. lot, batch, *item* (3.8), revision/version or serial number)

## 4 Requirements

### 4.1 Identification

#### 4.1.1 General

Enterprises may choose to assign uniqueness to items at the individual, group, or product level. Individual uniqueness requires serialization or one-of-a-kind production, see 4.1.2 and 4.2.3.3. A lot or batch number captures group uniqueness, see 4.1.3 and 4.2.3.3. A product code is an example of item uniqueness, see 4.2.3.4.

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3) DUNS® Number is an example of a suitable product available commercially. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of this product.

### 4.1.2 Unique item identification

Items may be assigned a unique item identification code to each instance of the item, i.e. serialization. Serial numbers shall be unique either within an enterprise ID or within enterprise ID + part number. When using unique identification, the encoded symbol shall contain only one enterprise identifier, serial number and/or original part number to avoid confusion and ensure uniqueness.

### 4.1.3 Lot or batch identification

Items can have group uniqueness applied by an enterprise. Some items are assigned group identification, e.g. lot or batch number.

## 4.2 Data format common requirements

### 4.2.1 General

Those implementing this document should refer to the guidelines for their particular industries. For a partial list of industry guidelines, see the Bibliography.

### 4.2.2 General format

#### 4.2.2.1 Overview

Labels will accommodate both mandatory and optional data fields. The maximum length of each discrete data field shall be 25 data characters unless otherwise specified. This character count is exclusive of overhead characters.

See [Annex H](#) for information on serialization of some electronic products.

All data elements encoded in a machine-readable medium shall be preceded by the appropriate Data Identifier (DI) as defined in ANS MH10.8.2 Data Identifier, or the appropriate Application Identifier (AI) defined in the GS1 General Specifications. The exceptions to this rule are the UPC-A, UPC-E, EAN-8, and EAN-13 symbologies.

The choice between DIs and GS1 AIs, for any user, will normally be determined in the applicable industry convention being followed.

Other industries developing item identification conventions should consider business practices, information requirements and systems capabilities of the trading partners in choosing between DIs and GS1 AIs. See [Annex B](#) for a list of commonly used DIs and the equivalent AIs.

The character set shall be upper case alphabetic characters (A to Z), numeric digits (0 to 9), and the five characters [dash (-), period (.), space ( ), solidus (/) and plus sign (+)], as permitted within the applicable identifier standard, ANSI MH10.8.2 or the GS1 General Specification. Further, the recommended field separators, record separators, segment terminators and compliance indicator contained in ISO/IEC 15434 are part of the allowable character set. A table of these characters and their hexadecimal and decimal equivalent is given in [Annex C](#). The actual character set employed conforming to this document shall be the character set permitted by the data field and not the symbology. It is recommended that the resultant data stream from scanning a 2D symbol follow the syntax described in ISO/IEC 15434. See [Annex D](#) for guidance on the implementation of the ISO/IEC 15434 data syntax.

#### 4.2.2.2 Data identifiers (DIs)

The descriptions in the DI list are general in nature and are used in industrial and international applications. Specific application guidelines provide the detailed definition used among trading partners.

The full list of registered DIs and the full specification for their use are found in the American National Standard MH10.8.2.