MH10.8.1 – 2005

Automatic Identification and Data Capture Techniques Used in Shipping, Receiving, and Transport Applications

Approved: 26 September 2005

Abstract

Specifies minimum requirements for design of labels containing linear bar code and two-dimensional (2D) symbols on transport units to convey data between trading partners; provides for traceability of transported units via a Unique Transport Unit Identifier (license plate); provides guidance for formatting data; provides specific symbology recommendations; specifies quality requirements; makes recommendations as to label placement, size, free text and graphics; provides label material guidance.

Developed by:

MH10 Committee, Unit-Loads and Transport-Packages
Subcommittee 8, Coding & Labeling of Unit-Loads

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Material Handling Industry
8720 Red Oak Blvd., Suite 201
Charlotte, NC 28217-3992
standards@mhia.org

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American National Standards Institute, Inc.

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Foreword (This foreword is not part of American National Standard MH10.8.1 – 2005)

This standard is an application standard for the marking of product packages with linear bar code and two-dimensional symbols. It defines minimum requirements for identifying product packages that are distributed outside the originating location. It specifies label data content and requirements, including data element requirements; data representation; rules for encoding of mandatory and optional data elements in machine-readable symbols; and human readable information.

Bar codes and Two-Dimensional (2D) Symbols for Product Packaging provides the option of one of four different linear bar code symbols and one of three different two-dimensional symbols. It relies upon the technology standards and data semantic and syntax standards developed within ASC MH10. These standards have in turn been published internationally through the work of ISO/IEC JTC 1/SC 31.

The international equivalent of this standard is the international standard ISO 22389, developed by ISO Technical Committee 122/Working Group 7. ANSI MH10.8.6 and ISO 22389 were developed concurrently and differ primarily with a recommended/preferred two-dimensional symbol in the ANS while the ISO standard provides no such recommendation or preference.

At the date of approval of this standard, the MH10 Committee, Unit-Loads and Transport-Packages, consisted of the following members:

AIM, USA
American Trucking Associations
American Wood Packaging Association
APA – The Engineered Wood Association
Association of American Railroads
Assoc. of Professional Material Handling Consultants
ASTM
Automotive Industry Action Group
Containerization & Intermodal Institute
Consumer Electronics Association
Fibre Box Association
Flexible Intermediate Bulk Containers Association
Glass Packaging Institute
IDEAlliance
IMC & WD, Product Section - Material Handing Industry
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Integrated Business Communications Alliance
International Cargo Handling Coordination Assoc.
International Food Distributors Association
International Safe Transit Association
Material Handling Industry of America
Material Handling Management Society
Motorola
National Wooden Pallet & Container Association
Plastic Drum Institute
PMMI
Q.E.D. Systems
Rack Manufacturers Institute
Reusable Industrial Packaging Association
Steel Shipping Container Institute
Textile Bag Manufacturers Association
U.S. Air Force
U.S. Dept. of Agriculture
U.S. Dept. of Defense Logistics
U.S. Forest Products Laboratory
Uniform Code Council
United Fresh Fruit & Vegetable Association
United Parcel ServiceIntermec Technologies Corporation

Suggestions for improvement, and questions regarding interpretation of this standard will be welcome. They should be sent to: MH 10 Committee (MHIA), Material Handling Industry of America, 8720 Red Oak Blvd., Suite 201, Charlotte, NC, 28217-3992 or mhstandards@mhia.org.

Automatic Identification and Data Capture Techniques Used in Shipping, Receiving, and Transport Applications

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Automatic Identification and Data Capture Techniques Used in Shipping, Receiving, and Transport Applications

1 Scope

This American National Standard:

- specifies the minimum requirements for the design of labels containing linear bar code and two-dimensional (2D) symbols on Transport Units to convey data between trading partners;
- provides for traceability of transported units via a Unique Transport Unit Identifier (license plate);
- provides guidance for the formatting on the label of data presented in linear bar code, 2D symbol, or human readable form;
- provides specific recommendations regarding the choice of linear bar code and 2D symbologies, and specifies quality requirements;
- makes recommendations as to label placement, size, and the inclusion of free text and any appropriate graphics;
- provides guidance in the selection of label material.

2 Normative references

This American National Standard incorporates, by dated and undated references, provisions from other publications. These normative references are listed as follows. For dated references subsequent amendments to or revisions of any of these publications apply to this American National Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

ANS MH10.8.2	Data Identifier and Application Identifier Standard
ISO/IEC 2382	Information technology – Vocabulary
ANS MH10.8.3	Transfer Syntax for High Capacity ADC Media
General EAN.UCC Specifications	Available from Uniform Code Council (UCC), 7887 Washington Village Drive, Suite 300, Dayton, OH, 45459-8605. Telephone: (937) 435-3870 • Telefax: (937) 435-7317
ISO/IEC 15415	Information technology – Automatic identification and data capture techniques – Bar code print quality test specification – Two-dimensional symbols
ISO/IEC 15416	Information technology – 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 – Bar code symbology specification – Code 128

ISO/IEC 15438	Information technology – Automatic identification and data capture techniques – Bar code symbology specifications PDF417
ISO/IEC 15459-1	Information technology – Unique identification of transport units – Part 1: General
ISO/IEC 16023	Information technology – International symbology specification – MaxiCode.
ISO/IEC 16388	Information technology – Automatic identification and data capture techniques – Bar code symbology specifications – Code 39
ISO/IEC 19762-1	Information Technology – AIDC Techniques – Harmonized Vocabulary – Part 1: General Terms Relating to Automatic Identification and Data Capture (AIDC)
ISO/IEC 19762-2	Information Technology – AIDC Techniques – Harmonized Vocabulary – Part 2: Optical Readable Media (ORM)
ISO/IEC 24723	Information technology, Automatic identification and data capture techniques – Bar code symbology specificarion – EAN.UCC Composite

3 Definitions

For the purpose of this American National Standard, the definitions in ISO/IEC 2382 (all parts), ISO/IEC 19762-1, and ISO/IEC 19762-2 shall apply.

4 Concepts

4.1 Principles

The purpose of a bar code label is to facilitate the automatic exchange of data among all members within a channel of distribution, e.g., supplier, carrier, purchaser, and other intermediaries. The amount of data, in a linear bar code, 2D symbol, and in human readable form is dependent on the requirements of the trading partners. Where a bar code label is used in conjunction with electronic databases and/or electronic data interchange (EDI) systems, the amount of data may be significantly reduced and may consist of only one piece of data, the unique identifier for the Transport Unit.

Trading partners have different information requirements. Some information may be common to two or more trading partners while other information may be specific to a single trading partner. Information for various trading partners becomes available at different times, e.g.:

- product specific information at the point of manufacture or packaging,
- order processing information at the time of processing the order,
- transport information at the time of shipment.

Trading partners may find it necessary to include significant data elements dealing with the above, which may be presented both in bar code/2D symbols and human readable form.

This standard shall be used in conjunction with application guidelines defining the parameters chosen by the trading partners concerned. Annex D gives guidance in the definition of these parameters.

4.2 Transport Package, Unit Load, and Transport Unit

4.2.1 Transport Package.

For the purposes of this standard, a Transport Package is considered to be a package intended for the transportation and handling of one or more articles, smaller packages, or bulk material.

4.2.2 Unit Load.

For the purposes of this standard, a Unit Load is considered to be one or more Transport Packages or other items held together by means such as pallet, slip sheet, strapping, interlocking, glue, shrink wrap, or net wrap, making them suitable for transport, stacking, and storage as a unit.

4.2.3 Transport Unit.

Both Unit Loads and Transport Packages are referred to as Transport Units in this document.

4.3 Unique Transport Unit Identifier

One Unique Transport Unit Identifier shall be assigned and applied to each Transport Unit prior to shipment. The Unique Transport Unit Identifier shall be associated with the highest level of packaging intended to be conveyed as single physical entity by the shipper (e.g., a Transport Package within an unbreakable Unit Load does not require a Unique Transport Unit Identifier). This is a common requirement for all label formats specified by this standard. The identifier or license plate is the key providing access to information stored in computer files and which may be transmitted electronically. The identifier may be used by all of the trading partners to retrieve information about the Transport Unit itself or about the status of the physical movement of the Transport Unit along the supply chain. It enables systems to track and trace individual Transport Units.

4.4 Label formats

4.4.1 Base Label for shipping / transport / receiving

The Base Label defined by this standard includes the data that fulfills the minimum requirements of all trading partners in a supply chain when data is exchanged electronically between the parties involved.

A Unique Transport Unit Identifier shall be included on the Base Label. All Base Labels attached to the Transport Unit shall be identical.

In addition to the Unique Transport Unit Identifier (license plate), it is recommended to provide the following information on a Base Label:

- Ship From address (to be able to return the shipment in the case delivery was not possible),
- Ship To address (for shipment delivery),
- key to the carrier's database (if the license plate is not this data element),
- key to the customer's database (if the license plate is not this data element).

4.4.2 Extended Label for shipping / transport / receiving

In practice, fully automated communication channels which make it possible to rely exclusively on electronic files for retrieving information on the movements of the Transport Units are not always available. For this reason, there is a need to indicate relevant information on the Transport Units themselves, in addition to their identification.

The Extended Label is used when the data available from the Base Label is not sufficient to satisfy the requirements of all trading partners. In order to facilitate the processing and interpretation by trading partners, information provided in the Extended Label is organized in three segments:

- Carrier segment. In addition to the key to the carrier's database, this segment may contain additional data, such as shipment identification and delivery instructions;
- Customer segment. In addition to the pointer to the customer's database, this segment may contain additional data such as the customer part number;
- Supplier segment. Additional data may be generated by the supplier, such as product identification, batch number, and dimensions.

5 Data structure

5.1 Data presentation

5.1.1 Data in linear bar code symbols

Data elements in linear bar code symbols shall include Data Identifiers (DI) in accordance with ANSI MH10.8.2 or Application Identifier element strings in accordance with General EAN.UCC Specifications.

EAN.UCC Application Identifiers (AI)[1] shall only be used in conjunction with UCC/EAN-128 symbology (being a subset of Code 128[2]) and EAN.UCC Composite symbols. ANSI MH10.8.2 Data Identifiers shall be used in conjunction with either Code 39[3] or Code 128[2] bar code symbols.

Systems that may be confronted with both UCC/EAN-128 symbols using Application Identifiers and Code128 symbols using ANSI MH10.8.2 Data Identifiers shall have the capability to discriminate between these two structures. The preferred method to accomplish this discrimination is the use of Symbology Identifiers, specifically “]C1” that signifies a UCC/EAN-128 symbol having a FNC1 character in the first position after the start code and “]C0” that signifies a Code 128 symbol without a FNC1 character in the first position after the start code.

5.1.2 Data in two-dimensional (2D) symbols

When mutually agreed by trading partners, information may also be provided in 2D symbols. Data syntax in 2D symbols shall be in accordance with ANS MH10.8.3 (ISO/IEC 15434) or the General EAN.UCC Specifications and ISO/IEC 24723 for EAN.UCC Composite symbols.

5.1.3 Data in human readable form

The human readable interpretation of information presented in linear bar code form should be provided. Some information may be presented in human readable form only (see clause 0).

[1] In accordance with General EAN.UCC Specifications
[2] Compliant to ISO/IEC 15417
[3] Compliant to ISO/IEC 16388

5.2 Data elements

5.2.1 Unique Transport Unit Identifier

The Unique Transport Unit Identifier assigned by the labeler shall be encoded in a linear bar code symbol, preceded by the appropriate EAN.UCC Application Identifier or ANSI MH10.8.2 Data Identifier.

The structure of the Unique Transport Unit Identifier is defined in ISO/IEC 15459-1. The Unique Transport Unit Identifier:

- starts with the Issuing Agency Code (IAC), assigned to the issuing agency by the Registration Authority;
- conforms to a format specified by the issuing agency;
- is unique in the sense that no issuer reissues a number until a sufficient period of time has passed so that the first number has ceased to be of significance to any user;
- contains only numeric and upper case alphabetic characters (i.e., does not include lowercase characters or punctuation marks);
- does not contain more than 20 characters, including the ANSI MH10.8.2 Data Identifier or EAN.UCC Application Identifier. The only exception to this rule is when the Unique Transport Unit Identifier is encoded in the Code 39 symbology, in which case the maximum number of characters is 19, in accordance with Table 1 (see clause 0).

The Unique Transport Unit Identifier shall be either:

- the Serial Shipment Container Code (SSCC), that uses EAN.UCC Application Identifier "00";
- the Unique Transport Unit Identifier using the assigned ANSI MH10.8.2 Category 10 Data Identifiers for License Plates (J-999J) represented in either Code 39 or Code 128 symbologies.

NOTE This standard recognizes the historical practice in some industries and trading partners of using a 2D symbol or two separate linear bar code symbols to create unique license plate information, for example, using DI "V", "2V", "6V", or "13V" to identify the supplier and DI "S", "3S", "4S", "5S", "6S", or "7S" to identify the Package ID. While ANSI MH10.8.2 Data Identifiers such as "13V" (DUNS code) with a serial number can provide unique identification, the use of two separate linear bar code symbols or the 2D symbol to encode or identify the Unique Transport Unit Identifier or similar information is not recommended. Use of ANSI MH10.8.2 Data Identifiers such as "V", and "6V" with a serial number may not provide unique identification throughout the supply chain, and these historical usages should migrate to either the EAN.UCC SSCC or the Unique Transport Unit Identifier using the ANSI MH10.8.2 DI "J" in a single linear bar code.

5.2.2 Ship To

The Ship To data element refers to the address of the party to which Transport Units are to be delivered. When used, it shall be represented in a maximum of five lines of human readable characters comprised of no more than 35 alphanumeric (an..35) characters each. It may also be represented by a number identifying the party, in human readable or in bar code format.

NOTE: Although intended primarily as an American standard, this standard recognizes the need to represent alphabets/languages other than English in sections of the shipping label, particularly the Ship From and Ship To. The space necessary to represent 5 lines of 35 English characters is sufficient for addresses in other character sets. However, when one or more of the trading partners are American, sufficient information shall be presented in English in the Ship To and Ship From data elements to allow native English speakers to handle the shipment effectively.

5.2.3 Ship From

The Ship From data element refers to the address of the party to which Transport Units are to be returned, in case the shipment was unable to be delivered. When used, it shall be represented in a maximum of five lines of human readable characters comprised of no more than 35 alphanumeric (an..35) character each. It may also be represented by a number identifying the party, in human readable or in bar code format. The Ship From information shall be located in the left, upper-most area or building block of the label (see Annex C for building block information).

5.2.4 Key to carrier's database

The key to the carrier's database should be mutually agreed upon with the carrier. If the unique identifier described in 5.2.1 above does not provide the key to the carrier's database, one or more of the following keys may be used:

- carrier tracking number that includes class of service,
- carrier code to identify the shipment,
- carrier code to identify the Transport Unit.

This data element may be included within a 2D symbol, or a linear bar code symbol, or both.

5.2.5 Key to customer's database

The key to the customer's database should be mutually agreed upon with the customer. If the Unique Transport Unit Identifier described in 5.2.1 above does not provide the key to the customer's database, one or more of the following keys may be used:

- customer's purchase order number,
- part number,
- Kanban number/ pull signal number,
- shipment ID.

This data element may be included within a 2D symbol, or a linear bar code symbol, or both.

5.2.6 Other data elements

As much additional data as required may be included in the Extended Label to fulfill the needs of the supplier, carrier, and customer.

5.3 Concatenating data fields in linear and composite symbols

5.3.1 Using EAN.UCC Application Identifiers (AI)

When several EAN.UCC Application Identifiers and their data are concatenated into one UCC/EAN-128 symbol, each variable length field shall be followed by the FNC1 character, unless it is the last field encoded in the symbol. The FNC1 character used for this purpose assumes an ASCII character “GS” value when transmitted by the decoder.

When several EAN.UCC Application Identifiers and their data are concatenated into one EAN.UCC Composite symbol, the primary identification data shall be encoded in the UCC/EAN-128 linear component. (The linear component shall contain the SSCC and may contain other logisitical measures.) The remaining, secondary, data shall be encoded in the 2D Composite Component Type C (CC-C) . Each variable length field shall be followed by the Function Code 1 (FNC1) character, unless it is the last field encoded in the linear component or 2D component of the symbol. The FNC1 character used for this purpose assumes an ASCII character “GS” value when transmitted by the decoder. ISO/IEC 24723 gives further detail on the transmission of the FNC1 character for EAN.UCC Composite symbols. Definition and rules for usage of FNC1 are contained in ISO/IEC 15417 for the linear component and ISO/IEC 24723 for the Composite Component.

The linear component's primary data can be read by a UCC/EAN-128 scanner which will ignore the secondary data encoded in the 2D component. A scanner that is programmed to read EAN.UCC Composite symbols will read both the primary data in the linear component and the secondary data in the 2D component. This data will be concatenated into a single data string.

5.3.2 Using ANSI MH10.8.2 Data Identifiers (DI)

When several ANSI MH10.8.2 Data Identifiers and their data are concatenated into one Code 39 or Code 128 symbol, each field shall be followed by a plus "+" symbol, unless it is the last field encoded in the symbol.

Care should be exercised when concatenating data fields in linear symbols since some ANSI MH10.8.2 Data Identifiers prescribe the use of the "+" as an internal data structure syntax. Examples include the ANSI MH10.8.2 Data Identifiers “14K”, “19S”, and “3W”.

5.4 Structured data files

Structured data files, such as documentation supporting the handling of the Transport Units or complete EDI messages, may be included, for example, delivery notice, quality certificate, and insurance certificate. High capacity 2D symbols shall be used to represent this data. Structured data files shall comply with the syntax described in ANS MH10.8.3 (ISO/IEC 15434) or the General EAN.UCC Specifications.

6 Data carriers

6.1 Linear bar code symbols

This standard specifies the linear bar code symbologies Code 39, Code 128, and UCC/EAN-128 for all applications covered by this standard. For further information and guidance in the use of linear bar code symbols, see normative Annex A.

6.2 Two-dimensional symbols

If more data than can be accommodated with a linear bar code is required to be encoded on the label in optically readable symbol(s), 2D symbols may be used. This standard specifies the use of MaxiCode, PDF417, and EAN.UCC Composite 2D symbologies. This standard recommends the MaxiCode symbol for carrier sortation and tracking applications and PDF417 symbol for shipping and receiving and for supporting documentation applications For further information and guidance in the use of 2D symbols, see normative Annex B.

6.3 Human readable information

There are four types of human readable information that may appear on a label. They are:

- human readable interpretation (HRI),
- human translation,
- data area titles,
- free text and data.

6.3.1 Human readable interpretation (HRI)

A human readable interpretation of each linear bar code symbol shall be provided adjacent to the bar code. Such human readable interpretation shall represent the encoded data. A portion of the HRI (i.e., the DI or AI code) may be included in the data area title. See Figures 1a and 1b.

6.3.2 Human translation

Portions of information encoded in linear bar codes or 2D symbols, along with data field descriptions not encoded in the symbols, may be printed in a separate section of the label. The information is known as the human translation of encoded data. See Figures 1a and 1b.

6.3.3 Data area titles

Data areas comprise information in bar code or human readable form. Data areas shall be identified with the corresponding data area title in human readable text, which may be prefixed, if relevant, by the appropriate AI or DI. A data area title is not required when a data area contains:

- a single linear bar code symbol concatenating multiple data elements,
- multiple linear bar code symbols that are intended to be scanned in a single data capture operation;
- a 2D symbol.

6.3.4 Free text and data

Free text is human readable information that is other than what is encoded in a linear bar code or 2D symbol. This information may be needed by one or more trading partners. See Figure 1a for data encoded with ANSI MH10.8.2 Data Identifiers and Figure 1b for data encoded with EAN.UCC Application Identifiers.

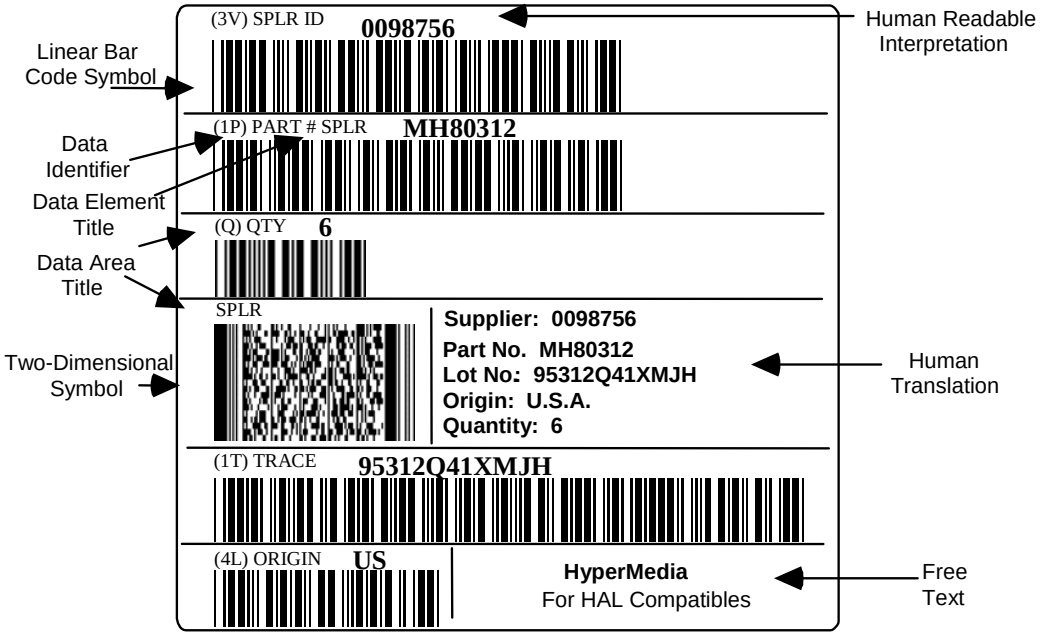


Figure 1a
Data Encoded with ANSI MH10.8.2 Data Identifiers (not to scale)

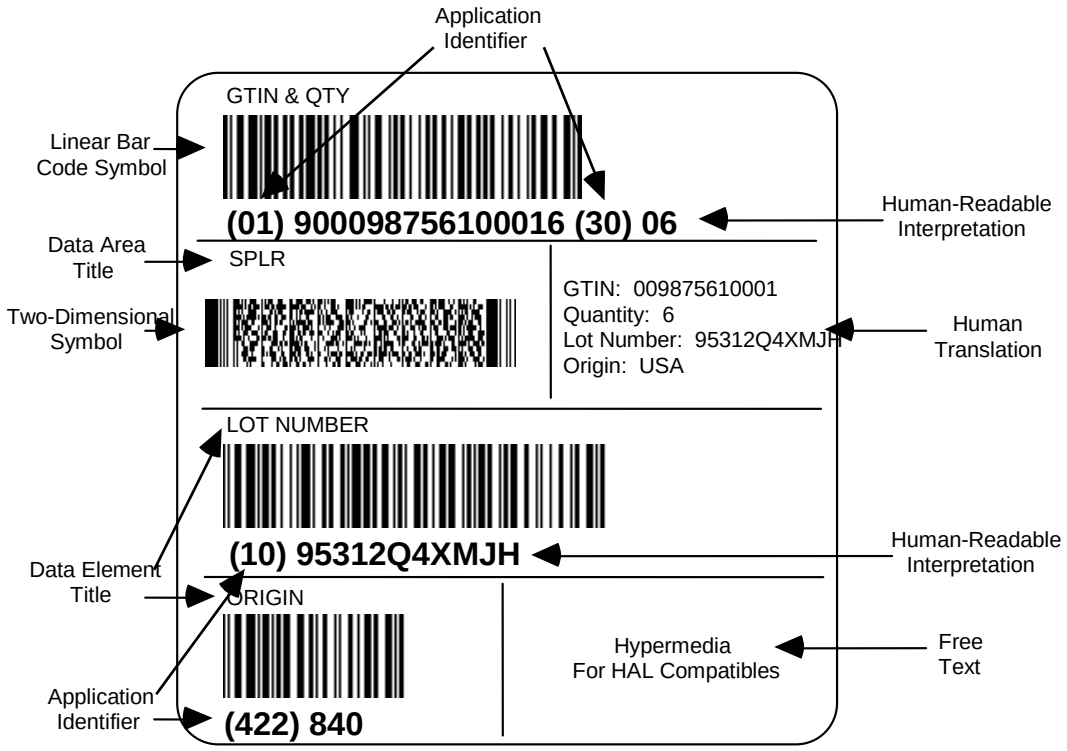


Figure 1b
Data encoded with EAN.UCC Application Identifiers (not to scale)

7 Label design

7.1 General considerations

Label segments are logical groupings of information based on the data needs of the trading partners within the distribution channel. Three segments are defined in clause 0: carrier segment, customer segment, and supplier segment. Label segments may or may not be printed at the same time on a single physical label. When the size and structure of the Transport Unit permits, segments shall be stacked vertically, from top to bottom, in the following order:

- carrier segment,
- customer segment,
- supplier segment.

Examples of labels are provided in Annexes E and F. The labels shown in Annexes E and F are for illustration only and do not represent all of the possible choices of label designs. Separate sections of the label may be applied at different stages to form the complete label.

7.2 Layout

The linear bar code representing the Unique Transport Unit Identifier (license plate), a mandatory element for this standard, shall be printed in the bottom-most area or building block of the label as described in Annex C.

7.2.1 Base Label layout

In addition to the required Ship From human readable information and Unique Transport Unit Identifier, a typical Base Label could include the following data areas:

- Ship To address, human readable;
- Ship To postal code or location number, linear bar code;
- carrier shipment tracking number (if required), linear bar code;
- customer purchase order number (if required), linear bar code.

The Ship To address shall be located below or to the right of the Ship From address. Ship From characters shall be noticeably smaller than the Ship To characters and the fields shall be easily distinguishable.

7.2.2 Extended Label layout

The Extended Label comprises more information than the Base Label. In addition to the information contained in the Base Label, the Extended Label may include:

- linear bar codes representing other discrete data elements;
- linear bar codes representing concatenated data elements;
- 2D symbols;
- human translation of linear bar code information;
- human readable only information;
- graphics.

7.2.3 Other data

This standard does not supersede or replace any applicable safety or regulatory marking or labeling requirements. The standard is to be applied in addition to any other mandated labeling requirements. Free areas or certain graphics such as safety, hazard, quality signs, or logos may be required.

7.3 Label dimensions

7.3.1 General considerations

The size of the label shall be consistent with the data requirements of all trading partners in the supply chain, with the only constraint being the size of the Transport Unit.

The label format described does not dictate a fixed size for the total label. To simplify label formatting, a modular building block structure is recommended. The building block structure guidance is described in Annex C and shown in Figure C-1. The physical dimensions of the label shall be determined by the labeler. Considerations for label size selection may include: the amount of data to be printed, the physical characteristics of the printing equipment used, or the size of the Transport Unit.

7.3.2 Label height

The height of the label shall be determined by the labeler based on the requirements and the type of printer used to print the label.

7.3.3 Label width

The width of the label shall be determined by the labeler based on the requirements and the type of printer used to print the label. Label width is determined by bar code symbology printing parameters and the maximum bar code message length. Table 2 shows the correlation between X dimension and label width for selected X dimensions, using the data limits set forth in Table 1.

Some existing industry standards have other data limits. If a trading partner needs a single Code 39 bar code data field that contains more characters than is shown in Table 1, the labeler may choose to use a wider label stock or an X dimension at the lower limits of this standard.

7.3.4 Data limits

Limits on the number of characters which can be required of the labeler for a single linear bar code symbol are shown in Table 1.

Table 1
Maximum character limits for linear symbols

Symbology and format	Character limits
Code 128 (numeric)	50 digits (after a single character DI)
Code 128 (alphanumeric)	27
UCC/EAN-128 (all numeric)	48
UCC/EAN-128 (alphanumeric)	26
Code 39	19

NOTE 1 For UCC/EAN-128, the character count includes all characters between the Function 1 (FNC1) character and the symbology check character.

NOTE 2 For Code 39, character count includes all characters between the start and stop characters.

Table 2
Minimum label width required to print the maximum character limits of Table 1

	Symbol Maximum Characters and Width (from Table 1)					
	Code 39	**Code 128 all numeric**	**Code 128 alphanumeric**	**UCC/EAN-128 SSCC**	**UCC/EAN-128 all numeric**	**UCC/EAN-128 alphanumeric**
	19	50 (single-character DI)	27	20 exactly	48	26
X dimension	**Symbol Width**					
0.25 mm	105 mm	105 mm	105 mm	**Not Recommended**	105 mm	105 mm
0.33 mm	148 mm	148 mm	148 mm		148 mm	148 mm
0.38 mm	148 mm	148 mm	148 mm		148 mm	148 mm
0.43 mm	over 148 mm	148 mm	over 148 mm		over 148 mm	over 148 mm
0.50 mm	**Not Recommended**			105 mm	over 148 mm	over 148 mm
0.66 mm				148 mm	over 148 mm	over 148 mm
0.76 mm				148 mm	over 148 mm	over 148 mm
0.81 mm				over 148 mm	over 148 mm	over 148 mm

NOTE 1 This table is intended to provide guidance to the printer/applier of a label on the size of label stock needed to accommodate the maximum character limits as stated in Table 1.

NOTE 2 This label width guidance is based on only two label sizes, 105 mm and 148 mm)

NOTE 3 Included in the minimum label width calculations in Table 2 are the following:

- symbology start and stop characters, 2.54 mm print registration, and quiet zones of 6.4 mm or 10 times the bar code symbol X dimension, whichever is greater;
- for UCC/EAN-128 symbols, function one character (FNC1) and symbology check character;
- for Code 39 symbols, a 3:1 wide to narrow ratio and one X intercharacter gap
- for Code 128 symbols, the symbology check character

NOTE 4 EAN.UCC SSCC bar code symbols have minimum X dimensions greater than 0.432 mm. In order to fit on a label size of 102 mm, this symbol should be printed at the smallest X dimension as specified in the General EAN.UCC Specifications for a UCC/EAN-128 symbol.

7.4 Text size

7.4.1 General considerations

The height of text characters is associated with the number of characters that can be required on a single line.

Nine sizes may be specified for text. The exact character heights corresponding to the nine text sizes shall be chosen by the labeler based on the capabilities of the printing process.

The characters shall be clearly legible.

Table 3 shows the maximum number of text characters per line that can be required of the labeler.

Table 3
Character height and character limits

Lines-per-block (LPB)	Approximate character height (millimeters)	Character limits for full width 102 mm label (# of characters)
1 LPB	25.4 mm	8
2 LPB	12.7 mm	18
3 LPB	8.4 mm	28
4 LPB	6.4 mm	34
5 LPB	5.1 mm	42
6 LPB	4.3 mm	48
7 LPB	3.6 mm	59
8 LPB	3.2 mm	68
10 LPB	2.5 mm	77
NOTE Calculations for the text character count limits are based on the following assumptions: a 102 mm wide label segment, clear distinction between the character sizes used, and fixed-width characters. The character height includes ascenders, descenders, and leading.		

7.4.2 Specific text dimensions

Data area titles shall be no smaller than 10 LPB.

The Ship From address shall be no smaller than 10 LPB, and in any case shall be smaller than the Ship To address text.

The Ship To address shall be not smaller then 6 LPB and in any case shall be larger than the Ship From address text.

The literal translation of the associated linear bar code symbol (also know as human-readable interpretation – HRI) shall be no smaller than 10 LPB.

Primary human-readable information (also know as human translation) shall be no smaller than 5 LPB.

Secondary human-readable information (also known as text or descriptive information) shall be no smaller than 10 LPB.

7.5 Material

Label material and the method of attaching the label to the Transport Unit shall be selected to ensure that the label:

- remains attached to the Transport Unit for the intended life of the label;
- remains readable for the life of the label;
- survives the environments for the life of the label, for example, contamination, heat, light, moisture;
- meets disposability requirements.

8 Label placement

8.1 General considerations

Labels should be affixed at a suitable location where there is a minimum risk of damage.

Labels containing carrier sortation and tracking application MaxiCode symbols shall be placed on top of Transport Units (see clause B.4.6.3 and clause 0).

Parcel carriers may require the placement of carrier information on the top of a Transport Unit.

All other labels should be placed on the side of the Transport Unit with the human readable information parallel to the natural bottom of the Transport Unit.

8.2 Unitized Loads (pallets)

Each Unitized Load shall have at least one bar code label and should have identical labels affixed on two adjacent sides.

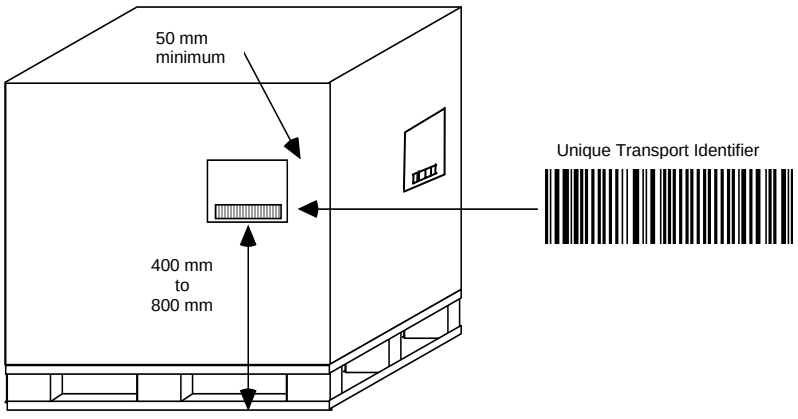


Figure 2
Unitized Load (pallet) label location

Labels shall be placed right of center on a vertical face, allowing a minimum of 50 mm from either edge. Labels should not be placed over a seam, nor should sealing tape or bands be placed over a label in a manner that interferes with the scanning of the label. The bottom edge of the Unique Transport Unit Identifier symbol should be within the range of 400 mm to 800 mm from the bottom of the pallet. If the pallet is less than 500 mm in height, the labels should be placed as high as possible on the pallet.

8.3 Transport Packages

For Transport Packages up to 1 meter in height, the target location for the Unique Transport Unit Identifier symbol should be within a range of 25 mm to 430 mm from the natural bottom of the package. Labels containing a MaxiCode symbol for carrier sortation and tracking applications shall be placed on top of the package in accordance with clause B.4.6.3. The edge of the label(s) should be a minimum of 25 mm from any Transport Package top or side edge. Transport Packages greater than 1 meter in height should follow the recommendations of 0.

8.4 Other Transport Units

Annex F provides examples of the labeling of various Transport Units. Label placement requirements should be developed in conjunction with specific application guidelines.

Annex A
(normative)

Guidelines for using linear bar code symbols

A.1 Symbology

The linear bar code symbologies shall be one of the following:

- Code 39 in accordance with ISO/IEC 16388;
- Code 128 in accordance with ISO/IEC 15417.

NOTE: UCC/EAN-128 is a subset of Code 128.

A.2 Symbol height

The minimum bar height of a linear bar code symbol shall be 12.7 mm and should be at least 15% of the length of the symbol including quiet zones.

A.3 Narrow element dimension

The minimum narrow element dimension (X dimension) shall not be less than 0.25 mm. The X dimension for Code 39 and Code 128 symbols should be in the range of 0.25 mm to 0.43 mm, as determined by the printing capability of the supplier/printer of the label. The X dimension for UCC/EAN-128 symbols should be in the range of 0.25 mm to 0.81 mm, as determined by the printing capability of the supplier/printer of the label. The X dimension for UCC/EAN-128 SSCC symbols should be in the range of 0.50 mm to 0.81 mm, as determined by the printing capability of the supplier/printer of the label.

In the case that fewer characters than specified in Table 1 are required, a larger X dimension may be used, as long as the bar code print quality requirements specified in A.8 and label width recommendations of Table 2 are met.

NOTE: Symbols with the X dimension at the lower end of this range, specifically 0.25 mm to 0.33 mm, may require special care in order to meet the quality requirements.

A.4 Wide to narrow ratio for Code 39 symbols

The wide to narrow ratio of elements of Code 39 symbols should be 3.0:1. The measured ratio shall be between 2.4:1 and 3.2:1.

A.5 Quiet zones

Linear bar code symbols should be printed with leading and trailing quiet zones not less than 6.4 mm. Where the X dimension is greater than 0.64 mm, the quiet zones shall not be less than ten (10) times the X dimension. The label registration parameters of the printer being used should be taken into consideration in order to ensure the minimum quiet zones.

A.6 Orientation

Linear bar code symbols should be presented on Transport Units with the bars vertical (picket fence orientation) when marked on a flat or slightly curved surface. Subject to agreement between trading partners, bars may be presented horizontally (ladder orientation).

Linear bar code symbols should be presented on Transport Units with the bars perpendicular to the longitudinal axis (ladder orientation) when marked on a tightly curved surface (tubes, rods, cylinders).

A.7 Placement

Linear bar code symbols should be placed to ensure that they do not interfere with each other when scanned.

NOTE: No more than two linear symbols should appear side by side on a label. If two linear symbols are placed side by side, the symbols should be placed so that they will not be in the same horizontal scan path to reduce the possibility of interference with successful bar code scanning.

A.8 Linear bar code symbol print quality

The ISO/IEC 15416 standard shall be used to determine the print quality of the linear bar code. The grade is expressed in the form of: grade/aperture/wavelength. The minimum symbol grade shall be 1.5/10/660 which is:

- an overall symbol grade greater than or equal to 1.5 (C) at point of production;
- a measurement aperture equal to 0.250 mm diameter (reference number 10),
- a light source wavelength equal to 660 ±10 nanometers.

It is important that the linear bar code be decodable throughout the system of use. Numerous environmental effects can lead to the degrading of the bar code symbol, substrate, adhesive, or laminate. These changes may affect one or more quality parameters of the label, whether they are optical or physical. The net effect of such changes can be to render the label unusable. It is therefore important to consider these effects when producing and applying bar code labels.

Labelers should not be held responsible for damage to the label incurred by shipping or handling subsequent to leaving the supplier's facilities. Every effort should be made by the labeler to reasonably protect and place the label so it is not damaged in shipment and handling.

It may not be possible to meet the print quality requirements of this standard when printing directly onto kraft colored corrugated surfaces. Users considering the printing of bar code symbols directly onto kraft colored corrugated surfaces should consider the scanning capabilities of their entire trading channel.

Unattended scanning may require a higher print quality grade than identified above. Consequently, those implementing this standard for unattended scanning applications should discuss print quality requirements with trading partners.

Annex B

(normative)

Guidelines for using 2D symbols

This annex defines the rules for using 2D symbols. These rules apply to the following three applications:

- shipping and receiving (B.1),
- supporting documentation (B.2),
- carrier sortation and tracking (B.4).

B.1 Shipping and receiving applications

The shipping and receiving data facilitates staging, transportation, and receipt of goods and materials. This data shall be printed on the label as defined by this document. This symbol is intended to be scanned in the same environment as other symbols on the label. The structure and syntax of the PDF417 symbols for shipping and receiving applications shall conform to the structure and syntax described in ANS MH10.8.3 (ISO/IEC 15434). The structure and syntax of the EAN.UCC Composite shall conform to the General EAN.UCC Specifications.

B.1.1 Symbology recommendation

This standard recommends the use of the PDF417 symbology (see ISO/IEC 15438) for shipping and receiving applications. For trading partners that support the EAN.UCC system, the EAN.UCC Composite symbology (see ISO/IEC 24723) may be used.

For the shipping and receiving applications, the Macro PDF417 symbol which is defined in the ISO/IEC 15438, shall not be used.

For the shipping and receiving applications, the Micro PDF417 symbol, which is defined in ISO/IEC 24728, shall not be used.

B.1.2 Error correction level

For shipping and receiving applications, the minimum PDF417 symbol error correction level shall be level 5. For EAN.UCC Composite symbols, the error correction level shall be level 5.

B.1.3 Narrow element dimension

For shipping and receiving applications, the narrow element dimension (X dimension) range should be from 0.254 mm to 0.432 mm, as determined by the printing capability of the supplier/printer of the label. Symbols with narrow elements at the lower end of this range, i.e., 0.254 mm to 0.330 mm, may require special care to meet the print quality requirements of B.1.7. Conformance to the print quality requirements shall be determined according to B.1.7.

B.1.4 Row height

The PDF417 symbol shall have a minimum row height (height of the symbol element) of three (3) times the width of the narrow element (X dimension). Increasing the row height may improve

scanning performance but will reduce the number of characters that can be encoded in a given space.

B.1.5 Quiet zone

For shipping and receiving applications, the PDF417 symbol shall have a minimum quiet zone of 1 mm above, below, to the left, and to the right. The quiet zone is included within the calculation of the size of the symbol.

B.1.6 Symbol size

For shipping and receiving applications, PDF417 symbols shall not exceed a height of 61 mm.

Tables B-2 through B-8 are provided as guidance in planning for the incorporation of PDF417 symbols into the design of the labels described in this standard. Actual achieved size of a PDF417 symbol may vary, based on data content and printing process. The sizes listed should accommodate most situations.

A PDF417 symbol for shipping and receiving applications should be printed with no more than 12 data columns in width (see Figure B-2). This will assure readability by the broadest range of reading devices. In no case shall the number of data columns exceed 18 columns. The use of 13 to 18 columns is allowed with the agreement of trading partners. Table B-1 shows the width of PDF417 symbols (including quiet zones) with 12 data columns at different X dimensions. For further information on data columns, symbol widths, character counts, and print densities, see clause B.3 and its sub-clauses.

Table B-1
Maximum PDF417 symbol width using 12 data columns

X dimension	Maximum width (including quiet zones)
0.25 mm	71.37 mm
0.33 mm	92.20 mm
0.38 mm	106.17 mm
0.43 mm	119.89 mm

B.1.7 Print quality

The ISO/IEC 15438 standard shall be used with reference to ISO/IEC 15415 to determine the print quality of the PDF417 and EAN.UCC Composite symbologies. The grade is expressed in the form of: grade/aperture/wavelength. For shipping and receiving applications, the minimum symbol grade should be 2.5/10/660 which is:

- an overall symbol grade greater than or equal to 2.5 (B) at point of production;
- a measurement aperture equal to 0.250 mm diameter (reference number 10),
- a light source wavelength equal to 660 ±10 nanometers.

The above symbol quality and measurement parameters assure scannability over a broad range of scanning environments. The print quality requirement at the point of production should be higher than the requirement at the point of use.

It may not be possible to meet the print quality requirements of this standard when printing directly onto kraft colored corrugated surfaces. Users considering the printing of 2D symbols directly onto kraft colored corrugated surfaces should consider the scanning capabilities of their entire trading channel.

B.1.8 Orientation and placement

B.1.8.1 PDF417 and UCC.EAN Composite symbol orientation

The bars of the symbol shall be perpendicular to the natural bottom of the label (see Figure B-1).

B.1.8.2 Label placement

Labels shall be placed on packages as specified in clause 8.

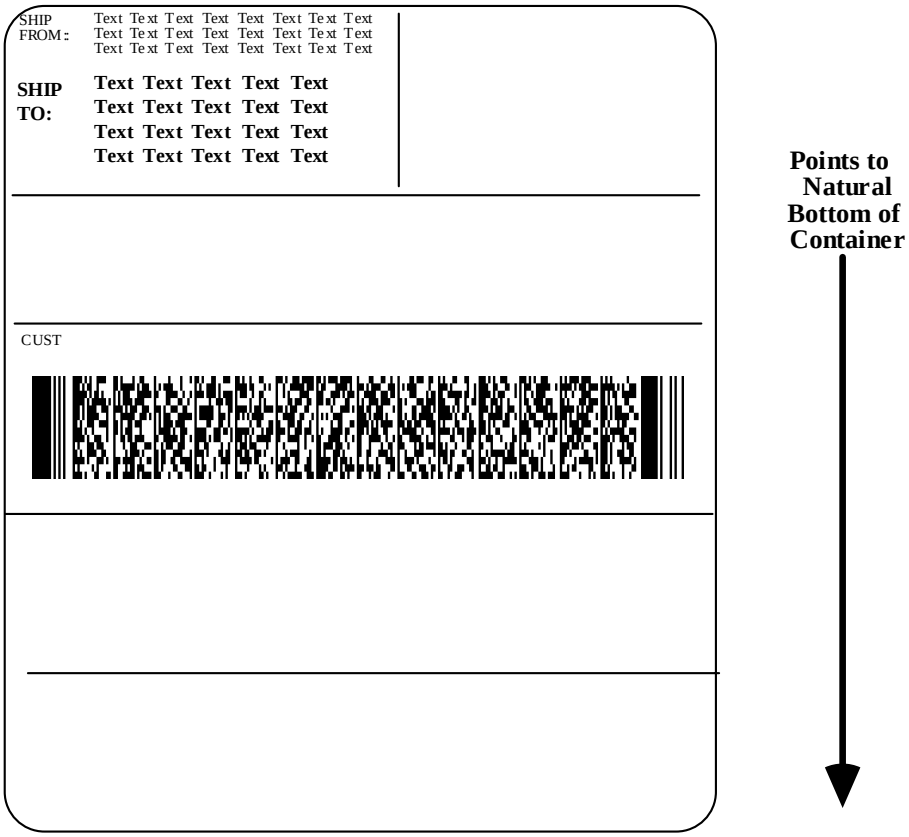


Figure B-1
PDF417 symbol orientation on label (not to scale)

B.2 Supporting documentation applications

The shipping, transportation, and receiving of Transport Units often requires supporting documentation data such as a bill of lading, manifest, packing slip, customs data, or information that might also be transmitted by EDI. This data is not intended to be printed on a label. This data is not intended to be scanned in the same environment as data on a label. The application

considered in this category involves the encodation of data in 2D symbols in support of the shipping, receiving, and transportation sortation and tracking. See Figure E-33.

B.2.1 Symbology recommendation

This standard recommends the use of PDF417 symbology (see ISO/IEC 15438) for supporting documentation applications. The structure and syntax of the PDF417 symbols for supporting documentation applications shall conform to the structure and syntax described in ANS MH10.8.3 (ISO/IEC 15434).

For supporting documentation applications, a Macro PDF417 symbol, which is defined in ISO/IEC 15438, may be used.

For supporting documentation applications, a MicroPDF417 symbol, which is defined in ISO/IEC 24728, shall not be used.

B.2.2 Error correction levels

For supporting documentation applications, the minimum PDF417 symbol error correction level shall be as identified in Table B-2. Level 5 is the preferred correction level.

Table B-2
PDF417 Error Correction Level

Number of Data Characters	PDF417 Error Correction Level
under 100	3
100 to 399	4
400 or more	5

B.2.3 Narrow element dimension

For supporting documentation applications, the PDF417 symbol X dimension should be 0.254 mm.

B.2.4 Row height

For supporting documentation applications, the PDF417 symbol should have a row height (height of the symbol element) three (3) times the width of the narrow element (X dimension).

B.2.5 Quiet zones

For supporting documentation applications, the PDF417 symbol shall have a minimum quiet zone of 1 mm above, below, to the left, and to the right.

B.2.6 Print quality

The ISO/IEC 15438 standard shall be used with reference to ISO/IEC 15416 to determine the print quality of the PDF417 symbol. The grade is expressed in the form of: grade/aperture/wavelength. For supporting documentation applications, the minimum symbol grade shall be 2.5/06/660 which is:

- an overall symbol grade greater than or equal to 2.5 (B) at point of production;

- a measurement aperture equal to 0.150 mm diameter (reference number 06),
- a light source wavelength equal to 660 ±10 nanometers.

In those applications where an aperture size of 0.125 mm (reference number 05) is being used to verify other symbols, the 0.125 mm aperture may be used for PDF417 symbols.

B.2.7 Orientation and placement

B.2.7.1 Orientation

All PDF417 symbols shall have the same orientation. The bars of the PDF417 symbol shall be oriented such that they are perpendicular to the natural bottom of the page. For supporting documentation applications, symbol skew shall not be more than ±5 degrees.

B.2.7.2 Placement

All PDF417 symbols for supporting documentation applications shall be placed so that they are clear of any folds or creases in the document itself.

NOTE As the document is likely to be folded after printing, tests should be carried out to select appropriate symbol locations.

B.2.8 Concatenation of symbols

For supporting documentation applications, the Macro PDF417 symbol version of the PDF417 symbology, as defined in the ISO/IEC 15438, shall be used to encode data messages that are greater in length than the maximum amount of data that can be encoded in a single PDF417 symbol. Application programmers should become familiar with the technical specifications for Macro PDF417 symbology to understand how the concatenated data will be transmitted to the application software.

B.2.8.1 Planning for large messages

When designing an application that will encode large amounts of data, consideration must be given to the amount of data to be encoded in a single message. If it is anticipated that a single data message, including formatting characters, could exceed approximately 1,200 alphanumeric characters, planning must be done to assure that all the concatenated symbols that constitute the entire Macro PDF417 symbol message be read in a single scanning sequence. Scanning an intervening symbol, either linear or 2D, will break the scanning sequence and may give unpredictable results.

B.2.8.2 Printing concatenated symbols

Printing systems should be configured in such a manner that when the amount of data encoded in a single message for a supporting documentation application exceeds the capacity of a single symbol, the printing system should either automatically use or be configurable to use Macro PDF417 symbology. The Macro PDF417 symbol Control Block should include the optional Segment Count field in addition to the mandatory fields to enable the Macro PDF417 symbols to be scanned in either a buffered or unbuffered mode.

B.2.8.3 Reading Macro PDF417 symbols

To read Macro PDF417 symbols properly, the transmission protocol of the decoder shall comply with Macro PDF417 symbology as defined in Annex H of ISO/IEC 15438. The symbols may be transmitted in buffered or unbuffered mode.

The decoder shall be capable of fully supporting the Symbology Identifier options for a PDF417 symbol. The decoder will transmit the Symbology Identifier, "]L1". This header signifies that escape and sequence characters have been inserted into the message by the reader, and must be handled by the application program. The application program must then recognize the Symbology Identifier, interpret escape characters, and reassemble the original message. The exact content of the escape and sequence characters, their usage, and the structure of a Macro PDF417 symbol is defined in ISO/IEC 15438.

B.3 Printing PDF417 and EAN.UCC Composite CC-C (PDF417) symbols

When printing PDF417 symbols compliant with this American National Standard, several factors must be considered. All of these factors must be used to determine what PDF417 symbol options to use. These considerations include:

- data requirements,
- scanner technologies,
- label area requirements,
- printer technologies.

Developers and users of PDF417 symbol printing software should follow these guidelines when determining what PDF417 symbol options should be used. Since no one solution is optimal, tradeoffs must sometimes be made. These guidelines will assure that valid symbols are printed. In addition, they will assure that a user's scanning and printing requirements have been considered. The following considerations should be used with following Tables B-3 through B-8 to determine approximate symbol size.

B.3.1 Plan for the maximum amount of data

Determine the fields that will be required in the message and the maximum anticipated length of each field. Add the additional characters needed for formatting.

B.3.2 Plan for scanning equipment likely to be used

When choosing a space in which to encode a PDF417 symbol, it is important to consider the capabilities of the scanning equipment likely to be used. For example, if the equipment has a maximum field of view of 76 mm, it would be impossible to read a symbol that is 100 mm wide, but the same data could fit in a taller configuration that is only 66 mm wide.

B.3.3 Plan for the maximum X dimension(s) and data columns

When planning for the space required in which a PDF417 symbol will be placed on the label, the designer should plan for the largest X dimension and the number of data columns that might be used in printing. These two factors essentially determine the width of the symbol.

Since the supplier/printer of the label ultimately determines the X dimension at which the symbol will be printed, it is possible that a PDF417 symbol printed for a shipping and receiving application

could be printed at any X dimension from 0.254 mm to 0.432 mm. The capability of the printing equipment being used will determine the possible choices of X dimension.

This standard recommends that PDF417 symbols for shipping and receiving applications be printed with no more than 12 data columns (see Figure B-2), unless otherwise agreed by all trading partners involved. This limitation, combined with the amount of space allocated for the symbol on the label, may influence the choice of X dimension for printing the symbol.

The encoded data is shown below contained within the data columns.

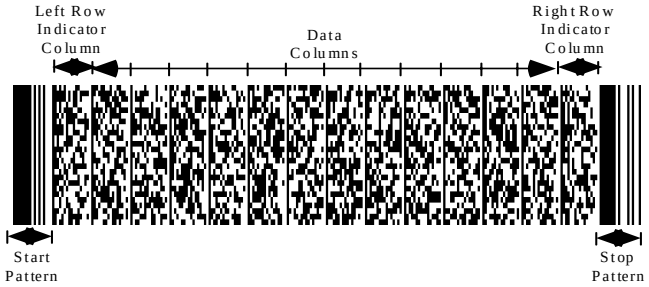


Figure B-2
The anatomy of a PDF417 symbol

B.3.4 Determine the appropriate label size

Tables B-3 through B-8 show the approximate number of characters that can be accommodated by a PDF417 symbol. Within each table, use the height and approximate width combinations to determine the actual width, number of data columns, and the estimated number of characters that can be accommodated. The sizes are an approximation; actual sizes may vary based on factors including the compaction algorithm and the nature of the data to be encoded. Error correction levels are defined as Error Correction Level 5. For all tables, the approximate width in the top row of each table includes symbol quiet zones.

B.3.4.1 Symbols for labels having a width of at least 102 mm.

Tables B-3 through B-6 illustrate at given X dimensions, at various symbol widths, the number of data columns and the number of alphanumeric characters which can be encoded in PDF417 symbols where the symbols are assumed to be either 25 mm or 50 mm high.

Table B-3
PDF417 symbols
X dimension = 0.25 mm
Approximate alphanumeric capacity

	Width 39 mm		**Width 52 mm**		**Width 65 mm**		**Width 78 mm**		**Width 96 mm**	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	36.8	4	49.8	7	62.7	10	75.7	13	93.0	17
25 mm	56 characters		185 characters		315 characters		445 characters		617 characters	
50 mm	293 characters		601 characters		909 characters		1217 characters		1535 characters	

Table B-4

PDF417 symbols
X dimension = 0.33 mm
Approximate alphanumeric capacity

	Width 39 mm		Width 52 mm		Width 65 mm		Width 78 mm		Width 96 mm	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	36.1	2	47.2	4	55.8	6	75.4	9	92.2	12
25 mm	N/A		13 characters		77 characters		175 characters		272 characters	
50 mm	41 characters		200 characters		358 characters		596 characters		833 characters	
NOTE N/A means not applicable. Where N/A appears, this means that for the associated label width and error correction level 5, no data can be encoded.										

Table B-5
PDF417 symbols
X dimension = 0.38 mm
Approximate alphanumeric capacity

	Width 39 mm		Width 52 mm		Width 65 mm		Width 78 mm		Width 96 mm	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	34.8	1	47.8	3	60.7	5	73.7	7	93.2	10
25 mm	N/A		N/A		27 characters		85 characters		171 characters	
50 mm	N/A		88 characters		225 characters		362 characters		567 characters	
NOTE N/A means not applicable. Where N/A appears, this means that for the associated label width and error correction level 5, no data can be encoded.										

Table B-6
PDF417 symbols
X dimension = 0.43 mm
Approximate alphanumeric capacity

	Width 39 mm		Width 52 mm		Width 65 mm		Width 78 mm		Width 96 mm	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	31.8	0	46.5	2	61.2	4	75.9	6	90.7	8
25 mm	N/A		N/A		N/A		34 characters		85 characters	
50 mm	N/A		N/A		121 characters		239 characters		358 characters	
NOTE N/A means not applicable. Where N/A appears, this means that for the associated label width and error correction level 5, no data can be encoded.										

B.3.4.2 Symbols for labels having a width of greater than 102 mm.

Tables B-7 and B-8 illustrate at given X dimensions, at various symbol widths, the number of data columns and the number of alphanumeric characters which can be encoded in PDF417 symbols where the symbols are assumed to be either 25 mm or 50 mm high.

Table B-7
PDF417 symbols
X dimension = 0.38 mm
Approximate alphanumeric capacity

	Width 122 mm		Width 137 mm		Width 147 mm	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	119	14	132	16	145	18
25 mm	286 characters		344 characters		401 characters	
50 mm	841 characters		891 characters		920 characters	

Table B-8
PDF417 symbols
X dimension = 0.43 mm
Approximate alphanumeric capacity

	Width 122 mm		Width 137 mm		Width 147 mm		Width 159 mm	
	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns	Actual mm	Data columns
Symbol height	120	12	135	14	142	15	157	17
25 mm	185 characters		236 characters		261 characters		311 characters	
50 mm	596 characters		715 characters		747 characters		770 characters	

B.4 Carrier sortation and tracking applications

Carrier sortation is the process in which Transport Units are routed between two or more points. Carrier tracking is the process by which the location of Transport Units being transported by a carrier is updated in the carrier's database.

Data to be included comprises that which is required to route Transport Units between multiple points, locate Transport Units, and other supporting data which is relevant to sortation and/or tracking for internal and external processing.

When a 2D symbol is used for carrier sortation and tracking applications, the MaxiCode symbology (see ISO/IEC 16023) is capable of being read in a high speed scanning environment. The structure and syntax of the MaxiCode symbols for carrier sortation and tracking applications shall conform to the structure and syntax described in ANS MH10.8.3 (ISO/IEC 15434).

B.4.1 Data encoding

B.4.1.1 Code set

When encoding information in the MaxiCode symbol, it is recommended that character selection be limited to Code Set A where possible (see ISO/IEC 16023).

B.4.1.2 Mode

The MaxiCode symbol incorporates one Mode per symbol. This standard recommends the use of MaxiCode Mode 2 or Mode 3 to ensure the sortation system can decode the Ship To Postal Code, Ship To Country Code, and Class of Service in the event of symbol damage (see ISO/IEC 16023).

The determination of which Mode to use is established by the data characteristics of the Ship To Postal Code and Class of Service. Table B-9 determines the appropriate Mode.

Table B-9
Determining which MaxiCode Mode to use

If the Ship To Postal Code is	and the Class of Service is	then use
numeric-only maximum of 9 digits	numeric-only	Mode 2
alphanumeric maximum of 6 characters	numeric-only	Mode 3
other than above	numeric-only	Mode 4
any of the above	alphanumeric	Mode 4

B.4.2 Error correction levels

The MaxiCode symbol has fixed levels of error correction. The MaxiCode symbol should use the Standard error correction level identified within ISO/IEC 16023.

B.4.3 Narrow element dimension

MaxiCode is not a scalable symbol (supporting different X dimensions). The MaxiCode symbol shall have an X dimension (the width of a symbol module) and all other dimensions consistent with ISO/IEC 16023. Each symbol, including the quiet zone, is of a fixed physical size, nominally 28.14mm wide x 26.91mm high.

B.4.4 Quiet zones

For carrier sortation and tracking applications, the MaxiCode symbol shall have a minimum quiet zone of 1 mm above, below, to the left, and to the right.

B.4.5 MaxiCode symbol print quality

ISO/IEC 15415 shall be used to determine the print quality of the MaxiCode symbol. For carrier sortation and tracking applications, the minimum symbol grade shall be 2.5/10/W is:

- an overall symbol grade greater than or equal to 2.5 (B) at point of production;
- a measurement aperture equal to 0.250 mm diameter (reference number 10),
- a broad band light source.

The above symbol quality and measurement parameters assure scannability over a broad range of scanning environments. Labelers may not be able to guarantee the print quality of a label when it is received by the customer. Therefore, the print quality requirement at the point of production should be higher than the requirement at the point of use.

It may not be possible to meet the print quality requirements of this standard when printing directly onto kraft colored corrugated surfaces. Users considering the printing of bar code symbols directly onto kraft colored corrugated surfaces should consider the scanning capabilities of their entire trading channel.

B.4.6 Orientation and placement

B.4.6.1 MaxiCode symbol orientation

Due to the nature of the MaxiCode symbology, specific symbol orientation is not required.

B.4.6.2 Symbol placement

If the symbol is included in the Extended Label described in this standard, the MaxiCode symbol shall be placed in the carrier segment. See Figure B-3 for example of placement.

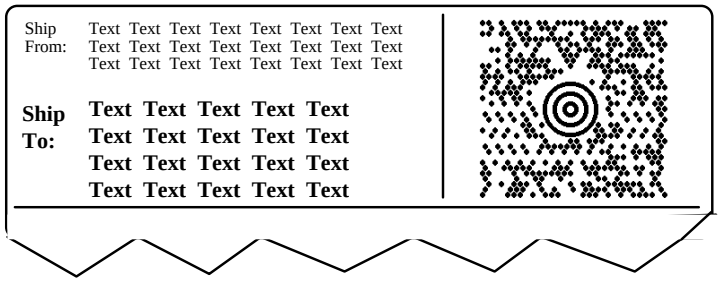


Figure B-3
MaxiCode symbol placement on a label (not to scale)

B.4.6.3 Label placement

Labels shall be placed on the top of Transport Units.

B.4.7 Concatenation

If the data message is greater in length than the maximum amount of data that can be encoded in a single MaxiCode symbol, two Structured Append symbols shall be used as follows. As this standard recommends the use of Modes 2 and 3, Structured Append shall be as defined in ISO/IEC 16023, and particularly:

- the primary message shall be repeated in both symbols;
- the Structured Append indicator sequence shall be placed in the first two data symbol characters in the secondary message;
- the continuation of the data message shall be in the secondary message of the second symbol.

B.4.7.1 Printing Structured Append MaxiCode symbols

Printing systems should be configured in such a manner that when the amount of data to be encoded in a single message for a carrier sortation and tracking application exceeds the capacity of a single symbol, the printing system will automatically use the Structure Append sequence.

The symbols shall be printed side by side.

B.4.7.2 Reading Structured Append MaxiCode symbols

When Structured Append is used with Modes 2 and 3 symbols, the primary message may be decoded from any of the symbols in the Structured Append sequence.

The entire message shall be reconstructed as defined in normative Annex B of ISO/IEC 16023.

Annex C

(informative)

Designing compliant labels using a building block approach

C.1 Label definition

The general term “label” means the printed area on the package that includes the text and/or bar code data (including linear bar code, composite, or 2D symbols), as covered in this document. The label is constructed by the use of indirect marking (e.g., pressure-sensitive labels, tags). Separate sections of the label may be applied at different stages to form the complete label.

Direct marking (e.g. inkjet, letterpress, and flexographic directly onto the package) may also be used, if it meets the quality requirements in Annexes A and B,. The label layout and principles still apply.

C.2 Building blocks

To simplify label formatting, a modular building block structure is described. The building block is the basic standard unit of the label format. An individual building block or sub-block may contain one of the following:

- text or graphics,
- bar code symbol (2D symbol, composite, or linear bar code symbol with human readable interpretation),
- a blank.

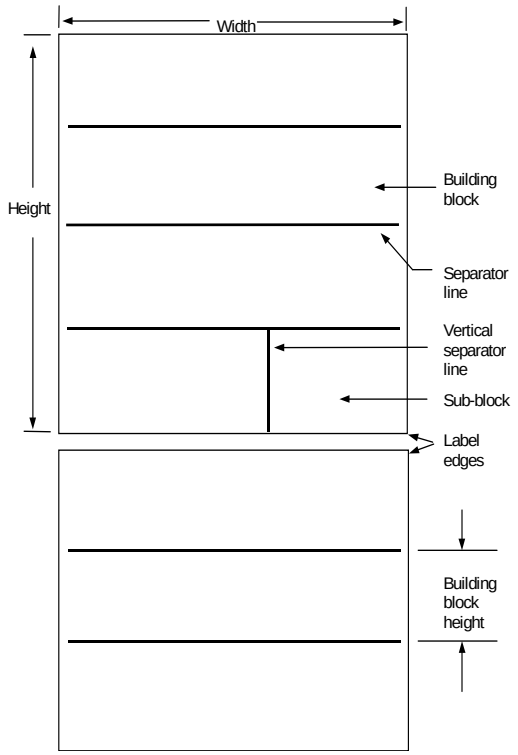


Figure C-1. Modular label structure

Each building block may be physically produced separately or in combination with other building blocks. This provides the option of printing data as it becomes known. Generally, building blocks should be stacked vertically.

C.3 Text lines-per-block

The height of text characters is defined using a unit of measure called lines-per-block (LPB), rather than inches, millimeters, or points. This enables the printer of the label to determine the actual height and font of text for a given LPB requirement. See clause C.6.2.

C.4 Segments

Segments are logical groupings of information based on the data needs of the trading partners within the distribution channel. Three segments are defined below: carrier segment, customer segment, and supplier segment.

When the size and structure of the package permits, segments shall be stacked vertically, from top to bottom, in the following order:

- carrier segment,
- consignee segment,
- shipper segment.

When stacked vertically, information required by carriers shall be placed top-most on the label.

C.5 Label dimensions

The size of the label should be consistent with the data requirements of all trading partners in the supply chain, with the only constraint being the size of the Unit Load or Transport Package.

The label format described does not dictate a fixed size for the total label. The physical dimensions of the label shall be determined by the labeler. Considerations for label size selection may include: the amount of data to be printed, the physical characteristics of the printing equipment used, or the size of the Transport Units.

The full label height will be determined by the number of building blocks included on the label.

The width of the label shall be determined by the labeler.

C.6 Label format

This section defines a standardized format for shipping labels.

C.6.1 Building blocks

Building blocks are stacked vertically to construct the label. Building blocks should be separated from each other by a horizontal line.

C.6.1.1 Building block size

Building block height shall be 25 mm ± 5 mm, as determined by the printing capability of the labeler. The width of a building block is the width of the label.

One double-height bar code block per segment may be used to satisfy special scanning requirements (e.g., automated conveyor scanning, long range planning). Double-height building blocks shall be 51 mm ± 10.2 mm.

One half-height text building block per segment may be used at the discretion of the labeler. Half-height building blocks shall be 13 mm ± 2 mm.

C.6.1.2 Sub-blocks

Building blocks can be divided into no more than four sub-blocks. The minimum width of a sub-block shall be determined by the amount of data that will be printed in that sub-block. A sub-block shall be the full height of the building block. Vertical lines should be used between sub-blocks.

C.6.2 Text block

A text building block or sub-block may contain text or graphics or both. A text building block or sub-block shall not contain a bar code symbol.

Table C-1
Lines-per-block (LPB) alternatives and measurements calculated

Lines-per-block	Character Height (Points)	Character Height (Millimeters)	Character Height (Inches)
1 LPB	72 pts	25.4 mm	1.00 in
2 LPB	36 pts	12.7 mm	0.50 in
3 LPB	24 pts	8.4 mm	0.33 in
4 LPB	18 pts	6.4 mm	0.25 in
5 LPB	14 pts	5.1 mm	0.20 in
6 LPB	12 pts	4.3 mm	0.17 in
7 LPB	10 pts	3.6 mm	0.14 in
8 LPB	8 pts	3.2 mm	0.13 in
10 LPB	7 pts	2.5 mm	0.10 in
NOTE The character height includes ascenders, descenders, and leading.			

Nine LPB sizes may be specified for text, ranging from one to eight and ten LPB. The exact character heights corresponding to the nine LPB sizes shall be chosen by the labeler based on the capabilities of the printing process.

Labelers shall choose a single height for each of the nine LPB sizes so that clear distinctions shall be evident between character heights (i.e., 8 LPB text shall be smaller than 7 LPB text, etc.). Table C-1 provides dimensional considerations for 1, 2, 3, 4, 5, 6, 7, 8, and 10 LPB printing.

The characters shall be clearly legible. For maximum legibility, the ratio of the height to width of a character should not exceed 2:1 (measured on an "M" character).

Character heights for double-height and half-height building blocks shall be the same as specified for a single-height block.

C.6.3 Text building block and sub-block title line(s)

A title should be used. When a title is used, it should be printed in the upper left corner of the text building block or sub-block. The title should be printed in upper case characters at a height of 6 LPB, two lines maximum, left justified.

C.6.4 Bar code symbol block

A bar code symbol may be specified for either a building block or sub-block.

A title should be used for a bar code symbol building block. Title exceptions are in clause 0. When a title is used, it should be printed in the upper left corner of the bar code symbol building block or sub-block. In the case when two linear symbols appear in the same building block, the right-hand symbol may have the title printed in the lower left corner of the machine readable building block or sub-block. The title should be printed in upper case characters at a height of 6 LPB, two lines maximum, left justified. The title should consist of a description of the data type. The title should also identify the respective ANSI MH10.8.2 Data Identifier or EAN.UCC Application Identifier if not part of the printed human readable interpretation of the bar code symbol.

Annex D

(informative)

Issues to consider in the drafting of application guidelines or standards conforming to this American National Standard

This standard is a framework to which various industry application standards for a bar code shipping and receiving label should conform. The American National Standard defines the minimum and common elements and specifies the symbology options. The application guideline should, within the overall constraint of complying with this American National Standard, be more specific. This annex describes the features which need to be defined in the application guideline.

D.1 The domain

Define the domain of the application guideline or standard in terms of:

- the responsible agent (typically, a trade association, federation, or similar body) publishing and maintaining the application guideline,
- the industry sector,
- the geographic domain,
- classes of trading partners covered by the application guideline.

D.2 Data presentation

Define which method(s) of data presentation (see clauses 5.1.1 and 5.1.2) is (are) to be used:

- linear Code 39 and Code 128 bar codes,
- 2D PDF417, UCC.EAN Composite, or MaxiCode symbols.

D.3 The label

The document should make it clear whether the Base Label and/or Extended Label (see clause 0) are acceptable to trading partners.

D.4 Data elements

Specify the set of data elements together with a definition of whether they are required or optional:

- The required data element of the Unique Transport Unit Identifier (see clauses 0 and D.5) shall be fully defined as per ISO/IEC 15459-1.
- If EAN.UCC Application Identifiers are used, then those suppliers shall comply with the rules ofthe General EAN.UCC Specifications.
- If ANSI MH10.8.2 Data Identifiers are used, then those labelers shall comply with the rules for ISO/IEC 15459-1.

- The information needs of the carrier shall be considered, particularly for the key to carrier information (see clause 0).
- The information needs of the customer shall be considered, particularly for the key to customer information (see clause 0).
- Other data shall be considered by mutual agreement between the supplier, carrier, and customer (see clause 0).

D.5 The Unique Transport Unit Identifier

When the Unique Transport Unit Identifier is encoded with the ANSI MH10.8.2 Data Identifiers:

- A single international Registration Authority is designated in accordance with ISO/IEC 15459-2.
- The Registration Authority assigns a unique Issuing Agency (IAC) code.
- The Issuing Agency then controls and assigns identifiers to individual organizations or persons, ensuring that those identifiers are unique within the system of the Issuing Agency.
- The organizations or persons then use the IAC and their own Issuing Agency assigned identifier to create a license plate number for the Transport Unit, using the ANSI MH10.8.2 Data Identifier "J". The data following the "J" identifier starts with the Issuing Agency Code (IAC), and then conforms to a format specified by the Issuing Agency; this will ensure that the data will be unique in a sense that no issuer re-issues a number until a sufficient period of time has passed so that the first number has ceased to be of significance to any user of data.

D.6 2D symbol

If 2D symbol(s) are incorporated, specify the selected ANS MH10.8.3 (ISO/IEC 15434) formatsThe precise rules of normative Annex B need to be incorporated.

D.7 Linear bar code

Specify which linear symbology shall be used (see clause 0). If migrating from Code 39, see Annex G.

D.8 The X dimension

Specify the narrow element X dimension (see clauses A.3 and B.1.3). Ideally, this should offer the full range of 0.25 mm to 0.43 mm in accordance with this American National Standard. However, there can be industry-specific reasons for being more restrictive within this range.

D.9 Symbol quality

Specify the symbol quality (see clauses A.8, B.1.7, B.2.6, and B.4.5). Ideally, this should be identical to that of this American National Standard. However, there can be industry-specific requirements which call for a higher print quality. In drafting the application guideline, consideration needs to be given to the cross-over effect both for:

- labels from suppliers covered by the application guideline going to customers outside the domain of the industry,
- labels coming from suppliers outside the domain of the industry.

In both these cases, the expectation of trading partners will be to conform to the print quality as specified in the American National Standard.

D.10 Label design

Specify, in as much detail as is appropriate for the application, the label design (see clause 7) taking into consideration the size of label (see clause 0) and any special label materials (see clause 0).

D.11 Label placement

Specify the label placement appropriate for the application (see clause 8).

Annex E
(informative)

Label examples

E.1 Base Label examples

E.1.1 Minimum data examples

At a minimum, one of the two following formats shown in Figures E-1 or E-2 is required. Exceptions are described in the note at clause 0.

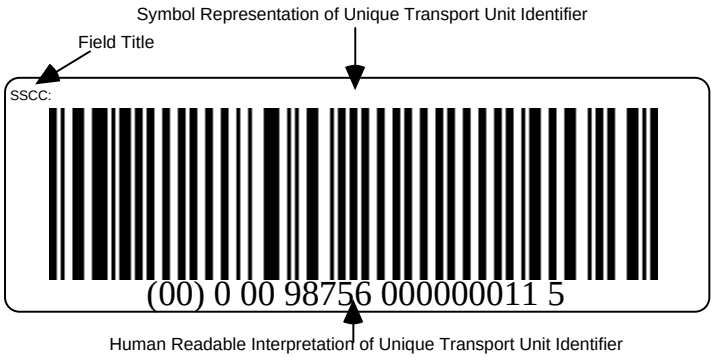


Figure E-1
Base Label using UCC/EAN-128 license plate (not to scale)

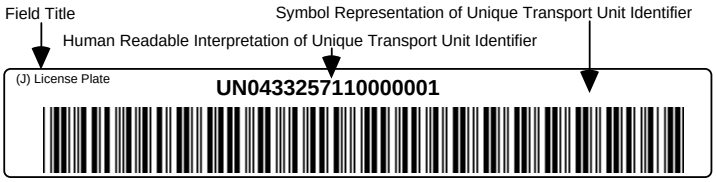


Figure E-2
Base Label using "J" ANSI MH10.8.2 Data Identifier license plate (not to scale)

E.1.2 Bar code symbols as pointers to a trading partner's databases

When, with mutual agreement of the trading partner, pointers to the carrier's or customer's databases are needed, the formats shown in either Figure E-3 or Figure E-4 are recommended.

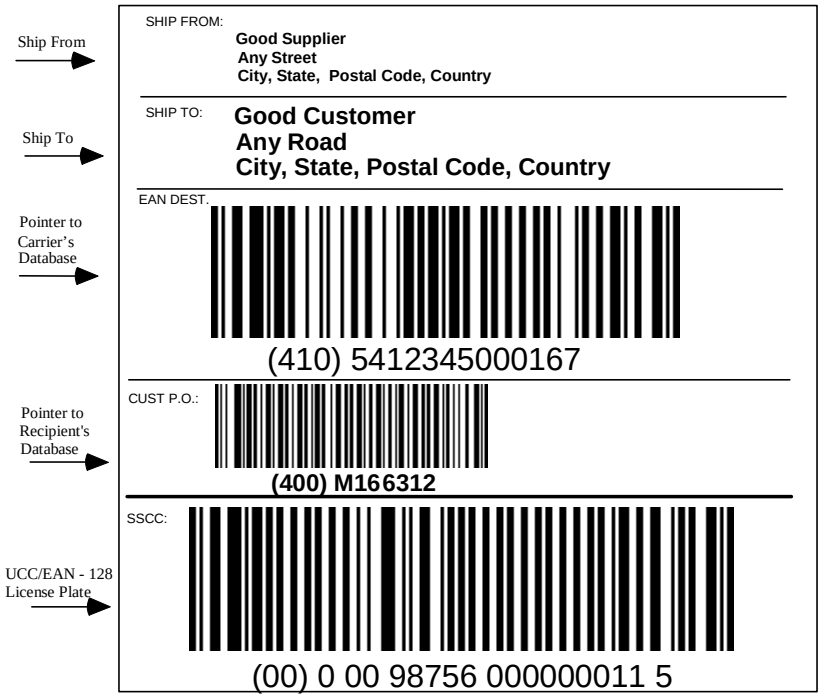


Figure E-3
Label using UCC/EAN-128 license plate
with pointers to carrier's and customer's databases (not to scale)

Figure E-4
Label using "J" ANSI MH10.8.2 Data Identifier license plate
with pointers to carrier's and customer's databases (not to scale)

E.2 Extended Label Examples

E.2.1 Bar code symbols as pointers to trading partner's databases

When, with the mutual agreement of the trading partners, pointers to the carrier's or customer's databases and additional information are needed, the formats shown in either Figure E-5 or Figure E-6 are recommended.

Figure E-5
Label using UCC/EAN-128 license plate with
pointers to carrier's and customer's databases (not to scale)

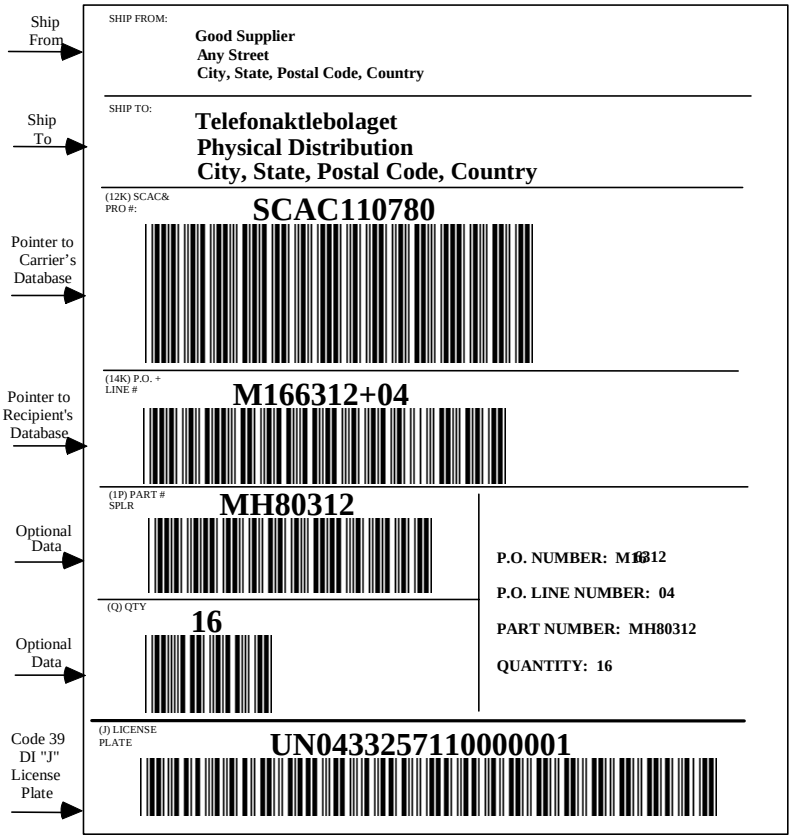


Figure E-6
Label using "J" ANSI MH10.8.2 Data Identifier license plate with pointers to carrier's and customer's databases (not to scale)

E.2.2 Using license plate and 2D symbols for trading partner data

When, with mutual agreement of the trading partner, data in 2D symbols are needed, the formats shown in Figure E-7, Figure E-8, Figure E-9, or Figure E-10 are recommended. The 2D symbol examples in Figure E-7, Figure E-8, and Figure E-9 are encoded in accordance with ANSI MH10.8.2 data formats identified as Format 01 through Format 06. The 2D EAN.UCC Composite symbol example in Figure E-10 is encoded directly with EAN.UCC Application Identifier element string data according to the General EAN.UCC Specifications.

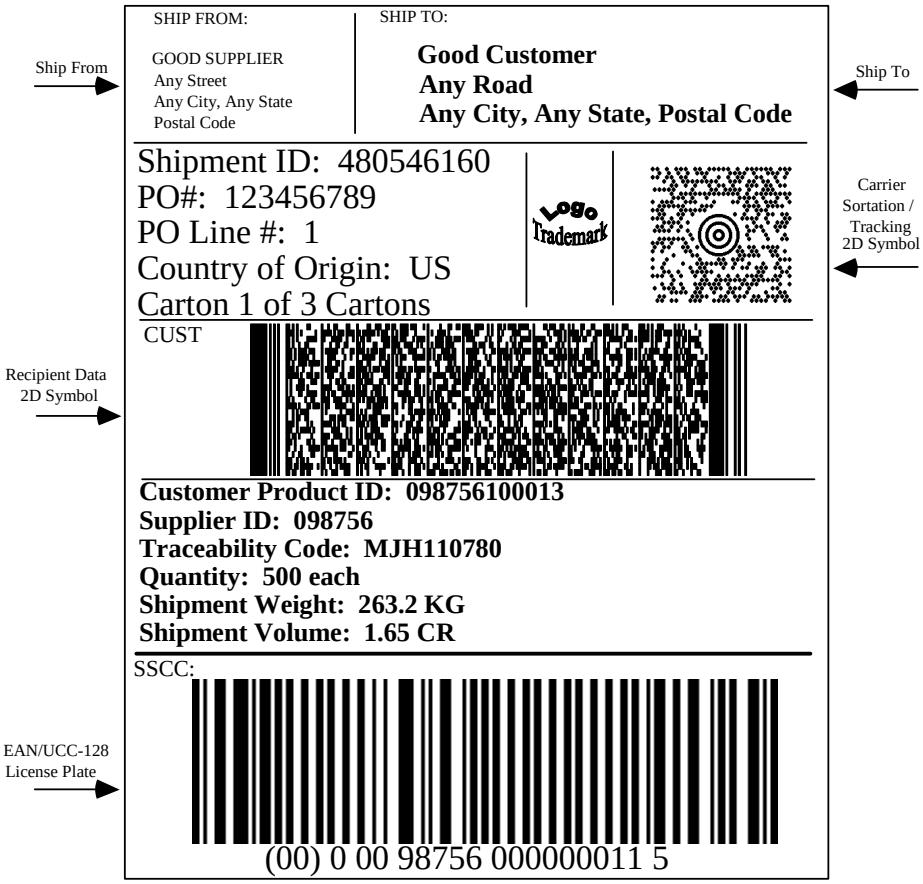


Figure E-7
Label using UCC/EAN-128 license plate and
additional trading partner data in 2D symbols (not to scale)

The data encoded in the MaxiCode symbol in Figure E-7 is as follows:

Compliance Indicator	[)>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	352440000$^{G}_{S}$840$^{G}_{S}$001$^{G}_{S}$ 96341592653598414709 8$^{G}_{S}$SCAC$^{G}_{S}$ 5215716587$^{G}_{S}{}^{G}_{S}$480546160$^{G}_{S}{}^{G}_{S}$580$^{R}_{S}$
Format 05 Application Identifier Header	05$^{G}_{S}$
Supplier's Transport Unit ID	00000987560000000115$^{R}_{S}{}^{E}O_{T}$

The data encoded in the PDF417 symbol in Figure E-7 is as follows:

Header	[)>$^{R}_{S}$
Format 03 Header	03003030$^{F}_{S}{}^{G}_{S}{}^{U}_{S}$
Ship From Name	N1$^{G}_{S}$SF$^{G}_{S}$GOOD SUPPLIER$^{F}_{S}$
Ship From Street Address	N3$^{G}_{S}$ANY STREET$^{F}_{S}$
Ship From City, State, and Postal Code	N4$^{G}_{S}$ANY CITY$^{G}_{S}$ANY STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Ship To Name	N1$^{G}_{S}$ST$^{G}_{S}$GOOD CUSTOMER$^{F}_{S}$
Ship To Street Address	N3$^{G}_{S}$ANY ROAD$^{F}_{S}$
Ship To City, State, and Postal Code	N4$^{G}_{S}$ANY CITY$^{G}_{S}$ANY STATE$^{G}_{S}$POSTAL CODE$^{R}_{S}$
Format 05 Application Identifier Header	05$^{G}_{S}$
Shipment ID	902S480546160$^{G}_{S}$
Transport Unit ID (Container License Plate)	00000987560000000115$^{G}_{S}$
Carrier Shipment Number	96341592653598414709 8$^{G}_{S}$
Customer PO # and Line Item #	400123456789+001$^{G}_{S}$
SCC-14 (Item Code) & Quantity (Each)	01900987561000163050 0$^{G}_{S}$
Customer Product ID	241AA00211211$^{G}_{S}$
Country of Origin	904LUS$^{G}_{S}$
Lot / Batch Number	10MJH110780$^{G}_{S}$
Carton "n of x"	9013Q1/3$^{G}_{S}$
Shipment Weight	3301263$^{G}_{S}$
Shipment Volume	3362165CR$^{R}_{S}$
Trailer	$^{E}O_{T}$

Figure E-8
Label using "J" ANSI MH10.8.2 Data Identifier license plate and additional trading partner data in 2D symbols (not to scale)

The carrier data encoded in the MaxiCode symbol in Figure E-8 is as follows:

Header	[)>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	S-13189$^{G}_{S}$752$^{G}_{S}$006$^{G}_{S}$MH80312$^{G}_{S}$SCAC$^{G}_{S}$ 5215716587$^{G}_{S}{}^{G}_{S}$1JEABCXXXA$^{G}_{S}{}^{G}_{S}$580$^{R}_{S}{}^{E}O_{T}$

The customer data encoded in the PDF417 symbol in Figure E-8 is as follows:

Header	[)>$^{R}_{S}$
Format 04 Header	04092001$^{F}_{S}{}^{G}_{S}{}^{U}_{S}$
Ship From Name & Address	NAD$^{G}_{S}$SF$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$GOOD SUPPLIER$^{G}_{S}$ANY STREET$^{G}_{S}$ANY CITY$^{G}_{S}$ANY STATE$^{G}_{S}$ANY STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Ship To Name & Address	NAD$^{G}_{S}$ST$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$GOOD CUSTOMER$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$ANY CITY$^{G}_{S}$ANY STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Despatch Advice Number	BGM$^{G}_{S}$351$^{G}_{S}$93-5678ML$^{G}_{S}$9$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Transport Unit ID (Container License Plate)	JUN0433257110000001$^{G}_{S}$
Carrier Shipment Number	12KSCACMH80312$^{G}_{S}$
Customer PO #	KPO505054$^{G}_{S}$
Quantity (Each Implied)	Q500$^{G}_{S}$
Supplier ID	3V0662742$^{G}_{S}$
Customer Product ID	PAA00211211$^{G}_{S}$
Country of Origin	4LUS$^{G}_{S}$
Lot / Batch Number	1TMJH110780$^{G}_{S}$
Carton “n of x”	13Q1/3$^{G}_{S}$
Shipment Weight	7Q263.2KG$^{G}_{S}$
Shipment Volume	7Q1.65CR$^{R}_{S}$
Trailer	$^{E}O_{T}$

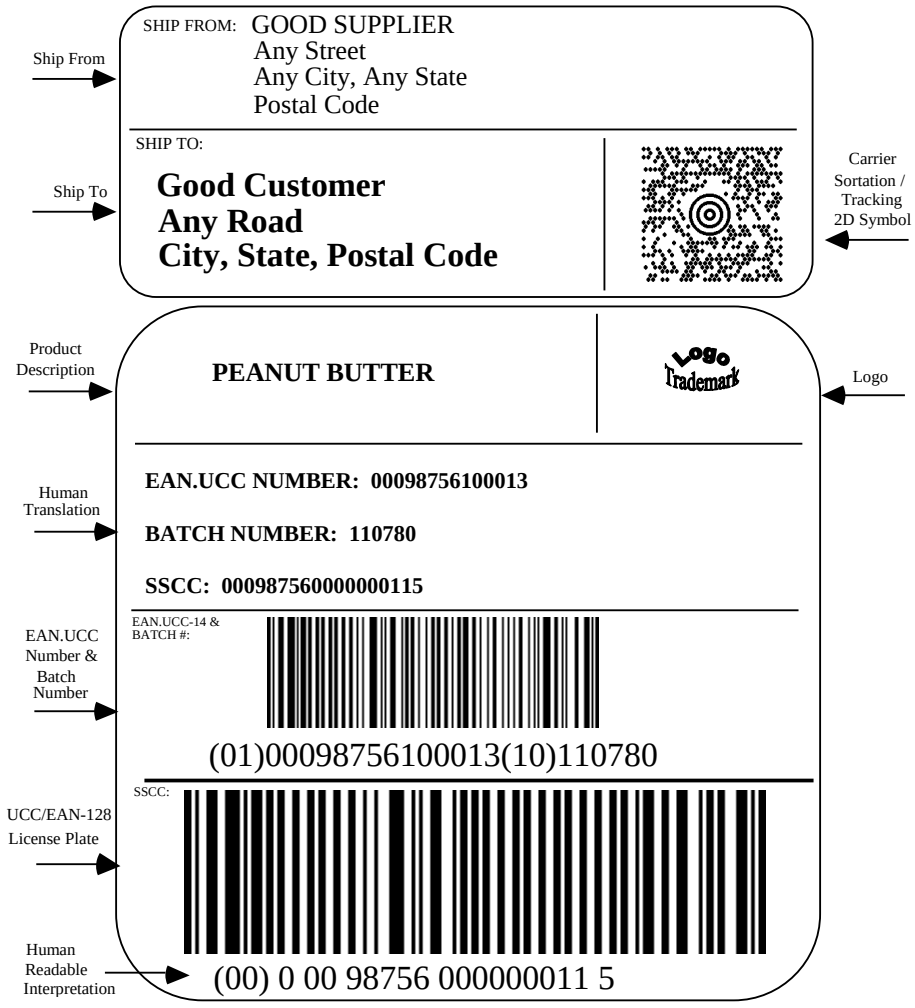


Figure E-9
Two labels (top label is carrier label,
bottom label is supplier label (not to scale)

Figure E-10
Label using EAN.UCC Composite data carrier with additional contents and carrier data

The data encoded in the EAN.UCC Composite symbol in Figure E-10 is as follows:

Encoded in UCC/EAN-128:	
Header	$^{F}_{1}$
Transport Unit ID (Container License Plate)	00000614141012345677
Shipment Weight	3301002632
Shipment Volume	3362000165
Encoded in CC-C:	
Case GTIN	0200614141000012
Case Quantity	37500 $^{F}_{1}$
Lot / Batch Number	10MJH110780 $^{F}_{1}$
Customer Product ID	241AA00211211 $^{F}_{1}$
Ship From Location Code	4120614141900015
Ship To Location Code	4100614141900992
Country of Origin	422123
Ship To Postal Code	42098765 $^{F}_{1}$
Shipment ID	402480546160 $^{F}_{1}$
Carrier Shipment Number	401963141592653598414709 8 $^{F}_{1}$
Customer PO # and Line Item #	400123456789+001

where $^{F}_{1}$ is a FNC1.

E.3 Format 02 (with complete EDI message)

A simple License Plate on all cartons provides instant access to previously received EDI data from suppliers. However, as a result of EDI message spooling, the nearness of suppliers to customers, and the batch nature of many EDI systems, freight may arrive prior to the electronic message detailing the contents of the shipment. Accordingly, this guideline identifies two formats for ensuring that the data arrives, at the latest, with the shipment in the form of a machine-readable symbol encoding a specific EDI message. The two methods of encoding EDI messages are UN/EDIFACT, administered by the United Nations (UN) and ASC X12, administered by the ANSI Accredited Standards Committee X12. This standard provides for encodation of both UN/EDIFACT and ANSI ASC X12 messages.

E.3.1 EDIFICE UN/EDIFACT Despatch Advice (DESADV) in Format 02

The following example of a Despatch Advice message provides the description of a shipment of goods that have been despatched by the supplier of the goods, identified as Company A. The buyer of the goods is identified as Company B, and the warehouse where the goods are to be delivered is identified as Location B.

The Despatch Advice, reference number 93-5678ML, is sent on 20 April 1993 at 14:50. The goods to be despatched are a complete shipment of the goods purchased on 17 April 1993 according to the buyer's purchase order number PO505054. They are despatched on 20 April at 14:30 and are expected to arrive the next day at 12:00.

The Despatch Advice refers to a shipment of goods containing two pallets. Each pallet is uniquely identified by a bar coded serial number.

The first pallet is identified by a package ID number ABCXXX90 and contains three cartons of the product identified by the number ABCDE-AA, each carton containing a number of units. The pallet is a standard 800 mm x 1200 mm pallet with a gross weight of 263.2 kilograms.

The second pallet has an ID number of ABCXXX91 and has a mixed product load: 1 carton of product 12345-AA and 1 carton of product 67890-AB. The pallet has the same dimensions as the first one with a gross weight of 305.1 kilograms.

Each of the cartons has their own associated barcode Package ID number.

A contact code is given for Company A, along with a telephone number.

The Despatch Advice describes the shipment as being composed of two pallets, providing for each pallet a description of the type of pallet in terms of dimensions and weight, as well as the pallet's unique identity number. The contents of each pallet are then described in terms of the despatch units it contains, including the package serial number.

Examples shown below of Format 02 are not intended to show how to construct an EDI message.

E.3.1.1 Descriptive transaction

The following example uses DESADV "package" related logic, i.e., there is a one-to-one relationship between the CPS and PAC segments.

Consider the example of an EDIFICE UN/EDIFACT Despatch Advice (DESADV):

Message Header	UNH+1+DESADV:1:921:UN:EIVER1'
Shipment 93-5678ML	BGM+351+93-5678ML+9'
Date/time of Despatch Advice	DTM+137:199304201450:203'
Actual Ship Date and Time	DTM+11:199304201430:203'
Est Delivery Date and Time	DTM+17:199304211200:203'
Total Gross Shipment Weight	MEA+WT+AAD+KGM:568.3'
Number of Unit Loads	MEA+CT+SQ+NMP:2'
Purchase Order No.	RFF+ON:PO505054'
Date of PO	DTM+4:19930417:102'
Code Assigned by Seller	NAD+SE+COMPANYA::91'
Contact Person	CTA+IC+John Smith'
Contact Telephone Number	COM+883306:TE'
Buyer Code Assigned by Seller	NAD+BY+COMPANYB::91'
Ship to Location	NAD+DP+LocationB::92'
Main-Carriage, by Road	TDT+20++30+++++:::H1234 CFD'
Trailer	EQD+TE'
Trailer Seal No. Assigned by Customs	SEL+ABCD123456+CU'
1st Unit Load	CPS+1'
Unit Load is Shrink Wrapped	PAC+1++SW'
Gross Weight in Kilograms	MEA+WT+G+KGM:263.2'
Unit Load Contains 3 Boxes	QTY+52:3'
Heavy Cargo	HAN+HEA::EAN'
Labels/IDs Supplied by Seller	PCI+17'
Invoice Number	RFF+IV:V1013-015'
Unit Identification	GIN+ML+ABCXXX90'
Second Level of Description	CPS+2+1'
1st box, 1st Unit Load	PAC+1++BX'
Gross Weight of Box	MEA+WT+G+KGM:100'
Labels/IDs Supplied by Seller	PCI+17'
Package ID of Box	GIN+ML+ABCXXXA'
First Line Item	LIN+1++ABCDE-AA:SA::91'
500 X ABCDE-AA Despatched	QTY+12:500'
Serial Numbers	GIN+BN+999001:999500'
Third Level of Description	CPS+3+1'
2nd Box, 1st Unit Load	PAC+1++BX'
Gross Weight of Box	MEA+WT+G+KGM:100'
Labels/IDs Supplied by Seller	PCI+17'
Package ID of Box	GIN+ML+ABCXXXB'
First Line Item	LIN+1++ABCDE-AA:SA::91'
500 X ABCDE-AA Despatched	QTY+12:500'
Serial Numbers	GIN+BN+998001:998500'
Fourth Level of Description	CPS+4+1'
3rd box, 1st Unit Load	PAC+1++BX'
Gross Weight of Box	MEA+WT+G+KGM:63.2'
Labels/IDs Supplied by Seller	PCI+17'
Package ID of Box	GIN+ML+ABCXXXC'
First Line Item	LIN+1++ABCDE-AA:SA::91'
250 X ABCDE-AA Despatched	QTY+12:250'

Serial Numbers	GIN+BN+997001:997250'
2nd Unit Load	CPS+5'
Unit Load is Shrink Wrapped	PAC+1++SW'
Gross Weight in Kilograms	MEA+WT+G+KGM:305.1'
Unit Load Contains 3 Boxes	QTY+52:3'
Heavy Cargo	HAN+HEA::EAN'
Labels/IDs Supplied by Seller	PCI+17'
Invoice Number	RFF+IV:V1013-015'
Package ID of Pallet	GIN+ML+ABCXXX91'
Sixth Level of Description	CPS+6+5'
1st Box in 2nd Unit Load	PAC+1++BX'
Gross Weight in Kilograms	MEA+WT+G+KGM:65.1'
Contains 50 Items	QTY+52:50'
Labels/IDs Supplied by Seller	PCI+17'
Package ID of Box	GIN+ML+ABCXXXA1’
1st Line Item	LIN+1++12345-AA:SA::91'
50 X 12345-AA Despatched	QTY+12:50'
Serial Numbers	GIN+BN+996001:996050'
Seventh Level of Description	CPS+7+5'
2nd Box in 2nd Unit Load	PAC+1++BX'
Gross Weight in Kilograms	MEA+WT+G+KGM:120'
Contains 100 Items	QTY+52:100'
Labels/IDs Supplied by Seller	PCI+17’
Package ID of Box	GIN+ML+ABCXXXA2'
1st Line Item; Product Type	LIN+1++67890-AB:SA::91'
Buyer's Item Number	PIA+1+SD12345:IN::92'
100 X 67890-AB Despatched	QTY+12:100'
Country of Origin	ALI+US'
Serial Numbers	GIN+BN+995001:995100'
Invoice Number	RFF+IV:V1013-015'
Eighth Level of Description	CPS+8+5'
3rd Box in 2nd Unit Load	PAC+1++BX'
Gross Weight in Kilograms	MEA+WT+G+KGM:120’
Contains 100 Items	QTY+52:100'
Labels/IDs Supplied by Seller	PCI+17'
Package ID of Box	GIN+ML+ABCXXXA3’
1st Line Item; Product Type	LIN+1++67890-AB:SA::91'
Buyer's Item Number	PIA+1+SD12345:IN::92’
100 X 67890-AB Despatched	QTY+12:100'
Country of Origin	ALI+US'
Serial Numbers	GIN+BN+995101:995200'
Invoice Number	RFF+IV:V1013-015'
Message Trailer	UNT+91+1'

E.3.1.2 2D encodation

A Despatch Advice might be encoded as follows (1,345 characters):

[]>$^{R}_{S}$
02
UNH+1+DESADV:1:921:UN:EIVER1'BGM+351+93-5678ML+9'DTM+137:199304201450:203'
DTM+11:199304201430:203'DTM+17:199304211200:203'MEA+WT+AAD+KGM:568.3'MEA+CT+
SQ+NMP:2'RFF+ON:PO505054'DTM+4:19930417:102'NAD+SE+COMPANYA::91'CTA+IC+John
Smith'COM+883306:TE'NAD+BY+COMPANYB::91'NAD+DP+LocationB::92'TDT+20++30+++++H
:::1234 CFD'EQD+TE'SEL+ABCD123456+CU'CPS+1'PAC+1++SW'MEA+WT+G+KGM:
263.2'QTY+52:3'HAN+HEA::EAN'PCI+17'RFF+IV:V1013-015'GIN+ML+ABCXXX90'CPS+2+
1'PAC+1++BX'MEA+WT+G+KGM:100'PCI+17'GIN+ML+ABCXXXA'LIN+1++ABCDE-AA:SA::
91'QTY+12:500'GIN+BN+999001:999500'CPS+3+1'PAC+1++BX'MEA+WT+G+KGM:100'PCI+17'
GIN+ML+ABCXXXB'LIN+1++ABCDE-AA:SA::91'QTY+12:500'GIN+BN+998001:998500'CPS+
4+1'PAC+1++BX'MEA+WT+G+KGM:63.2'PCI+17'GIN+ML+ABCXXXC'LIN+1++ABCDE-AA:
SA::91'QTY+12:250'GIN+BN+997001:997250'CPS+5'PAC+1++SW'MEA+WT+G+KGM:305.1'QT
Y+52:3'HAN+HEA::EAN'PCI+17'RFF+IV:V1013-015'GIN+ML+ABCXXX91'CPS+6+5'PAC+1++
BX'MEA+WT+G+KGM:65.1'QTY+52:50'PCI+17'GIN+ML+ABCXXXA1'LIN+1++12345-AA:SA::
91'QTY+12:50'GIN+BN+996001:996050'CPS+7+5'PAC+1++BX'MEA+WT+G+KGM:120'QTY+52:
100'PCI+17'GIN+ML+ABCXXXA2'LIN+1++67890-AB:SA::91'PIA+1+SD12345:IN::92'QTY+12:
100'ALI+US'GIN+BN+995001:995100'RFF+IV:V1013-015'CPS+8+5'PAC+1++BX'MEA+WT+G+
KGM:120'QTY+52:100'PCI+17'GIN+ML+ABCXXXA3LIN+1++67890-AB:SA::91'PIA+1+
SD12345:IN::92'QTY+12:100'ALI+US'GIN+BN+995101:995200'RFF+IV:V1013-015'UNT+91+1'

NOTE The Format Trailer Character ($^{R}_{S}$) and the Message Trailer Character ($^{E}_{OT}$) are not used with Format 02.

When encoded in sequential PDF417 symbols, the 2D EDI (syntactically compliant message) would appear as shown in Figure E-11.

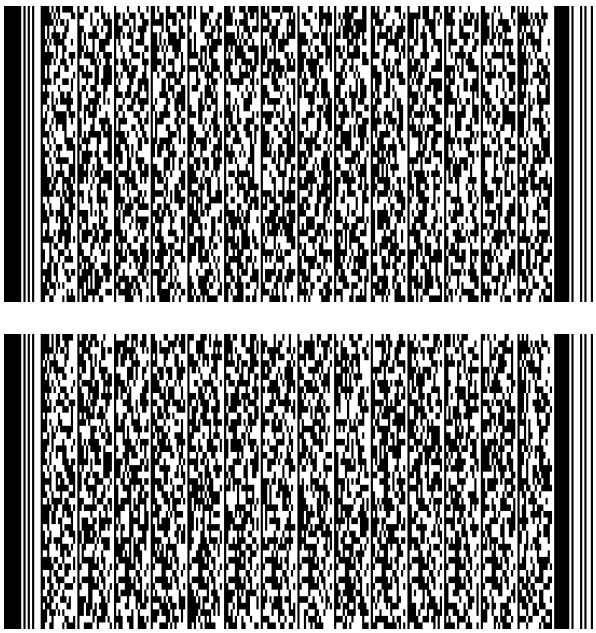


Figure E-11
PDF417 symbol encoding EDIFICE UN/EDIFACT DESADV

E.3.2 ANSI ASC X12 856 EDI Ship Notice Manifest in Format 02

The data to be formatted and encoded into a message in this example is an entire EDI transaction, a formatted ANSI ASC X12 Ship Notice/Manifest (856). Since the data is intended to be passed directly to an EDI translator and includes full EDI headers and trailers, Format 02 is the appropriate data format. The descriptive transaction clause below shows the data as it would be formatted under ANSI ASC X12 rules, with brief explanations of each segment type. The 2D encodation with envelopes clause shows the data as it would be formatted in a complete 2D message.

E.3.2.1 Descriptive transaction

Transmission Header	ISA*00*bbbbbbbbbb*00*bbbbbbbbbb*16* 0433257110000bb*16*0118504840000bb* 920926*1705*U*00302*000002327**0*T$^{C}_{R}$
Functional Group Header	GS*SH*0433257110000bb*0118504840000bb* 920926*1045*145*X*003020$^{C}_{R}$
Transaction Header	ST*856*579333453$^{C}_{R}$
Beginning Segment	BSN*00*MH80312*920223*1442*0001$^{C}_{R}$
Hierarchical Level	HL*1**S$^{C}_{R}$
Carrier Details (Qty/Wt)	TD1*PLT94*36****G*220*KG$^{C}_{R}$
Carrier Details (Routing)	TD5***2*SCAC*AE**CC*****WD*2$^{C}_{R}$
Carrier Details (Special Handling)	TD4*AMM$^{C}_{R}$
Carrier Tracking Number	REF*AW*3115387693$^{C}_{R}$
Ship Date	DTM*017*921012*0800*GM*19$^{C}_{R}$
Ship To Co. & DUNS	N1•ST*ABCbSYSTEMS*9*0433257110000$^{C}_{R}$
Other Name	N2*ORDERbFULFILLMENT$^{C}_{R}$
Street Address	N3*ANY STREET$^{C}_{R}$
City, State, ZIP	N4*CITY*STATE*12345-6789$^{C}_{R}$
Hierarchical Level	HL*2*1*O$^{C}_{R}$
Purchase Order Reference	PRF*MH80312**920512$^{C}_{R}$
Carrier Details (Qty/Wt)	TD1*CTN25*48$^{C}_{R}$
Carrier PRO #	REF*CN*ABC123$^{C}_{R}$
FOB Instructions	FOB*PP$^{C}_{R}$
Hierarchical Level	HL*3*2*T$^{C}_{R}$
Item Physical Details	P04*64*8*BX***320*LB***60*60*60*IN$^{C}_{R}$
Carrier Details (Qty/Wt)	TD1*CTN25*40$^{C}_{R}$
Pallet License Plate	MAN*GM*100987560000000112$^{C}_{R}$
Hierarchical Level	HL*4*3*P$^{C}_{R}$
Item Physical Details	P04*8*6*EA***8*LB***8.5*11*2.2*IN$^{C}_{R}$
Pack License Plate	MAN*GM*000987560000000115$^{C}_{R}$
Pack Container Code	MAN*UC*50098756100018$^{C}_{R}$
Hierarchical Level	HL*5*4*Q$^{C}_{R}$
Item Physical Details	P04***6*EA***8*LB***8.5*11*2.2*IN$^{C}_{R}$
Carrier Details (Qty/Wt)	TD1*PCS71*40$^{C}_{R}$
Marks & Numbers	MAN*UC*30098756100014$^{C}_{R}$
Hierarchical Level	HL*6*5*I$^{C}_{R}$
Item Identification	LIN**UP*098756100013*BP*P16235128L$^{C}_{R}$
Shipment Item Detail	SN1*12*EA*12*12*EA$^{C}_{R}$
Sub line Item Detail	SLN*ABC123**A*1****VP*0098756XYZ12345789$^{C}_{R}$

Sub line Item Detail	SLN*ABC567**A*1****VP*0098756ABC00110010$^{C}_{R}$
Item Physical Details	P04***20*FT$^{C}_{R}$
Product/Item Descript.	PID*F*08***ABC QUARTERMASTER$^{C}_{R}$
Product Serial Numbers	REF*LS*00987563115387693$^{C}_{R}$
Hierarchical Level	HL*7*5*I$^{C}_{R}$
Item Identification	LIN**UP*098756100020*BP*A53261652R$^{C}_{R}$
Shipment Item Detail	SN1*12*EA*12*12*EA$^{C}_{R}$
Sub line Item Detail	SLN*ABC345**A*1****VP*0098756QED97531246$^{C}_{R}$
Sub line Item Detail	SLN*ABC897**A*1****VP*0098756ABC00110010$^{C}_{R}$
Item Physical Details	P04*1*1*EA$^{C}_{R}$
Product/Item Descript.	PID*F*08***ABC BEST PART$^{C}_{R}$
Product Serial Numbers	REF*LS*00987563111111111$^{C}_{R}$
Transaction Totals	CTT*7$^{C}_{R}$
Transaction Trailer	SE*47*579333453$^{C}_{R}$
Functional Group Trailer	GE*1*732$^{C}_{R}$
Transmission Trailer	IEA*1*000002327$^{C}_{R}$

E.3.2.2 2D encodation

[)>$^{R}_{S}$
02
ISA*00*bbbbbbbbbb*00*bbbbbbbbbb*16*0433257110000bb*16*0118504840000bb*920926*17
05*U*00302*000002327**0*T$^{C}_{R}$GS*SH*0433257110000bb*0118504840000bb*920926*1045*14
5*X*003020$^{C}_{R}$ST*856*579333453$^{C}_{R}$BSN*00*MH80312*920223*1442*0001$^{C}_{R}$HL*1**S$^{C}_{R}$TD1*PL
T94*36****G*220*KG$^{C}_{R}$TD5***2*SCAC*AE**CC*****WD*2$^{C}_{R}$TD4*AMM$^{C}_{R}$REF*AW*3115387693
$^{C}_{R}$DTM*017*921012*0800*GM*19$^{C}_{R}$N1•ST*ABCbSYSTEMS*9*0433257110000$^{C}_{R}$N2*ORDERb
FULFILLMENT$^{C}_{R}$N3*ANY STREET$^{C}_{R}$N4*CITY*STATE*12345-6789$^{C}_{R}$HL*2*1*O
$^{C}_{R}$PRF*MH80312**920512$^{C}_{R}$TD1*CTN25*48$^{C}_{R}$REF*CN*ABC123$^{C}_{R}$FOB*PP$^{C}_{R}$HL*3*2*T$^{C}_{R}$P04*6
4*8*BX***320*LB***60*60*60*IN$^{C}_{R}$TD1*CTN25*40$^{C}_{R}$MAN*GM*100987560000000112$^{C}_{R}$HL*4*3*
P$^{C}_{R}$P04*8*6*EA***8*LB***8.5*11*2.2*IN$^{C}_{R}$MAN*GM*000987560000000115$^{C}_{R}$MAN*UC*5009875
6100018$^{C}_{R}$HL*5*4*Q$^{C}_{R}$P04***6*EA***8*LB***8.5*11*2.2*IN$^{C}_{R}$TD1*PCS71*40$^{C}_{R}$MAN*UC*30098
756100014$^{C}_{R}$HL*6*5*I$^{C}_{R}$LIN**UP*098756100013*BP*P16235128L$^{C}_{R}$SN1*12*EA*12*12*EA$^{C}_{R}$SL
N*ABC123**A*1****VP*0098756XYZ12345789$^{C}_{R}$SLN*ABC567**A*1****VP*0098756ABC00110
010$^{C}_{R}$P04***20*FT$^{C}_{R}$PID*F*08***ABC
QUARTERMASTER$^{C}_{R}$REF*LS*00987563115387693$^{C}_{R}$HL*7*5*I$^{C}_{R}$LIN**UP*098756100020*BP*
A53261652R$^{C}_{R}$SN1*12*EA*12*12*EA$^{C}_{R}$SLN*ABC345**A*1****VP*0098756ABC97531246$^{C}_{R}$SL
N*ABC897**A*1****VP*0098756ABC00110010$^{C}_{R}$P04*1*1*EA$^{C}_{R}$PID*F*08***ABC BEST
PART$^{C}_{R}$REF*LS*00987563111111111$^{C}_{R}$CTT*7$^{C}_{R}$SE*47*579333453$^{C}_{R}$GE*1*732$^{C}_{R}$IEA*1*00000
2327$^{C}_{R}$

When encoded in a PDF417 symbol, the 2D EDI message / transaction would appear as shown in Figure E-12.

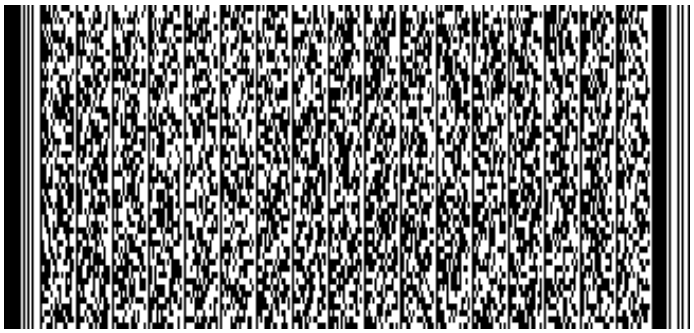


Figure E-12
PDF417 symbol encoding ANSI ASC X12 856 data with envelopes

E.3.3 ANSI ASC X12 204 EDI Motor Carrier Information in Format 02

The data to be formatted and encoded into a message in this example is an entire EDI transaction, a formatted ANSI X12 Motor Carrier Information transaction (204), commonly used as an electronic Bill of Lading. Since the data is intended to be passed directly to an EDI translator and includes full EDI headers and trailers, Format 02 is the appropriate data format. The EDI transaction below shows the data as it would be formatted under ANSI ASC X12 rules, with brief explanations of each segment type.

E.3.3.1 Descriptive transaction

Transmission Header	ISA*00*bbbbbbbbbb*00*bbbbbbbbbb*16*0433257110000bb*02*ABCDbbbbbbbbbb*920926*1705*U*00302*000002327*0*P: $^{C}_{R}$
Functional Group Header	GS*SH*0433257110000bb*0118504840000bb*920926*1045*145*X*003020$^{C}_{R}$
Transaction Header	ST*204*001*840001$^{C}_{R}$
Beginning Segment	B2**ABCD*****13216**CC*C*M****6$^{C}_{R}$
Set Purpose	B2A*00*BL$^{C}_{R}$
Carrier PRO #	N9*CN*0877208484$^{C}_{R}$
Ship Notice/Manifest Number	N9*MA*00184$^{C}_{R}$
Ship Date	G62*11*910617$^{C}_{R}$
Shipper	N1*SH*LANDA, INC. $^{C}_{R}$
Street Address	N3*13705 N.E. AIRPORT WAY$^{C}_{R}$
City, State, Zip	N4*PORTLAND*OR*97230$^{C}_{R}$
Consignee	N1*CN*ROTARY DRILLING SUPPLY$^{C}_{R}$
Street Address	N3*HWY 61 67 SOUTH$^{C}_{R}$
City, State, Zip	N4*FESTUS*MO*63028$^{C}_{R}$
Assigned Number	LX*1$^{C}_{R}$
Description	L5**OUTFITS, CLEANING STEAM OR WATER (147300)*147300*N$^{C}_{R}$
Weight and Quantity	L0****80*N***1*PLT$^{C}_{R}$
Tariff Reference	L7********77.5$^{C}_{R}$
Total Weight and Charges	L3*80*G*********1**T5013$^{C}_{R}$
Transaction Trailer	SE*18*001840001$^{C}_{R}$

Functional Group Trailer	GE*1*732$^{C}_{R}$
Transmission Trailer	IEA*1*000002327$^{C}_{R}$

E.3.3.2 2D encodation

The 2D EDI message with envelopes should appear as follows (569 characters):

[)>$^{R}_{S}$
02
ISA*00*bbbbbbbbbb*00*bbbbbbbbbb*16*0433257110000bb*16*0118504840000bb*920926*17
05*U*00302*000002327**0*P:$^{C}_{R}$GS*SH*0433257110000bb*0118504840000bb*920926*1045*1
45*X*003020$^{C}_{R}$ST*204*001*840001$^{C}_{R}$B2**SCAC****13216**CC**C*M****6$^{C}_{R}$B2A*00*BL$^{C}_{R}$N9*C
N*0877208484$^{C}_{R}$N9*MA*00184$^{C}_{R}$G62*11*910617$^{C}_{R}$N1*SH*LANDA, INC.$^{C}_{R}$N3*13705 N. E.
AIRPORT WAY$^{C}_{R}$N4*PORTLAND*OR*97230$^{C}_{R}$N1*CN*ROTARY DRILLING SUPPLY$^{C}_{R}$
N3*HWY 61 67 SOUTH$^{C}_{R}$N4*FESTUS*MO*63028$^{C}_{R}$LX*1$^{C}_{R}$L5**OUTFITS, CLEANING STEAM
OR WATER (147300)*147300*N$^{C}_{R}$L0****80*N***1*PLT$^{C}_{R}$L7*******77.5$^{C}_{R}$L3*80*G*********1**
T5013$^{C}_{R}$SE*18*001840001$^{C}_{R}$GE*1*732$^{C}_{R}$IEA*1*000002327$^{C}_{R}$

When encoded in a PDF417 symbol, the 2D complete EDI message / transaction would appear as shown in Figure E-13.

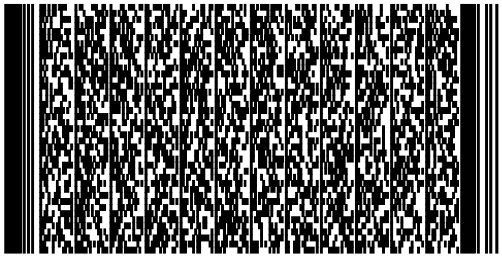


Figure E-13
PDF417 symbol encoding a simple LTL
bill of lading ANSI ASC X12 204 transaction set (one item)

E.4 Format 03 (structured data (EDI segments) using ANSI ASC X12)

In some cases it may be desirable to communicate specific text in a structured format, but a complete, enveloped EDI transaction would not be necessary. When EAN.UCC Application Identifiers (example in clause E.6) and ANSI MH10.8.2 Data Identifiers (example in clause E.7) cannot accommodate the data that needs to be formatted, the rules used for formatting individual segments of EDI transactions could provide a model for structuring the data. This is the case in the following example.

In this example, address data for the Ship From and Ship To are formatted using individual segments from the ANSI ASC X12 EDI standards using Format 03. This data is not intended to be passed to an EDI translator, since it is not a complete EDI transaction.

An example of structured data using ANSI ASC X12 segments is shown in the following Ship From and Ship To portion of a shipping label:

Figure E-14
Ship From and Ship To portions of a shipping label (not to scale)

When coded in ANSI ASC X12 segments, the above example of Ship From and Ship To portions of a shipping label might be encoded as follows:

Header	[]>$^{R}_{S}$
Format 03 Header	03003030$^{F}_{S}{}^{G}_{S}{}^{U}_{S}$
Ship From Name	N1$^{G}_{S}$SF$^{G}_{S}$GOOD SUPPLIER$^{F}_{S}$
Ship From Additional Name	N2$^{G}_{S}$ORDER FULFILLMENT$^{F}_{S}$
Ship From Street Address	N3$^{G}_{S}$ANY STREET$^{F}_{S}$
Ship From City, State, and Postal Code	N4$^{G}_{S}$ANY PLACE$^{G}_{S}$ANY STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Ship To Name	N1$^{G}_{S}$ST$^{G}_{S}$GOOD CUSTOMER$^{F}_{S}$
Ship To Additional Name	N2$^{G}_{S}$RECEIVING DEPARTMENT$^{F}_{S}$
Ship To Street Address	N3$^{G}_{S}$ANY ROAD$^{F}_{S}$
Ship To City, State, and Postal Code	N4$^{G}_{S}$CITY$^{G}_{S}$STATE$^{G}_{S}$POSTAL CODE$^{R}_{S}$
Trailer	$^{E}O_{T}$

When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. When encoded in a PDF417 symbol, the above data would appear as follows:

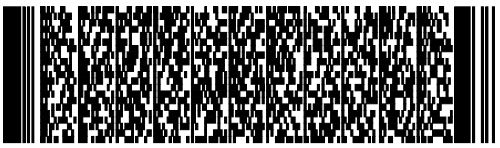


Figure E-15
PDF417 symbol encodation of Ship From and
Ship To data in ANSI ASC X12 segment format (not to scale)

E.5 Format 04 (structured data (EDI segments) using UN/EDIFACT)

In some cases, it may be desirable to communicate specific text in a structured format, but a complete, enveloped EDI transaction would not be necessary. When EAN.UCC Application Identifiers (example in clause E.6) or ANSI MH10.8.2 Data Identifiers (example in clause E.7) cannot accommodate the data that needs to be formatted, the rules used for formatting individual segments of EDI transactions could provide a model for structuring the data. This is the case in the following example.

In this example, address data for the Ship From and Ship To fields are formatted using individual segments from the UN/EDIFACT EDI standards using Format 04. This data is not intended to be passed to an EDI translator, since it is not a complete EDI translation.

An example of structured data using UN/EDIFACT segments is shown in the following Ship From and Ship To portion of a shipping label:

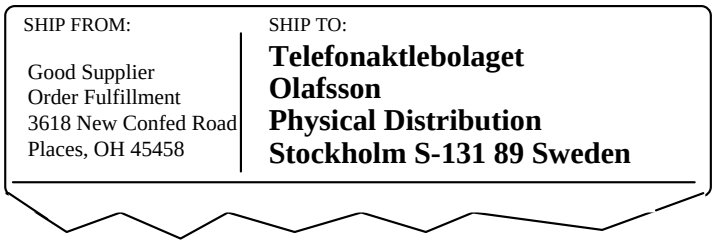


Figure E-16
Ship From and Ship To portions of a shipping label (not to scale)

When coded in UN/EDIFACT segments, the above example of Ship From and Ship To portions of a shipping label might be encoded as follows:

Header	[]>$^{R}_{S}$
Format 04 Header	04092001$^{F}_{S}{}^{G}_{S}{}^{U}_{S}$
Ship From Name & Address	NAD$^{G}_{S}$SF$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$GOOD SUPPLIER+ORDER FULFILLMENT$^{G}_{S}$3618 NEW CONFED ROAD$^{G}_{S}$PLACES$^{G}_{S}$OH$^{G}_{S}$45458$^{G}_{S}$USA$^{F}_{S}$
Ship To Name & Address	NAD$^{G}_{S}$ST$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$TELEFONAKTLEBOLAGET OLAFSSON+PHYSICAL DISTRIBUTION$^{G}_{S}{}^{G}_{S}$ $^{G}_{S}$STOCKHOLM$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$S-131 89$^{G}_{S}$ SEK$^{R}_{S}$
Trailer	$^{E}O_{T}$

When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. When encoded in a PDF417 symbol, the above data would appear as follows:

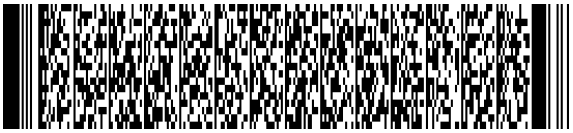


Figure E-17
PDF417 symbol encodation of Ship From and
Ship To data in UN/EDIFACT segment format (not to scale)

E.6 Format 05 (data using EAN.UCC Application Identifiers)

EAN.UCC Application Identifiers (AIs) are recognized in this standard as one method of identifying what specific type of information was encoded in a bar code symbol.

An example of data using EAN.UCC Application Identifiers is shown in the following bar code symbols that might be found on a shipping label:

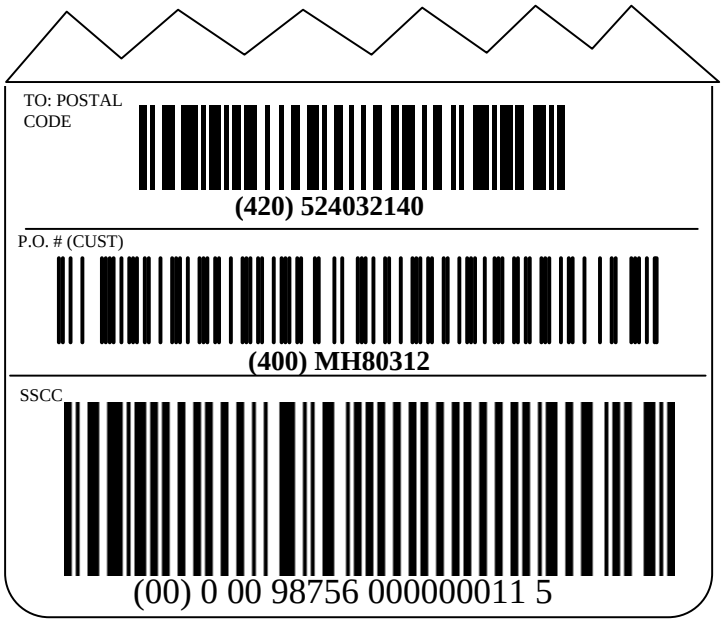


Figure E-18
Shipping Label segments using EAN.UCC Application Identifiers (not to scale)

When coded in Format 05 of this standard, the EAN.UCC Application Identifier data in the above example portions of a shipping label would be encoded as follows:

Header	]$>^{R}_{S}$
Format 05 Application Identifier Header	05^{G}_{S}
Ship To Postal Code	420524032140^{G}_{S}
Customer Purchase Order Number	$400MH80312^{G}_{S}$
SSCC License Plate	$00000987560000000115^{R}_{S}$
Trailer	$^{E}O_{T}$

When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. When encoded in a PDF417 symbol, the above data would appear as follows:

Figure E-19
PDF417 symbol encoding EAN.UCC Application Identifier data (not to scale)

When directly encoded in EAN.UCC Application Identifier syntax, the Application Identifier data in the above example data in the shipping label would be encoded as follows:

Encoded in the UCC/EAM-128 linear component:

Header	$^{F}_{1}$
SSCC License Plate	00000987560000000115

Encoded in the CC-C 2D component:

Ship To Postal Code	420524032140$^{F}_{1}$
Customer Purchase Order Number	400MH80312

When this format is used within a shipping and receiving application, this data would be encoded in a EAN.UCC Composite symbol, the above data would appear as follows:

Figure E-20
EAN.UCC Composite symbol encoding Application Identifier data (not to scale)

E.7 Format 06 (data using ANSI MH10.8.2 Data Identifiers)

ANSI MH10.8.2 Data Identifiers (DIs) are recognized in this standard as one method of identifying what specific type of information was encoded in a bar code symbol.

An example of data using ANSI MH10.8.2 Data Identifiers is shown in the following bar code symbols that might be found on a shipping label:

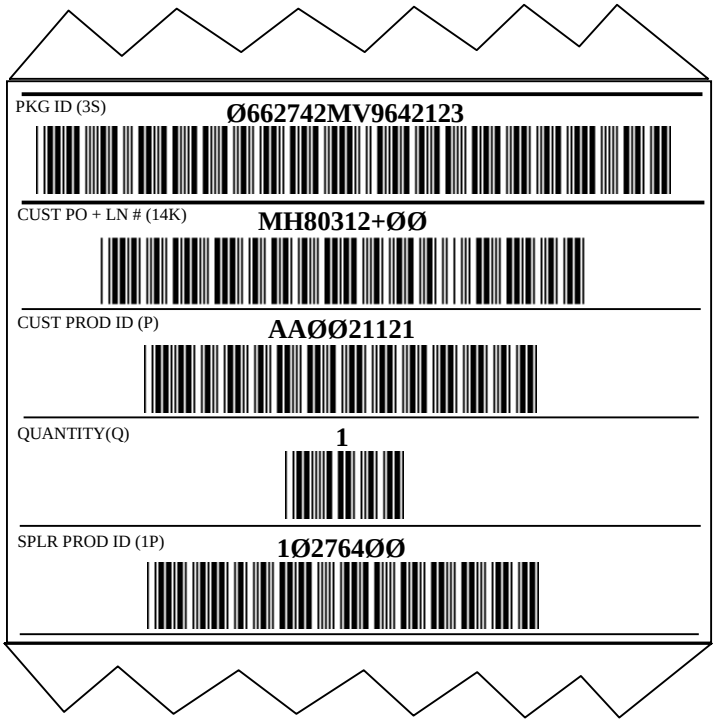


Figure E-21
Shipping label segments using ANSI MH10.8.2 Data Identifiers (not to scale)

When coded in Format 06 of this standard the ANSI MH10.8.2 Data Identifier data in the above example portions of a shipping label would be encoded as follows:

Header	[]>$^{R}_{S}$

Format 06 Data Identifier Header	06^{G}_{S}
Package ID (Container License Plate)	$3S0662742MV96421234^{G}_{S}$
Customer PO # and Line Item #	$14KMH80312+001^{G}_{S}$
Customer Product ID	$PAA00211211^{G}_{S}$
Quantity (Each Implied)	$Q1^{G}_{S}$
Supplier Product ID	$1P102764007^{R}_{S}$
Trailer	$^{E}O_{T}$

When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. When encoded in a PDF417 symbol, the above data would appear as follows:

Figure E-22
PDF417 symbol encoding ANSI MH10.8.2 Data Identifier data (not to scale)

E.8 Combining Format 01 with Format 03

Two examples are provided for combining carrier data (Format 01) with ANSI ASC X12 EDI segments (Format 03).

E.8.1 Format 01/03 using a 2D symbol for automated sortation / tracking

The following example depicts a situation in which a carrier might be using a MaxiCode symbol for sortation and tracking and desires to capture additional data, as well as allowing for the encodation of packing slip data for its customer.

The carrier data (Format 01) would be encoded in a MaxiCode symbol as well as being combined with ANSI ASC X12 EDI segments (Format 03) in a PDF417 symbol. The MaxiCode symbol would be used for automated sortation / tracking and the PDF417 symbol for additional carrier and customer data. In this example, the MaxiCode symbol might appear as follows:

Compliance Indicator	$]>^{R}_{S}$
Format 01 Sortation/Tracking Header	$01^{G}_{S}96$
Carrier Data	$52403^{G}_{S}840^{G}_{S}001^{G}_{S}31415926535984147098^{G}_{S}$ $SCAC^{G}_{S}678202^{G}_{S}{}^{G}_{S}93527^{G}_{S}{}^{G}_{S}25.2^{G}_{S}{}^{G}_{S}$ $RETAIL\ STORE\ \#325^{G}_{S}CITY^{G}_{S}STATE^{R}_{S}{}^{E}O_{T}$

In this example, the PDF417 symbol might appear as follows:

Compliance Indicator	$]>^{R}_{S}$
Format 01 Sortation/Tracking Header	$01^{G}_{S}96$
Carrier Data	$52403^{G}_{S}840^{G}_{S}001^{G}_{S}31415926535984147098^{G}_{S}$ $SCAC^{G}_{S}678202^{G}_{S}{}^{G}_{S}93527^{G}_{S}{}^{G}_{S}25.2^{G}_{S}{}^{G}_{S}RETAIL$ $STORE\ \#325^{G}_{S}CITY^{G}_{S}STATE^{R}_{S}$
Format 03 ASC X12 Segments Header	$03^{F}_{S}{}^{G}_{S}{}^{U}_{S}003050$
Purchase Order Number	$PRF^{G}_{S}MH80312^{F}_{S}$
Shipment ID	$REF^{G}_{S}SI^{G}_{S}93527^{F}_{S}$
SSCC Data	$MAN^{G}_{S}GM^{G}_{S}000987560000000115^{F}_{S}$

Consignee's DUNS+4	$N1^{G}{}_{S}CN^{G}{}_{S}{}^{G}{}_{S}9^{G}{}_{S}2749746924523^{F}{}_{S}$
Consignee's Store Number	$N4^{G}{}_{S}{}^{G}{}_{S}{}^{G}{}_{S}{}^{G}{}_{S}{}^{G}{}_{S}{}^{G}{}_{S}SN^{G}{}_{S}325^{F}{}_{S}$
1st Item - Customer Catalog Number	$LIN^{G}{}_{S}{}^{G}{}_{S}CB^{G}{}_{S}1234567^{F}{}_{S}$
1st Item - Quantity	$SN1^{G}{}_{S}{}^{G}{}_{S}3^{G}{}_{S}EA^{F}{}_{S}$
2nd Item - Customer Catalog Number	$LIN^{G}{}_{S}{}^{G}{}_{S}CB^{G}{}_{S}5828233^{F}{}_{S}$
2nd Item - Quantity	$SN1^{G}{}_{S}{}^{G}{}_{S}5^{G}{}_{S}EA^{F}{}_{S}$
3rd Item - Customer Catalog Number	$LIN^{G}{}_{S}{}^{G}{}_{S}CB^{G}{}_{S}8447272^{F}{}_{S}$
3rd Item - Quantity	$SN1^{G}{}_{S}{}^{G}{}_{S}3^{G}{}_{S}EA^{F}{}_{S}$
4th Item - Customer Catalog Number	$LIN^{G}{}_{S}{}^{G}{}_{S}CB^{G}{}_{S}6723113^{F}{}_{S}$
4th Item - Quantity	$SN1^{G}{}_{S}{}^{G}{}_{S}4^{G}{}_{S}EA^{F}{}_{S}$
5th Item - Customer Catalog Number	$LIN^{G}{}_{S}{}^{G}{}_{S}CB^{G}{}_{S}4637721^{F}{}_{S}$
5th Item - Quantity	$SN1^{G}{}_{S}{}^{G}{}_{S}5^{G}{}_{S}EA^{R}{}_{S}{}^{E}O_{T}$

In the following example, carrier data (Format 01) is encoded in a MaxiCode symbol. Carrier data (Format 01) is also combined with ANSI ASC X12 EDI segments (Format 03) and encoded in a PDF417 symbol. The MaxiCode symbol would be used for automated sortation / tracking and the PDF417 symbol for additional carrier and customer data.

Linear symbol data (data Format "01") is also combined with ASC X12 EDI segments (Format "03") shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols.

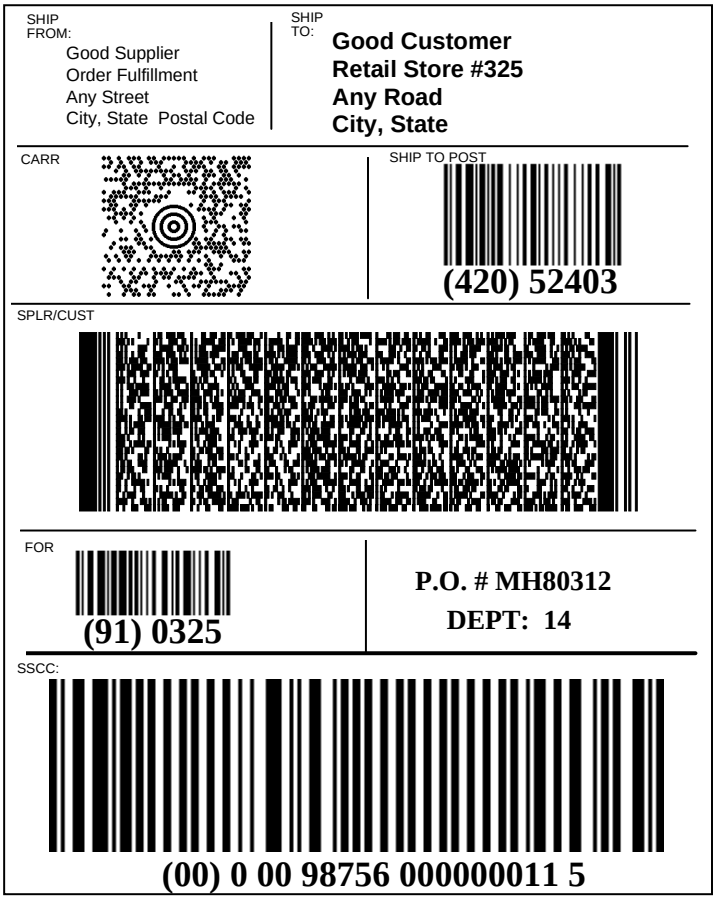


Figure E-23
Example of combination of Format 01 and Format 03 (not to scale)

E.8.2 Format 01/03 using a linear bar code symbol for automated sortation / tracking

The following example depicts a situation in which a carrier might be using a linear bar code symbol for sortation and tracking and desires to capture additional data, as well as allowing for the encodation of packing slip data for the customer.

In the following example, carrier data (Format 01) is combined with ANSI ASC X12 EDI segments (Format 03). Because it is anticipated that such a combination would appear on a shipping label, the PDF417 symbol would be used to encode packing slip data in a shipping and receiving application.

The following figure also includes a linear bar code symbol for sortation and tracking.

The 2D data stream might appear as follows:

Compliance Indicator	[]>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	52403$^{G}_{S}$840$^{G}_{S}$001$^{G}_{S}$ 1234123456712345678901$^{G}_{S}$SCAC$^{G}_{S}$ 678202$^{G}_{S}$$^{G}_{S}93527^{G}_{S}$$^{G}_{S}25.2^{G}_{S}$$^{G}_{S}$RETAIL STORE #325$^{G}_{S}$CITY$^{G}_{S}$STATE$^{R}_{S}$
Format 03 ASC X12 Segments Header	03003050$^{F}_{S}$$^{G}_{S}$$^{U}_{S}$
Purchase Order Number	PRF$^{G}_{S}$MH80312$^{F}_{S}$
Shipment ID	REF$^{G}_{S}$SI$^{G}_{S}$93527$^{F}_{S}$
Tracking # (Carrier)	REF$^{G}_{S}$08$^{G}_{S}$1234123456712345678901$^{F}_{S}$
SSCC Data	MAN$^{G}_{S}$GM$^{G}_{S}$000987560000000115$^{F}_{S}$
Consignee's DUNS+4	N1$^{G}_{S}$CN$^{G}_{S}$$^{G}_{S}9^{G}_{S}2749746924523^{F}_{S}$
Consignee's Store Number	N4$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$$^{G}_{S}SN^{G}_{S}325^{F}_{S}$
1st Item - Customer Catalog Number	LIN$^{G}_{S}$$^{G}_{S}CB^{G}_{S}1234567^{F}_{S}$
1st Item - Quantity	SN1$^{G}_{S}$$^{G}_{S}3^{G}_{S}EA^{F}_{S}$
2nd Item - Customer Catalog Number	LIN$^{G}_{S}$$^{G}_{S}CB^{G}_{S}5828233^{F}_{S}$
2nd Item - Quantity	SN1$^{G}_{S}$$^{G}_{S}5^{G}_{S}EA^{F}_{S}$
3rd Item - Customer Catalog Number	LIN$^{G}_{S}$$^{G}_{S}CB^{G}_{S}8447272^{F}_{S}$
3rd Item - Quantity	SN1$^{G}_{S}$$^{G}_{S}3^{G}_{S}EA^{F}_{S}$
4th Item - Customer Catalog Number	LIN$^{G}_{S}$$^{G}_{S}CB^{G}_{S}6723113^{F}_{S}$
4th Item - Quantity	SN1$^{G}_{S}$$^{G}_{S}4^{G}_{S}EA^{F}_{S}$
5th Item - Customer Catalog Number	LIN$^{G}_{S}$$^{G}_{S}CB^{G}_{S}4637721^{F}_{S}$
5th Item - Quantity	SN1$^{G}_{S}$$^{G}_{S}5^{G}_{S}EA^{R}_{S}$$^{E}O_{T}$

The following label format is an example of what a label might look like when encoding Format 01 and Format 03 in a PDF417 symbol for a shipping and receiving application. The linear bar code symbol, as shown in the bar code block entitled SSCC is used for automated sortation / tracking and depicts the relative size and location of the linear bar code symbol which may be used by carriers. Specific requirements for size and location of linear symbols on the label are found in normative Annex A.

Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols.

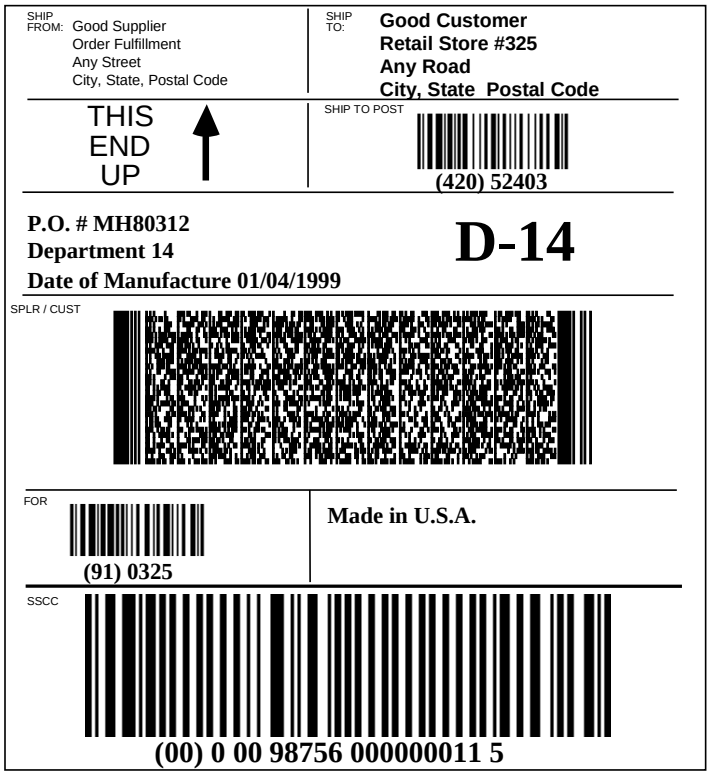


Figure E-24
Combination of Format 01 and Format 03 (not to scale)

E.9 Combining Format 01 with Format 06

The following example depicts a situation in which a carrier might be using a MaxiCode symbol for sortation and tracking and offers the customer the ability to also track the customer's purchase order number. In the following example carrier data (Format 01) is combined with ANSI MH10.8.2 Data Identifier data (Format 06). In this example the MaxiCode symbol data would appear as follows:

Compliance Indicator	[)>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	52403$^{G}_{S}$840$^{G}_{S}$001$^{G}_{S}$07388978815$^{G}_{S}$SCAC$^{G}_{S}$ 678202$^{G}_{S}{}^{G}_{S}$93527$^{G}_{S}{}^{G}_{S}$25.2$^{G}_{S}$N$^{G}_{S}{}^{G}_{S}$ CITY$^{G}_{S}$ STATE$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Customer's P.O. Number	KMH80312$^{R}_{S}{}^{E}$O$_{T}$

The following label format provides a representative example of what labels might look like when complying with this standard encoding Format 01 and Format 06 using a MaxiCode symbol for automated sortation/tracking and a purchase order using ANSI MH10.8.2 Data Identifiers. When used within a carrier sortation and tracking application, this data would be encoded in a MaxiCode symbol. Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols.

Figure E-25
Combination of Format 01 and Format 06 (not to scale)

E.10 Combining Format 03 with Format 05

To encode information commonly found on a shipping label, Format 03 (ANSI ASC X12 segments) and Format 05 (EAN.UCC Application Identifier) data might be encoded as follows.

Compliance Indicator	[]>$^{R}_{S}$
Format 03 ASC X12 Segments Header	03003030$^{F}_{S}$$^{G}_{S}$$^{U}_{S}$
Ship From Name	N1$^{G}_{S}$SF$^{G}_{S}$GOOD SUPPLIER$^{F}_{S}$
Ship From Additional Name	N2$^{G}_{S}$ORDER FULFILLMENT$^{F}_{S}$
Ship From Street Address	N3$^{G}_{S}$ANY STREET$^{F}_{S}$
Ship From City, State, and Postal Code	N4$^{G}_{S}$PLACES$^{G}_{S}$STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Ship To Name	N1$^{G}_{S}$ST$^{G}_{S}$GOOD CUSTOMER$^{F}_{S}$Ship To
Additional Name	N2$^{G}_{S}$RETAIL STORE #325$^{F}_{S}$
Ship To Street Address	N3$^{G}_{S}$ANY ROAD$^{F}_{S}$
Ship To City, State, and Postal Code	N4$^{G}_{S}$CITY$^{G}_{S}$STATE$^{G}_{S}$5POSTAL CODE$^{F}_{S}$
Product Description	PID$^{G}_{S}$F$^{G}_{S}$02$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$RINGER C4C$^{F}_{S}$
Carrier Bar Code	REF$^{G}_{S}$08$^{G}_{S}$SCAC3141592653598414709 8$^{R}_{S}$
Format 05 Application Identifier Header	05$^{G}_{S}$
SSCC (Container License Plate)	0000098756000000115$^{G}_{S}$
Customer PO # and Line Item #	400123456789+001$^{G}_{S}$
Quantity of 12 (Each Implied)	3012$^{G}_{S}$
Supplier Product ID	01500098756100018$^{G}_{S}$
Package Weight	32003$^{R}_{S}$^{E}O$_{T}$

The following label format provides an example of what labels might look like encoding Format 03 and Format 05 using a linear bar code symbol (carrier bar code) for automated sortation/tracking and a PDF417 symbol to encode all label data. When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. The carrier bar code (linear symbol) is intended to show the location and relative size used by many carriers. Different carriers use different linear bar code symbologies for container tracking.

Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols. The carrier bar code shows a combined use of AI “90” and DI “12K”).

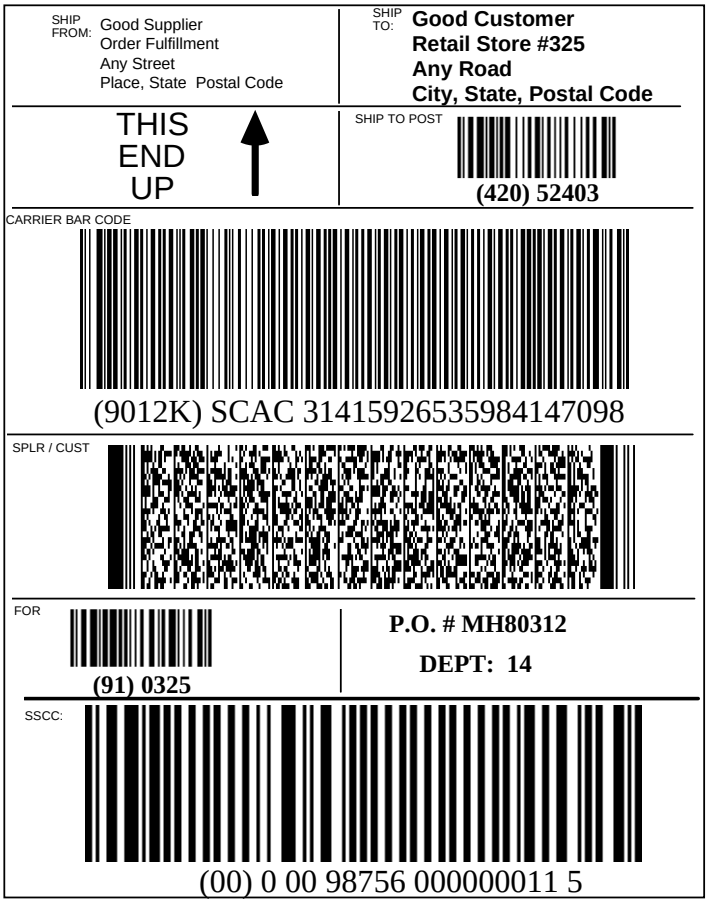


Figure E-26
Combination of Format 03 and Format 05 (not to scale)

The following label format provides an example of what labels might look like encoding Format 03 and Format 05 using a PDF417 symbol to encode all label data. Also included is a MaxiCode symbol for carrier automated sortation and tracking. When used within a carrier sortation and tracking application, this data would be encoded in a MaxiCode symbol. When used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols.

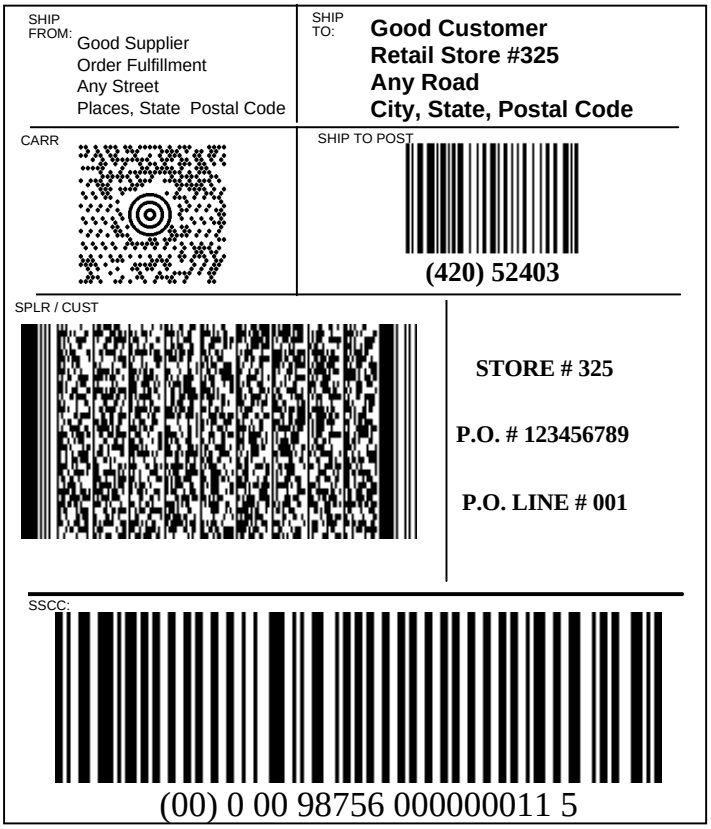


Figure E-27
Combination of Format 03 and Format 05 (not to scale)

E.11 Combining Format 03 with Format 06

To encode information commonly found on a shipping label, Format 03 (ANSI ASC X12 segments) and Format 06 (ANSI MH10.8.2 Data Identifier) data might be encoded as follows and might be represented as shown in Figure E-28. When this format is used within a shipping and receiving application, the data would be encoded in a PDF417 symbol.

Compliance Indicator	[)>$^{R}_{S}$
Format 03 ASC X12 Segments Header	03003030$^{F}_{S}$$^{G}_{S}$$^{U}_{S}$
Ship From Name	N1$^{G}_{S}$SF$^{G}_{S}$GOOD SUPPLIER$^{F}_{S}$
Ship From Street Address	N3$^{G}_{S}$123 ANY STREET$^{F}_{S}$
Ship From City, State, Zip	N4$^{G}_{S}$YOUR TOWN$^{G}_{S}$ST$^{G}_{S}$12345-6789$^{F}_{S}$
Ship To Name	N1$^{G}_{S}$ST$^{G}_{S}$GOOD CUSTOMER$^{F}_{S}$
Ship To Street Address	N3$^{G}_{S}$ANY ROAD$^{F}_{S}$
Ship To City, State, Zip	N4$^{G}_{S}$CITY$^{G}_{S}$STATE$^{G}_{S}$POSTAL CODE$^{F}_{S}$
Product Description	PID$^{G}_{S}$F$^{G}_{S}$02$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$RINGER C4C$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Carrier SCAC and PRO #	12KSCAC1234567890$^{G}_{S}$
Package ID (Pallet License Plate)	5S0662742MV96421234$^{G}_{S}$
Customer PO # and Line Item #	14KMH80312+001$^{G}_{S}$
Customer Product ID	PAA00211211$^{G}_{S}$
Quantity (Each Implied)	Q40$^{G}_{S}$
Supplier Product ID	1P102764007$^{G}_{S}$
Supplier DUNS	13V043325711$^{G}_{S}$
Pallet Weight	2Q120LB$^{R}_{S}$^{E}O$_{T}$

Figure E-28
Combination of Format 03 and Format 06 (not to scale)

E.12 Combining Format 04 with Format 06

To encode information commonly found on a shipping label, Format 04 (UN/EDIFACT segments) and Format 06 (ANSI MH10.8.2 Data Identifier) data might be encoded as follows and appear as in Figure E-29. When used within a shipping and receiving application, this data would be encoded in a PDF417 symbol.

Compliance Indicator	[]>$^{R}_{S}$
Format 04 UN/EDIFACT Header	04092001$^{F}_{S}$$^{G}_{S}$$^{U}_{S}$
Ship From Name & Address	NAD$^{G}_{S}$SF$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$GOOD SUPPLIER+ORDER FULFILLMENT$^{G}_{S}$ANY STREET$^{G}_{S}$PLACES$^{G}_{S}$ STATE$^{G}_{S}$12345-6789$^{G}_{S}$USA$^{F}_{S}$
Ship To Name & Address	NAD$^{G}_{S}$ST$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$TELEFONAKTLEBOLAGET OLAFSSON+PHYSICAL DISTRIBUTION$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$ STOCKHOLM$^{G}_{S}$$^{G}_{S}$$^{G}_{S}$S-131 89$^{G}_{S}$ SEK$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Package ID (Pallet License Plate)	5S0662742MV96421234$^{G}_{S}$
Customer PO # and Line Item #	14KMH80312+001$^{G}_{S}$
Customer Product ID	PAA00211211$^{G}_{S}$
Quantity (Each Implied)	Q40$^{G}_{S}$
Supplier Product ID	1P102764007$^{G}_{S}$
Supplier DUNS	13V043325711$^{G}_{S}$
Package Weight	2Q120LB$^{R}_{S}$^{E}O$_{T}$

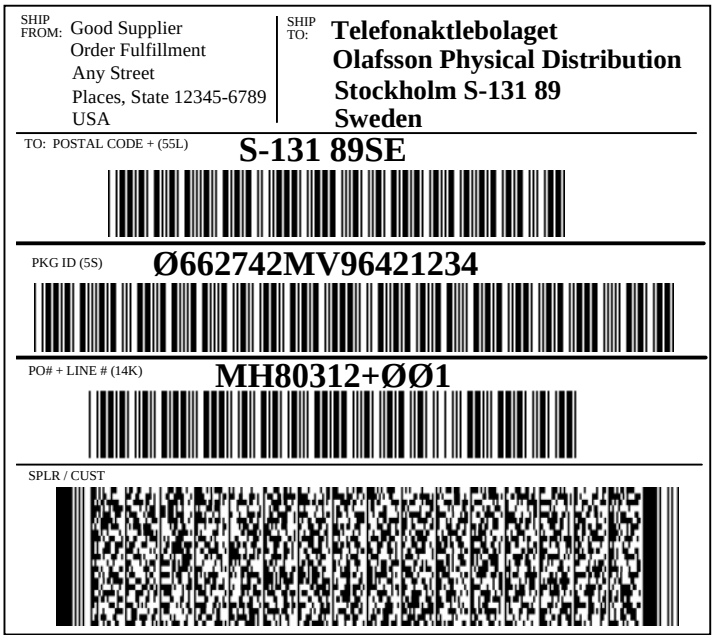


Figure E-29
Combination of Format 04 and Format 06 (not to scale)

E.13 Combining Format 01 with Format 03 and Format 05

In Figure E-30, carrier data (Format 01) is combined with ANSI ASC X12 EDI segments (Format 03) and EAN.UCC Application Identifiers (Format 05). Because it is anticipated that such a combination would appear on a shipping label, PDF417 symbol would be used to encode the shipping and receiving application data.

Figure E-30 also depicts a label with a linear bar code symbol that may be used by a carrier for sortation and tracking. The PDF417 symbol encodes transportation information and additional customer data.

In Figure E-30, the linear bar code symbol is used for carrier sortation and tracking applications, not the PDF417 symbol.

The data stream might appear as follows:

Compliance Indicator	[]>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	52403$^{G}_{S}$840$^{G}_{S}$001$^{G}_{S}$31415926535984147098$^{G}_{S}$
	SCAC$^{G}_{S}$678202$^{G}_{S}$$^{G}_{S}93527^{G}_{S}$$^{G}_{S}25.2^{G}_{S}$$^{G}_{S}$
	RETAIL STORE #325$^{G}_{S}$CITY$^{G}_{S}$STATE$^{R}_{S}$
Format 03 ASC X12 Segments Header	03003050$^{F}_{S}$$^{G}_{S}$$^{U}_{S}$
Shipment ID	REF$^{G}_{S}$SI$^{G}_{S}$93527$^{F}_{S}$
Carrier Bar Code	REF$^{G}_{S}$08$^{G}_{S}$SCAC31415926535984147098$^{F}_{S}$
Consignee's DUNS+4	N1$^{G}_{S}$CN$^{G}_{S}$$^{G}_{S}9^{G}_{S}2749746924523^{R}_{S}$
Format 05 Application Identifier Header	05$^{G}_{S}$
SSCC (Container License Plate)	0000098756000000115$^{G}_{S}$
Customer PO # plus Line Item #	400123456789+001$^{G}_{S}$
Quantity of 12 (Each Implied)	3012$^{G}_{S}$
Supplier Product ID	0150098756100018$^{G}_{S}$
Package Weight	32003$^{R}_{S}$$^{E}O_{T}$

Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols.

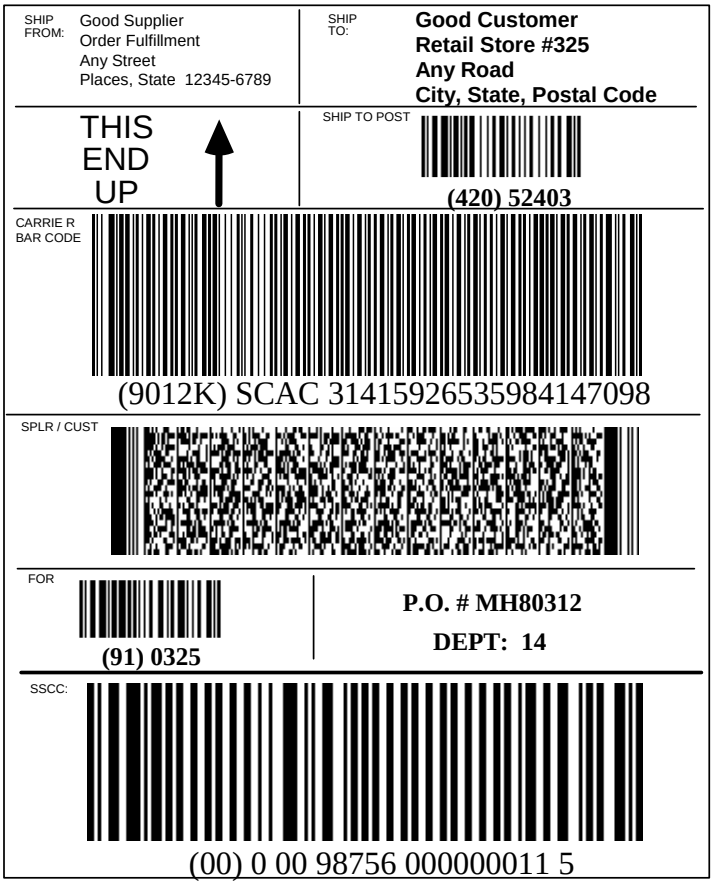


Figure E-30
Combination of Format 01, Format 03, and Format 05 (not to scale)

E.14 Combining Format 01, Format 06, and Format 03 over two labels

In this example two labels are employed: one for carriers and a second for customers.

E.14.1 Label example: (transportation label)

Figure E-31 depicts a situation in which a carrier might be using a MaxiCode symbol for sortation and tracking, and offers the customer the ability to also track the customer's purchase order number. In the following example, carrier data (Format 01) is combined with ANSI MH10.8.2 Data Identifier data (Format 06). In this example the MaxiCode symbol data would appear as follows:

Compliance Indicator	[]>$^{R}_{S}$
Format 01 Sortation/Tracking Header	01$^{G}_{S}$96
Carrier Data	146524316$^{G}_{S}$840$^{G}_{S}$001$^{G}_{S}$MH80312$^{G}_{S}$SCAC$^{G}_{S}$ 678202$^{G}_{S}$$^{G}_{S}93527^{G}_{S}$$^{G}_{S}5.2^{G}_{S}N^{G}_{S}$$^{G}_{S}$ ROCHESTER$^{G}_{S}$NY$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Customer's P.O. Number	KMH80312$^{R}_{S}$^{E}O$_{T}$

Figure E-31
Combination of Format 01, Format 03, and Format 06 (not to scale)

E.14.2 Label example (customer label)

The second label in the following example provides customer data. In Figure E-32, ANSI ASC X12 Segment Data (Format 03) is combined with ANSI MH10.8.2 Data Identifier data (Format 06). Linear symbols are shown in the example below to illustrate situations where the linear symbols may coexist with 2D symbols. When this format is used within a shipping and receiving application, this data would be encoded in a PDF417 symbol. In this example the PDF417 data would appear as follows:

Compliance Indicator	[]>$^{R}_{S}$
Format 03 ASC X12 Segments Header	03003030$^{F}_{S}{}^{G}_{S}{}^{U}_{S}$
Product Description	PID$^{G}_{S}$F$^{G}_{S}$02$^{G}_{S}{}^{G}_{S}{}^{G}_{S}$RINGER C4C$^{R}_{S}$
Format 06 Data Identifier Header	06$^{G}_{S}$
Package ID (Container License Plate)	3S0662742MV96421234$^{G}_{S}$
Customer PO # and Line Item #	14KMH80312+001$^{G}_{S}$
Customer Product ID	PAA00211211$^{G}_{S}$
Quantity (Each Implied)	Q1$^{G}_{S}$
Supplier Product ID	1P102764007$^{G}_{S}$
Supplier DUNS	13V043325711$^{G}_{S}$
Package Weight	2Q3LB$^{R}_{S}{}^{E}_{O}{}_{T}$

Figure E-32
Combination of Format 03 and Format 06 (not to scale)

E.15 EAN.UCC Looping and Compaction Encodation for use with Composite Symbols

In this example a label encodes mixed transport container contents, e.g., different cases mixed on a single pallet. This mixed pallet data can facilitate the receiving and put away of transport containers and their contents.

An EAN.UCC Composite symbol is used to encode the transport container's data. The transport unit ID, SSCC, is encoded in the UCC/EAN-128 linear component. The mixed contents are encoded in the 2D component using "looping compaction" encodation which compresses the mixed contents data. All the element strings are identified by EAN.UCC Application Identifiers.

This label can be used to read the transport unit ID as a key to the advance ship notice database by all users, or in addition to read the mixed contents data by users that support the "looping compaction" encoding.

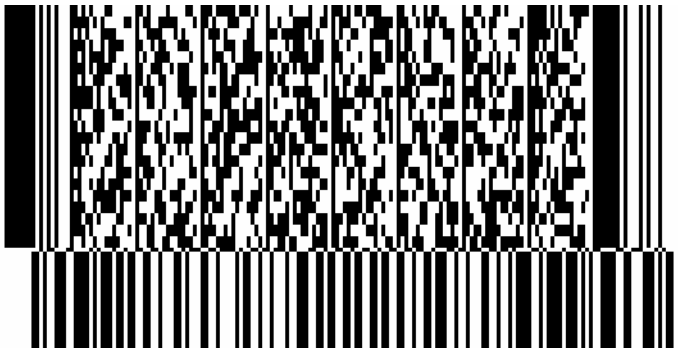
The data encoded in the EAN.UCC Composite symbol in Figure E-33 is as follows:

Header: $^{F}_{1}$
SSCC: 00376109170100130481
PO: 400AB123450$^{F}_{1}$ GTIN: 0200614141987658 Qty: 3717$^{F}_{1}$ Lot: 21ABC000987$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050002$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050001$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050003$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050004$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050008$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050013$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050007$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050005$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050009$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050006$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050011$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050012$^{F}_{1}$
PO: 400AB123456$^{F}_{1}$ GTIN: 0200614141012565 Qty: 371$^{F}_{1}$ S/N: 2120010904050010$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060058$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060068$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060066$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060060$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060061$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060064$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060063$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060062$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060067$^{F}_{1}$
PO: 400AB123458$^{F}_{1}$ GTIN: 0200614141012343 Qty: 371$^{F}_{1}$ S/N: 2110063009060069$^{F}_{1}$

Ship from:
Good Supplier
Elm St.
Fromtown, TX 012345
USA

Ship to:
Good Customer
Kodiak Rd.
Totown, AK 98765 USA

SSCC and pallet contents:



(00)376109170100130481

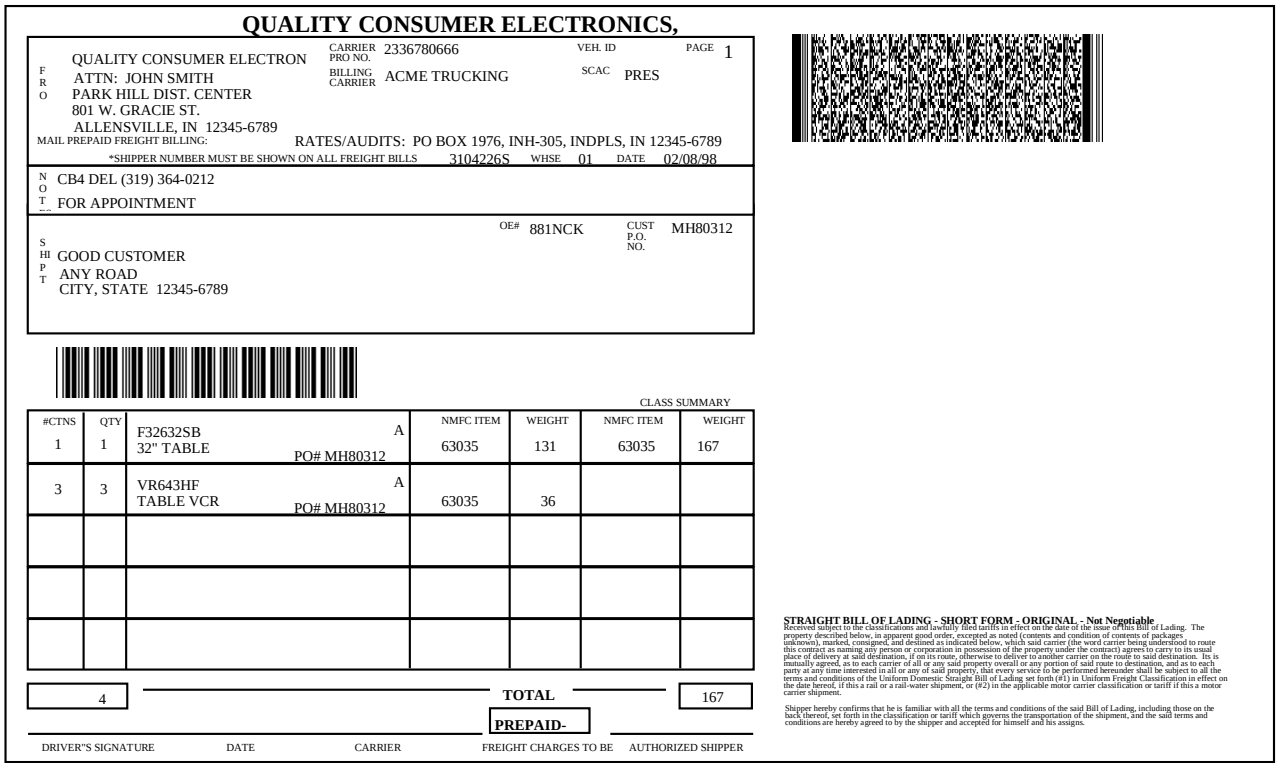
Shipment data:
Transport Unit ID: **376109170100130481**

Pallet contents:
PO number: **AB123450**:
GTIN: **00614141987658** Qty: **27** Lot #: **ABC000987**
PO number: **AB123456**:
GTIN: **00614141012565** Qty: **13**
S/N: **20010904050002** S/N: **20010904050001**
S/N: **20010904050003** S/N: **20010904050004**
S/N: **20010904050008** S/N: **20010904050013**
S/N: **20010904050007** S/N: **20010904050005**
S/N: **20010904050009** S/N: **20010904050006**
S/N: **20010904050011** S/N: **20010904050012**
S/N: **20010904050010**
PO number: **AB123458**:
GTIN: **00614141012343** Qty: **10**
S/N: **10063009060058** S/N: **10063009060068**
S/N: **10063009060066** S/N: **10063009060060**
S/N: **10063009060061** S/N: **10063009060064**
S/N: **10063009060063** S/N: **10063009060062**
S/N: **10063009060067** S/N: **10063009060069**

Figure E-33
Label encoding the mixed contents of a transport container

E.16 Bill of lading example

Figure E-34 is an example of PDF417 use on Transport Unit supporting documentation.



QUALITY CONSUMER ELECTRONICS,

FROM: QUALITY CONSUMER ELECTRON
ATTN: JOHN SMITH
PARK HILL DIST. CENTER
801 W. GRACIE ST.
ALLENSVILLE, IN 12345-6789

CARRIER PRO NO. 2336780666 VEH. ID PAGE 1
BILLING CARRIER ACME TRUCKING SCAC PRES

MAIL PREPAID FREIGHT BILLING: RATES/AUDITS: PO BOX 1976, INH-305, INDPLS, IN 12345-6789

*SHIPPER NUMBER MUST BE SHOWN ON ALL FREIGHT BILLS 3104226S WHSE 01 DATE 02/08/98

NOTIFY: CB4 DEL (319) 364-0212
FOR APPOINTMENT

OE# 881NCK CUST P.O. NO. MH80312

SHIP TO: GOOD CUSTOMER
ANY ROAD
CITY, STATE 12345-6789

CLASS SUMMARY

#CTNS	QTY		NMFC ITEM	WEIGHT	NMFC ITEM	WEIGHT
1	1	F32632SB 32" TABLE A PO# MH80312	63035	131	63035	167
3	3	VR643HF TABLE VCR A PO# MH80312	63035	36		

4 TOTAL 167

PREPAID-

DRIVER'S SIGNATURE DATE CARRIER FREIGHT CHARGES TO BE AUTHORIZED SHIPPER

STRAIGHT BILL OF LADING - SHORT FORM - ORIGINAL - Not Negotiable
Received subject to the classifications and lawfully filed tariffs in effect on the date of the issue of this Bill of Lading. The property described below, in apparent good order, excepted as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated below, which said carrier (the word carrier being understood to route this contract as naming any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. Its is mutually agreed, as to each carrier of all or any said property overall or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Straight Bill of Lading set forth (#1) in Uniform Freight Classification in effect on the date hereof, if this a rail or a rail-water shipment, or (#2) in the applicable motor carrier classification or tariff if this a motor carrier shipment.

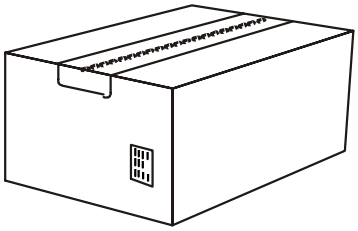
Shipper hereby confirms that he is familiar with all the terms and conditions of the said Bill of Lading, including those on the back thereof, set forth in the classification or tariff which governs the transportation of the shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

Figure E-34
Bill of Lading with PDF417 symbol encoding
an ANSI ASC X12 204 transaction set (not to scale)

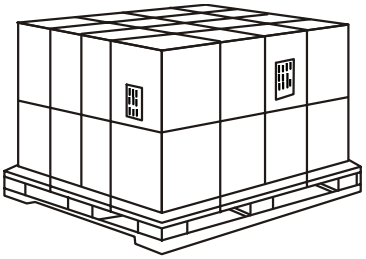
Annex F

(informative)

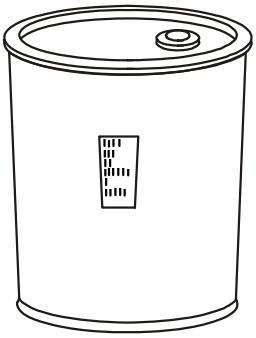
Recommended label locations on various containers



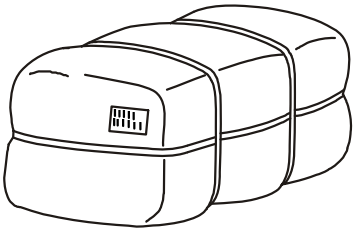
a) Box or carton with transport package label



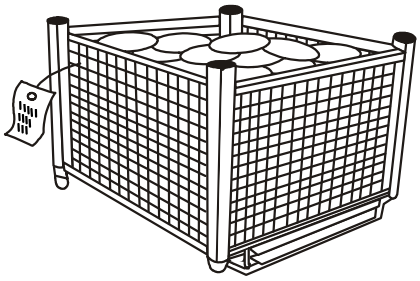
b) Pallet with two unit load labels



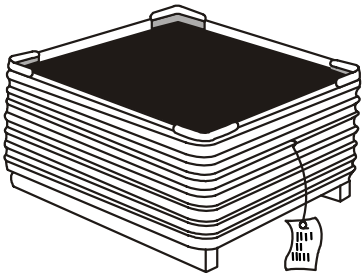
c) Drum, barrel, or cylindrical container



d) Bale

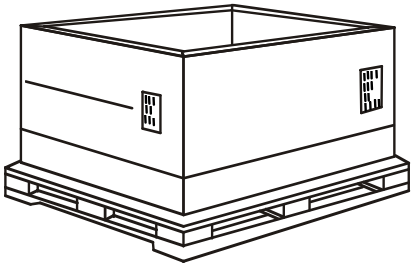


e) Basket, wire mesh container

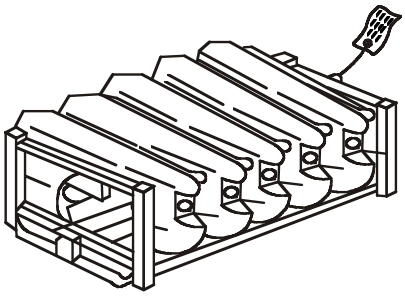


f) Metal bin or tub

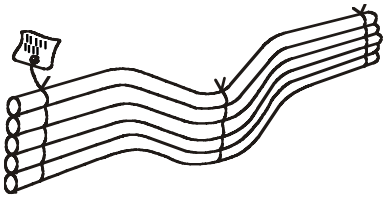
Annex F – Label placement on various packages



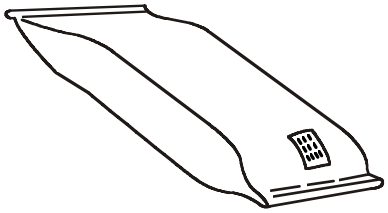
g) Pallet box



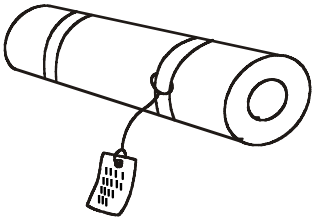
h) Rack



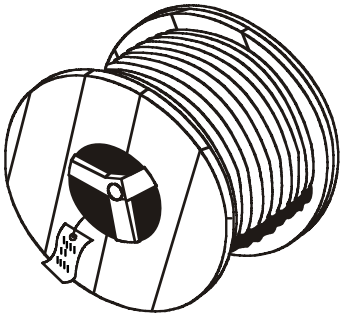
i) Bundle



j) Bag



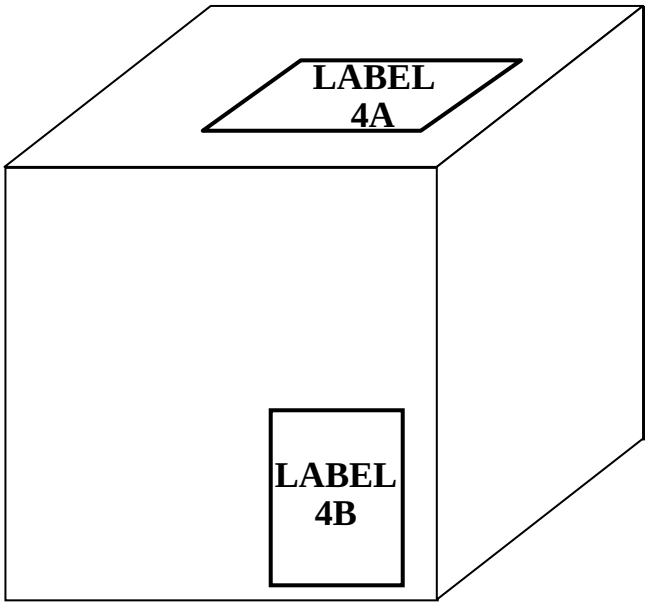
k) Roll or coil



l) Reel of cable

(m) below shows possible locations for the transportation MaxiCode sortation/tracking label and for the customer's label.

- Users may choose one label combining the needs of both transportation and customer.
- Also see above for additional label placement examples.



m) Location of transportation (4A) and customer labels (4B); (not to scale)

Annex G

(informative)

Applications using Code 39 and Code 128 symbologies

Open systems, such as identified in this standard, encourage the free movement of products between any supplier and customer. Organizations scanning the bar code label for shipping and receiving may be presented with symbols which do not conform to their specific requirements but are useful elsewhere in the supply chain. This annex addresses issues which are associated with this situation. These issues can affect any organization. The annex also addresses the issues which need to be considered in a planned migration between options.

This annex describes the use of Symbology Identifiers as identified in ISO/IEC 15424. The Symbology Identifier is a prefix to the data transmitted by a decoder. Symbology Identifiers are not encoded in the symbol.

The options are:

1. Application Identifiers with UCC/EAN-128 symbology,
2. ANSI MH10.8.2 Data Identifiers with Code 39 symbology,
3. ANSI MH10.8.2 Data Identifiers with Code 128 symbology.

Although it may be intended that only one of these combinations be in a system, it is important for all users to be aware that any of the other combinations can appear in a scanning system. Given this fact, organizations may choose to support a single option or support other options as well. These are discussed below.

G.1 Systems where a single option is intended to be scanned

For users selecting to operate in a single option environment, there are three procedures to consider.

- For single use of option 1, users may be able to switch off all other symbologies in a decoder, including Code 128, as described in option 3. If the decoder supports Symbology Identifiers, the host system shall validate the appropriate Symbology Identifier, specifically “]C1”, that signifies a UCC/EAN-128 symbol having a FNC1 character in the first position after the start code.
- For single use of option 2, users switch off all other symbologies in any decoder. If the decoder supports Symbology Identifiers, the host computer system shall validate the appropriate Symbology Identifier, specifically “]A0”.
- For single use of option 3, users will need to implement fully the Symbology Identifier capability. For decoders that do not support Symbology Identifiers, host computer systems will be unable to automatically distinguish between option 1 and option 3. By using the Symbology Identifier, the host computer can distinguish between the different options and filter out the unwanted options. The host computer shall validate the appropriate Symbology Identifier, specifically “]C0”.

G.2 Systems where multiple options are intended to be scanned

Users who choose to provide their systems with information scanned from labels using two or all of the options, shall fully implement Symbology Identifier capabilities. For decoders that do not support Symbology Identifiers, host computer systems will be unable to automatically distinguish between option 1, option 2, and option 3. By using the Symbology Identifier, the host applications can be coded to distinguish between the different options and filter out the unwanted options. The combination of the Symbology Identifier and the ANSI MH10.8.2 Data Identifier or EAN.UCC Application Identifier will provide the user with reliable input.

Bibliography

[1] ASCII/ISO 646 — Information technology – ISO 7-bit coded character set for information interchange

[2] D-U-N-S® Number Users' Guide — Available from Dun & Bradstreet, 1 Diamond Hill Road, Murray, NJ, 07974

[3] EAN Standards — EAN International, Rue Royale 145, B-1000 Brussels, Belgium. Telephone: +32 2 218 76 74 • Telefax: +32 2 218 75 85

[4] ISO 15394 — Packaging – Bar code and two-dimensional symbols for shipping, transport and receiving labels

[5] ISO/IEC 15418 — Information technology – EAN/UCC Application Identifiers and Fact Data Identifiers and Maintenance

[6] ISO/IEC 15419 — Information technology -- Automatic identification and data capture techniques -- Bar code digital imaging and printing performance testing

[7] ISO/IEC 15421 — Information technology -- Automatic identification and data capture techniques -- Bar code master test specifications

[8] ISO/IEC 15424 — Information technology – Automatic identification and data capture techniques – Data Carrier Identifiers (including Symbology Identifiers)

[9] ISO/IEC 15434 — Information technology – Transfer syntax for high capacity ADC media

[10] ISO/IEC 15459-2 — Information technology – Unique identification of transport units – Part 2: Registration procedures

[11] ISO/IEC AWI 24728 — Information Technology -- Automatic Identification and Data Capture techniques -- Bar Code Symbology Specification -- MicroPDF417

[12] UCC Standards — Membership, and to receive a UCC Company Prefix – Uniform Code Council, 7887 Washington Village Drive, Suite 300, Dayton, OH, 45459-8605. Telephone: (937) 435-3870 • Telefax: (937) 435-7317