INTERNATIONAL STANDARD

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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

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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.

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.

ISO 28219 was prepared by Technical Committee ISO/TC 122, *Packaging*.

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 may 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 may contain other information as agreed between the trading partners.

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

1 Scope

This International Standard

— 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;

  — 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.

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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 International Standard).

This International Standard does not supersede or replace any applicable safety or regulatory marking or labeling requirements. This International Standard 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 International Standard is to be applied in addition to any other mandated labeling direct-marking requirements.

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

This International Standard uses the terms "part marking" and "item marking" interchangeably. Unless otherwise stated, this document will use the term "item marking" to describe both the labeling 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 International Standard is to establish the machine-readable (linear, two dimensional, and composite symbols) and human readable content for direct marking and labeling of items, parts, and components.

This International Standard provides a means for items, parts and components to be marked, and read in either fixtured or handheld 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 International Standard.

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/IEC 646, *Information Processing — ISO 7-Bit Coded Character Set for Information Interchange*

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

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

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

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

ISO/IEC 15418, *Information technology, Automatic identification and data capture techniques — GS1 Application Identifiers and ASC MH10 Data Identifiers*

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

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

ISO/IEC 15459-2, Information technology — *Unique identifiers — Part 2: Registration procedures*

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

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

ISO/IEC 18004, Information technology — *Automatic identification and data capture techniques — QR Code 2005 bar code symbology specification*

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

ISO 21067, *Packaging — Vocabulary*

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

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

ANS MH10.8.2, *Data Application Identifier Standard*

AIM DPM-1, *Direct Part Mark (DPM) Quality Guideline*

ASTM D1000-93, *Pressure-Sensitive Adhesive-Coated Tapes Used for Electrical and Electronic Applications*

Dun & Bradstreet, *DUNS® Number*

GS1 *General Specifications*

International Symbology Specification — *GS1 Composite Symbology*

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.

3.1
cell
smallest element of a two-dimensional matrix symbol

3.2
CLEI^{TM} code
coding structure maintained by Telcordia that identifies communications equipment, in a concise, uniform feature-oriented language, describing product type, features, source document and associated drawings and vintages

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

3.4
data element separator
specified character used to delimit discrete fields of data

3.5
first level
modular assembly
manufactured item (populated printed circuit board, hydraulic pump, starter, dashboard assembly, door assembly, etc.) made up of components

3.6
intrusive marking
device designed to alter a material surface to form a human- or machine-readable symbol

NOTE   Intrusive marking includes, but is not limited to, devices that abrade, burn, corrode, cut, deform, dissolve, etch, melt, oxidize or vaporize a material surface. Intrusive marking methods include laser etch, chemical etch, dot peen and micro-sandblast.

3.7
item
product
first level or higher assembly that is sold in a complete end-usable configuration

3.8
label
adhesive backed media capable of being marked with information in machine-readable and/or human-readable form

NOTE   Both labels and direct marking methods are referred to in this International Standard under the term "label".

3.9
manufacturer
actual producer or fabricator of an item; not necessarily the supplier in a transaction

3.10
non-intrusive marking
method of forming markings by adding material to a surface

NOTE   Non-intrusive marking methods include ink jet, laser bonding, liquid metal jet, silk screen, stencil and thin film deposition.

3.11
supplier
party that produces, provides, or furnishes an item or service

3.12
syntax
manner in which data is put together to form messages

NOTE 1   Syntax also includes rules governing the use of appropriate identifiers, delimiters, separator character(s), and other non-data characters within the message.

NOTE 2   Syntax is the equivalent to grammar in spoken language.

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 4.2.2.2. A lot or batch number

captures group uniqueness, see 4.1.3 and 4.2.2.2. A product code is an example of item uniqueness, see 4.2.2.3.

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

Those implementing this International Standard should refer to the guidelines for their particular industries. For a partial list of industry guidelines see the bibliography.

4.2.1   General format

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.

All data elements encoded in a machine-readable medium shall be preceded by the appropriate data identifier (DI) as defined in ISO/IEC 15418 and ANS MH10.8.2 Data Identifier, or the appropriate application identifier (AI) defined in ISO/IEC 15418 and 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.

4.2.1.1   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 amongst 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.

DIs may be used with any alphanumeric data carrier and are designed to ensure cross-industry commonality of data identifiers used in automatic identification technologies.

DIs have a format of one alphabetic character alone, or one alphabetic character prefixed by one, two or three numeric characters.

4.2.1.2   GS1 Application Identifiers (AIs)

The definitions of the GS1 AIs are supported by application guidelines. The GS1 AIs, and associated guidelines, have been designed for international and multi-sector trading purposes.