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# General rules of two dimensional barcodes for traceability

追溯二维码技术通则

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# General rules of two dimensional barcodes for traceability

## 1 Scope

This document specifies the basic requirements, data structure, information processing, symbols and symbol quality requirements for two dimensional barcodes for traceability.

This document applies to the establishment, management and application of traceability systems using two-dimensional barcodes as information carriers.

## 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 version corresponding to that date is applicable to this document; for undated references, the latest version (including all amendments) is applicable to this document.

GB/T 1988-1998, Information technology - 7-bit Coded character set for information interchange

GB/T 12905-2019, Bar code terminology

GB/T 16986-2018, Bar code for commodity - Application identifier

GB/T 23704, Two-dimensional bar code symbol print quality test

GB/T 33993-2017, Two dimensional code for commodity

GB/T 38155-2019, Important product traceability - Traceability terminology

## 3 Terms and definitions

Terms and definitions determined by GB/T 12905-2019, GB/T 16986-2018 and GB/T 38155-2019, as well as the following ones are applicable to this document.

**3.1**

**Two dimensional barcodes for traceability**

Two-dimensional barcodes that carry key traceability information.

**3.2**

**Application identifier, AI**

Characters that identify the meaning and format of data, consisting of 2 ~ 4 digits.

[Source: GB/T 16986-2018, 3.1]

# 4 Basic requirements

## 4.1 General

The two dimensional barcodes for traceability shall be based on the identification object corresponding to the traceability system; an appropriate data structure shall be selected, to be in one-to-one correspondence with its traceability accuracy. A two dimensional barcode for traceability shall be given when the traceability unit is generated; the barcode shall accompany the entire life cycle of the traceability unit. The coding of the two dimensional barcodes for traceability shall adopt the international common coding technology; the identification of the two dimensional barcodes for traceability shall adopt the two-dimensional code symbology with international standards or national standards.

## 4.2 Identification objects

The identification objects of the two dimensional barcodes for traceability are traceability participants, traceability units, physical locations and transaction information. Among them, traceability units include trade traceability unit, logistics traceability unit, freight traceability unit, asset traceability unit and document traceability unit.

# 5 Data structure

## 5.1 General requirements

### 5.1.1 Data structure types

The data structure of the two dimensional barcodes for traceability is divided into coded data structure and URL data structure. Refer to 5.1.2 for coded data structure, and 5.1.3 for URL data structure.

### 5.1.2 Coded data structure

The coded data structure consists of one or more required unit data string(s) and optional unit data string(s) in sequence. Each unit data string consists of an application identifier (AI) and an application identifier data field. The application identifier shall comply with the provisions of GB/T 16986-2018; the meaning, format and unit data string name of the application identifier and its corresponding data coding shall comply with the provisions of Appendix A. The characters shall contain all the characters in Table 2 of GB/T 1988-1998, and shall comply with the provisions of Appendix B.

# 6 Information processing

## 6.1 Analysis of coded data structures

When the terminal scans and reads the two dimensional barcode for traceability of the traceability unit, the information carried by the two-dimensional code shall be analyzed. For each unit data string contained in the two dimensional barcode for traceability of the traceability unit, according to the analyzed application identifier, look up table A.1 to obtain the name of the unit data string and the corresponding application identifier data field and transmit it to the local information management system or network information system for processing. The name of the unit data string and the corresponding application identifier data field shall be separated by ":", and the information of different unit data strings shall be displayed in separate lines.

**EXAMPLE:**

The encoded information character string in the two dimensional barcode for traceability of a trade traceability unit is:

(01)06901234567892(10)A1000B0000(21)C51031902101083826

The encoded information format obtained after the terminal scans the two dimensional barcode for traceability of the trade traceability unit is:

Global Trade Item Number: 06901234567892

Batch or Lot Number: A1000B0000

Serial Number: C51031902101083826

**Note:** The brackets on both sides of the application identifier (such as "01", "10", "21", etc.) in the example of the encoded data structure are only for the convenience

of distinguishing the application identifier; they are not part of the identifier, and shall not be stored in the two-dimensional code.

### 6.2 Information services for URL data structures

When the terminal scans the two dimensional barcode for traceability, according to the interface and parameter definition of the relevant traceability service, access the service address pointed to by the URI in the two dimensional barcode for traceability to obtain the relevant traceability service information.

## 7 Symbols

### 7.1 Symbology

The two-dimensional code symbology with international or national standards such as ISO Han Xin Code, QR Code or Data Matrix Code shall be used for two dimensional barcodes for traceability.

### 7.2 Size

The size of the two dimensional barcodes for traceability shall be comprehensively determined according to the coding content, error correction level, reading device and system, and the allowable space of the label. If necessary, it needs to be determined by relevant adaptive experiments. The minimum module size should not be less than 0.254 mm.

### 7.3 Location

The identification carrier of the two dimensional barcodes for traceability shall be pasted or etched on the traceability unit, or attached to the tray containing the traceability unit or the attached document, until the traceability unit is no longer required. The selection of the location of the two dimensional barcodes for traceability shall meet the following conditions:

-- The selection of the identification location shall ensure that the identification symbol is not deformed or defaced;

-- The selection of the identification location shall be easy to scan and easy to read.

## 8 Symbol quality requirements

### 8.1 Requirements for symbol quality grade

The symbol grade of the two-dimensional barcode for traceability shall not be lower than 1.5/××/660. Where:

**Figure C.6 – Two dimensional barcode for traceability of the consignment traceability unit of Han Xin code**

### C.3.2 Example of two dimensional barcode for traceability of the shipment traceability unit

#### C.3.2.1 Example of two dimensional barcode for traceability of the shipment traceability unit based on coded data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a shipment traceability unit is:

(402)69012345678901238(420)45458

Use the GS1 data matrix code, to obtain the two dimensional barcode for traceability of the shipment traceability unit, as shown in Figure C.7.

**Figure C.7 – Example of two dimensional barcode for traceability of the shipment traceability unit of data matrix code**

Use the GS1 QR code, with the error correction level of L (7%), to gain the two dimensional barcode for traceability of the logistics traceability unit, as shown in Figure C.8.

**Figure C.8 – Example of two dimensional barcode for traceability of the shipment traceability unit of QR code**

#### C.3.2.2 Example of two dimensional barcode for traceability of the shipment traceability unit based on URL data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a shipment traceability unit is:

(402)69012345678901238(420)45458

The information service address of the two dimensional barcode for traceability of the shipment traceability unit is:

https://example.com/402/690123456789012 38?420=45458

Use the Han Xin code encoding, with the error correction level of L2 (15%), to gain the two dimensional barcode for traceability of the shipment traceability unit, as shown in Figure C.9.

**Figure C.9 – Two dimensional barcode for traceability of the shipment traceability unit of Han Xin code**

## C.4 Example of two dimensional barcode for traceability of the asset traceability unit

### C.4.1 Example of two dimensional barcode for traceability of the returnable asset traceability unit

#### C.4.1.1 Example of two dimensional barcode for traceability of the returnable asset traceability unit based on coded data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a returnable asset traceability unit is:

(8003)0690123456789200000 8(420)45458

Use the GS1 data matrix code, to obtain the two dimensional barcode for traceability of the returnable asset traceability unit, as shown in Figure C.10.

**Figure C.10 – Example of two dimensional barcode for traceability of the returnable asset unit of data matrix code**

**Figure C.17 – Example of two dimensional barcode for traceability of the logistics traceability unit of QR code**

### C.5.2 Example of two dimensional barcode for traceability of the document traceability unit based on URL data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a document traceability unit is:

(253)2536901234567892document1

The information service address of the two dimensional barcode for traceability of the document traceability unit is:

https://example.com/253/2536901234567892document1

Use the Han Xin code encoding, with the error correction level of L2 (15%), to gain the two dimensional barcode for traceability of the document traceability unit, as shown in Figure C.18.

**Figure C.18 – Two dimensional barcode for traceability of the document traceability unit of Han Xin code**

## C.6 Example of two dimensional barcode for traceability of the location traceability unit

### C.6.1 Example of two dimensional barcode for traceability of the location traceability unit based on coded data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a location traceability unit is:

(414)0614141123452(254)32a/b

Use the GS1 data matrix code, to obtain the two dimensional barcode for traceability of the location traceability unit, as shown in Figure C.19.

**Figure C.19 – Example of two dimensional barcode for traceability of the location traceability unit of data matrix code**

Use the GS1 QR code, with the error correction level of L (7%), to gain the two dimensional barcode for traceability of the location traceability unit, as shown in Figure C.20.

**Figure C.20 – Example of two dimensional barcode for traceability of the location traceability unit of QR code**

### C.6.2 Example of two dimensional barcode for traceability of the location traceability unit based on URL data structure

Assume that the encoded information character string of the two dimensional barcode for traceability of a location traceability unit is:

(414)0614141123452(254)32a/b

The information service address of the two dimensional barcode for traceability of the location traceability unit is:

https://example.com/414/0614141123452/254/32a%2Fb

Use the Han Xin code encoding, with the error correction level of L2 (15%), to gain the two dimensional barcode for traceability of the location traceability unit, as shown in Figure C.21.

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