ECIA

Publication

Labeling Specification for Product and Shipment Identification in the Electronics Industry - 2D Barcode (Including Human Readable and 1D Barcode)

EIGP 114.1

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Electronic Components Industry Association

Industry Specifications

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Contents

1 INTRODUCTION

1.1 Purpose

The purpose of this specification is to provide technical information that will address the product and shipment identification needs of the Electronics Components Industry and the end customer. This document is consistent with all global identification standards (see EIA, CEA, ANSI, & ISO/IEC reference documents in APPENDIX F), and will make recommendations for symbology(s), dimensions, print quality, standardized sets of data, and data identifiers, as well as specific barcode placement for each applicable level of labeling applications used in the electronic component supply chain.

2D barcoding has proven very effective in applications where it's been implemented. Benefits include single barcode scans, improved data accuracy, and increased efficiency. Because of the design of the 2D symbology, more information can be included on the labels. With the increasing requirements to add attributes (RoHS, REACH, etc.) to labels, the ability to add more information will become ever more important.

These specifications were created in collaboration with ECIA distributors. Identifying and standardizing the common requirements of distributors and end customers has allowed the creation of standardized formats that suppliers can use with all of their ECIA trading partners. These specifications further refine the use of ANSI MH10 Data Identifiers and bring usage into closer alignment with the existing standards.

2 ELEMENTS

2.1 Glossary

The following terms are helpful for understanding the ECIA 2D labeling requirements:

1-Dimensional (1D) Linear Barcode
A barcode symbol formed of a single row of symbol characters. Referred to as linear barcodes in this document. See APPENDIX C.

2-Dimensional (2D) Barcode
A barcode symbol formed of elements in a 2-dimension area that encode data vertically and horizontally. See APPENDIX B.

Carton Label
Also known as a Logistic Label. See definition below

Data Identifier (DI)
A specified character or string of characters that defines the intended use of the data element that follows. See section 2.2.

Product Label
Label required at the product level that contains product data in text and barcode format. See Section 4.5.

Intermediate Label
Label required at the intermediate (or inner-pack) level that contains product data in text and barcode format. See Section 4.6.

Logistic Label
Also known as a carton or shipping label. Label required on shipment packaging that contains shipment data, order data, and product data in text and barcode format. See section 4.7.

Packing Slip
Also known as a pick list, packing list or delivery note. This document contains shipment data, order data, and product data in text and barcode format. See section 4.9.

Product Package or Unit Pack
A commercial unit of components. Usually identified with the lowest level package label. See section 4.1.

Intermediate Package
Also known as an inner-pack. A box, carton or bag or other container used to contain multiple product packages. Intermediate packages are not always required or necessary. Marked with an intermediate product label when present. See section 4.1.1.

Shipping Container or External Packaging
The outer container that is sufficiently strong enough to be handled by a freight carrier in the transportation of an order. In a multi-carton shipment, the lead carton must be identified. See section 4.1.

Consolidated Orders or Mixed Load
These orders are separate line item orders and/or multiple purchase orders that are combined and placed in one or more shipping container(s). See section 4.8 and section 4.9.

2.2 Field Definitions

The following fields are used on product and shipment labeling. The data identifier and a brief definition are provided for each. For more details, review APPENDIX A.

Address Information (required)
Supplier's and Customer's names and addresses.

Ship Date (optional) Data Identifier 6D
Date that shipment was shipped. Optional on the Pack Slip format. Date format is YYYYMMDD.

Customer Part Number Data Identifier P
A unique part number assigned by Customer. May be a required field if indicated by Customer.

Supplier Part Number (required) Data Identifier 1P
Also known as Manufacturer or Vendor Part Number. Supplier assigned part number. Should reflect the supplier's part number as shown on the Purchase Order.

Quantity (required) Data Identifier Q
The quantity of items being sent in each package. The quantity on each label should represent the number of items contained at each level of packaging.

Purchase Order Number (required) Data Identifier K
Purchase order number that has been assigned by Customer.

PO Line Number (required) Data Identifier 4K
Line number of item from purchase order.

Date Code (required) Data Identifiers 9D, 10D
Significance of date to be established by supplier and communicated to customer. This is often the manufacture date. Data Identifiers 9D and 10D are always used in conjunction with the date format of YYWW (last two digits of year and two digit week number 01-53). 9D and 10D are the preferred data identifiers. Data Identifier D with date format (YYMMDD) is also permitted if format is currently used or the use of 9D or 10D are not possible. Use of this identifier and date format are allowed until January 2019. For Mixed Date Codes, see Section 4.3 and 4.4.

Lot Code (required) Data Identifier 1T
Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Maximum field length is currently 15 characters and is expanding to 20 characters in 2019.

Country of Origin (required) Data Identifier 4L
Country were part was manufactured. Data requires the two character code from ISO 3166 standard country code list.

Package ID (required) Data Identifier 3S, 4S, 5S
A unique alphanumeric number assigned by the supplier to a carton or package. See Section 2.2.1
3S - Package ID for Inner Pack when part of a mixed Logistic Carton
4S - Package ID for Logistic Carton with like items
5S - Package ID for Logistic Carton with mixed items

Packing List Number (required) Data Identifier 11K
A unique alphanumeric number assigned by the supplier to each shipment or Packing List. See Section 2.2.1

Serial Number (optional) Data Identifier S
A unique alphanumeric number assigned by the supplier to each product.

BIN Code (if available) Data Identifier 33P
Code for sorting and classifying LEDs. Use when applicable.

Company Name/Logo (optional)
Logo, name, or other identifying mark for the manufacturer. Used on the Product and Intermediate Product label formats.

Package Count (if available) Data Identifier 13Q
Sequential count of packages out of the total number of packages in a shipment. For example, “3/10” would identify the third carton in a shipment of ten cartons. If not incorporated on label, can be printed directly on cartons.

Revision Number (optional) Data Identifier 2P
An alphanumeric string assigned by the supplier to distinguish from one closely-related design variation to another. Used as needed and when applicable.

2.2.1 Package IDs and Packing List Numbers

The definitions for Package IDs and Packing List Numbers in this document follow the ANSI MH10.8.2 Data Application Identifier Standard. These are the data fields using the 3S, 4S, 5S, and 11K Data Identifiers. Each identifier is used for specific packaging levels and package types.

Previous ECIA specifications presented the 3S, 4S, and 11K data identifiers as interchangeable, permitting them to be used for both Package IDs and Packing List numbers. Companies should adopt the ANSI aligned definitions presented in this document, but note that legacy usage of 3S, 4S, and 11K will be allowed until January 2019.

2.3 Field Requirements

The Label Data Tables in Section 2.4 list a number of fields as "As Required" and "When Applicable". Each of these must be carefully evaluated when designing and implementing the labels. If a distributor has requested or expects certain data, then that data must be present on labeling. These data fields may be omitted when the data is not applicable to the product or when a manufacturer's trading partners acknowledge that the data is not required.

When a data field is omitted, it is best practice to also omit the data identifier and barcode. A data identifier without corresponding data might cause disruptions for some distributors.

2.4 Data Characteristics – Chart

The following chart lists all potential data fields and compares their use across the different ECIA 2D barcode label formats.

Field Name	Data Identifier	Max Field Length	Product Label	Intermediate Label	Logistic Label	Packing Slip	Specific Requirements
Ship From	*n/a*				∗	∗	Supplier name and address
Ship To	*n/a*				∗	∗	Customer name and address
Customer PO	K	25		○	●	●	Customer assigned purchase order number
Package ID *(Intermediate Label)*	3S	25		○			Unique alphanumeric number assigned by supplier 3S - Package ID for Inner Pack when part of a mixed Logistic Carton. Always used in conjunction with a mixed logistic label with a 5S data identifier for Package ID. For legacy use see Section 0
Package ID *(Logistic Label)*	4S, 5S	25			●		Unique alphanumeric number assigned by supplier 4S - Package ID for Logistic Carton with like items 5S - Package ID for Logistic Carton with mixed items Legacy use of 3S, 4S, and 11K permitted until 2019. See Section 2.2.1
Packing List Number	11K	25				●	Unique alphanumeric number assigned by supplier. 11K - Packing List number Legacy use of 3S, 4S, and 11K permitted until 2019. See Section 0
Ship Date	6D	8			○	○	Ship date in format YYYYMMDD
Customer Part Number	P	40	○	○	○	○	Customer assigned part number
Supplier Part Number	1P	40	●	●	●	●	Supplier assigned part number
Customer PO Line	4K	5			○	●	Line item number from PO. Required on Logistic Label when used on back of Packing Slip. See Section 4.9
Quantity	Q	9	●	●	●	●	Quantity of product
Date Code	9D, 10D	7	●	●	●	●	9D - YYWW, 10D – YYWW (preferred) D - YYMMDD (use permitted until January 2019)
Lot Code	1T	15	●	●	●	●	Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Max field length expanding to 20 characters in 2019.
Country of Origin	4L	2	●	●	●	●	Country where part was manufactured. Two letter code from ISO 3166 country code list.
Serial Number	S	25	○				Unique alphanumeric value assigned to each part by manufacturer
BIN Code	33P	35	○	○	○	○	Code for sorting and classifying LEDs. Use when applicable.
Company Logo	n/a		–	–			Logo, name, or other identifying mark for manufacturer
Package Count	13Q				○	○	Sequential carton count in format "#/#" or "# of #"
Revision number	2P	6	–	–			Alphanumeric string assigned by the supplier to distinguish from one closely-related design variation to another. Use as required or when applicable
ECCN	n/a					–	Use as required or when applicable
Weight	7Q					○	Use as required or when applicable
Manufacturer	1V					–	Use as required or when applicable
RoHS/CC	E		–	–	–	–	Use as required or when applicable. May be encoded in barcode form.
Reel ID	n/a				–	–	Use as required or when applicable
Moisture Sensitive Level	n/a		–	–	–	–	Use as required or when applicable
Moisture Barrier Bag Seal Date	n/a		–	–	–	–	Use as required or when applicable

● Required in barcode and text

○ Use as required or when applicable in barcode and text

∗ Required in text

– Use as required or when applicable in text

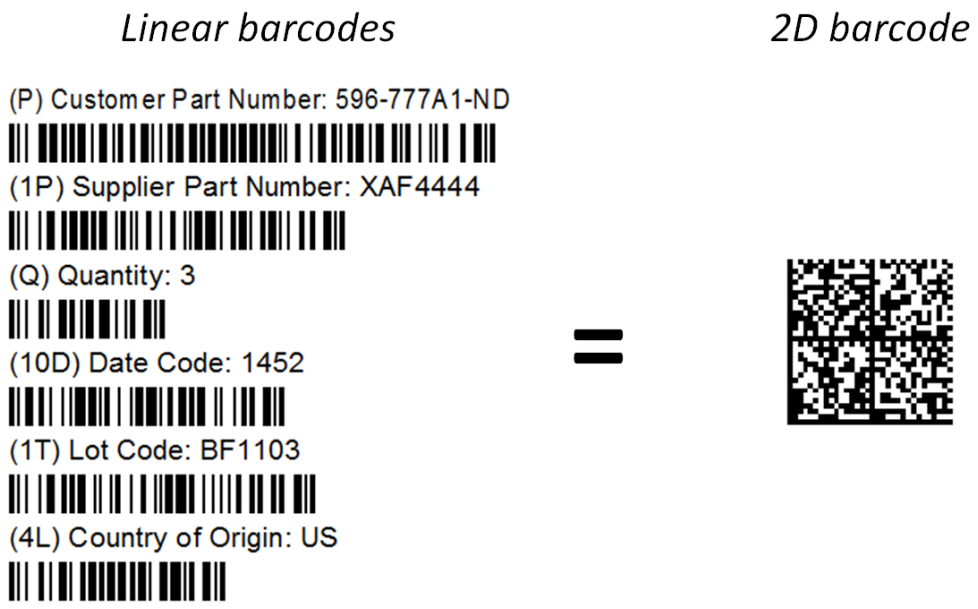
3 BARCODE SYMBOLOGIES

3.1 2D and Linear Barcodes

2D barcodes are capable of encoding a great amount of data in a small space, and require only one scan to capture all data elements. Linear barcodes require separate scans for each symbol on a label and take up more space.

In order to accommodate different scanning applications, suppliers are required to include 2D and linear barcodes on their product, intermediate product, logistic and packing slips. The corresponding human readable text is also required for each included data element. Some distributors have the ability to read solely the 2D barcodes but this functionality is not currently available by all trading partners. Examples of 2D barcode only formats are illustrated in APPENDIX D.

The following diagram shows the same data encoded in multiple linear barcodes compared to one 2D barcode.



3.2 Acceptable 2D Barcode Symbologies

The two types of acceptable 2D barcodes are **PDF417** and **Data Matrix ECC 200.** Detailed specifications can be found in APPENDIX B.

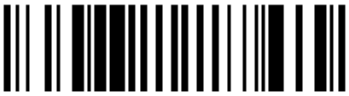
2D Examples – PDF417 & Data Matrix

PDF417 *Data Matrix ECC 200*

3.3 Acceptable Linear Barcode Symbologies

The two acceptable symbologies are **Code 39** and **Code 128**. Linear symbols must meet the minimum dimensional and print quality guidelines as defined in this specification. Detailed information can be found in APPENDIX C.

Code 39



Code 128

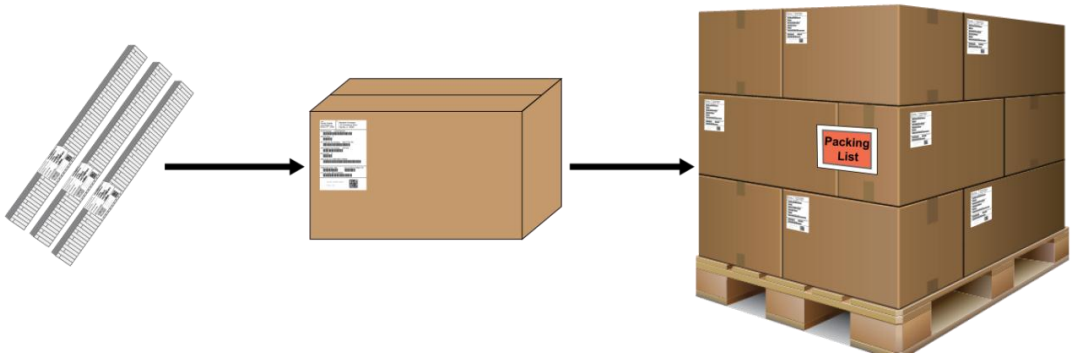
4 LABEL FORMATS

The 2D barcode formats include labels for each level of packaging and packing slip. The format requirements for each distributor may vary depending on their individual supply chain needs.

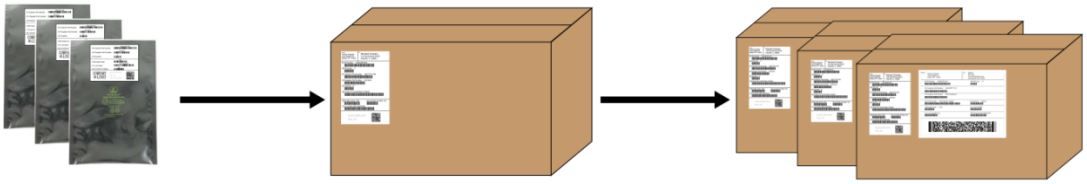
There are no set label size requirements for the 2D barcode formats. However, all data and barcodes must fit on the labels and satisfy the minimum dimensional and print quality requirements as indicated in APPENDIX B and APPENDIX C.

4.1 Shipment Examples

Due to the variance in product types and supply chains, products are packed and shipped in a multitude of configurations. The following are a few common examples.



Example shipment 1 – tubes containing product with product labels, a carton with a logistic label, and a pallet with a packing slip.

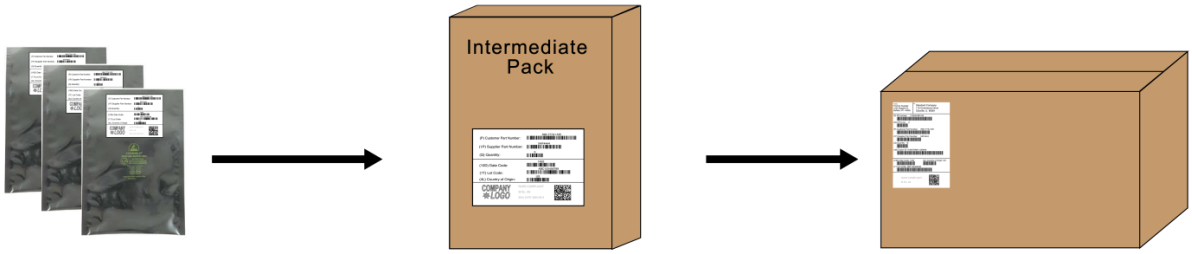


Example shipment 2 – bags containing product with product labels, a carton with a logistic label, and the full shipment (three cartons, all with logistic labels) with the lead carton marked with a packing slip.

Example shipment 3 – product on reels with product labels, a carton with a logistic label, and the full shipment with the lead carton marked with a packing slip.

4.1.1 Explanation of Intermediate Product Labels

Product labels are required at the smallest level of packaging, and on any intermediate packs that are used. The quantity field must reflect the total number of items for that level of packaging:



Product Label – applied to the smallest level of packing

Intermediate Product Label – applied to intermediate pack. Quantity field is total number of items in pack

Logistic (Carton) Label – applied to carton containing multiple intermediate packs

4.2 Quantity Field

The quantity field represents the number or items contained for each level of packaging.

For the product label, the quantity field is determined by the number of items contained in each ordering unit.

For the intermediate product label, the quantity field is the total number of items in the intermediate carton or inner-pack.

For the logistic label, the quantity field is determined by the total number of items contained in the carton or package that the logistic label is applied to.

For the packing slip, the quantity field is determined by the total number of items on the shipment for each line of the packing slip.

Example:

- A product pack contains three each/items. The quantity field on the product label will be “3”.
- 10 of that product are packed into a carton. The quantity field on the logistic label will be “30”. (10 products each containing 3 items)
- 15 cartons of product are shipped together. The quantity field on the packing slip will be “450”. (15 cartons each containing 30 items)

4.3 Mixed Fields on Labels

Mixed Date Codes and Lot Codes

These rules apply only to Logistic Cartons and Intermediate Product Cartons that contain the same item or part number with different lot codes or date codes:

Date Code: Use the oldest date code followed by an “M” (for MIXED or MULTIPLE). Alternatively, use the term “MIXED” in place of a date code. For example, if Data Identifier “9D” was used, and the oldest date code was “1540”, acceptable strings would be “9D1540M” or “9DMIXED”.

Lot Code: Use the term “MIXED” or “MULTI” in place of a lot code. Alternatively, leave the field blank. For example, “1TMIXED”, “1TMULTI”, and “1T” are acceptable strings to indicate mixed lot codes.

This graphic is an example of the label text for mixed Lot Code and Date Code fields. This is used for cartons that contain the same product or part with different Date Code or Lot Codes.

(10D) Date Code:	**MIXED**
(1T) Lot Code:	**MIXED**
(4L) Country of Origin:	**US**

4.4 Mixed Fields on Packing Slips

The packing slips for shipment that contain mixed products should contain lines for each product or similar grouping.

For example, if there is a shipment for Product A comprised of some items with Lot Code 1 and some items with Lot Code 2, there should be two lines on the Pack Slip for Product A, one with Lot Code 1 and one with Lot Code 2.

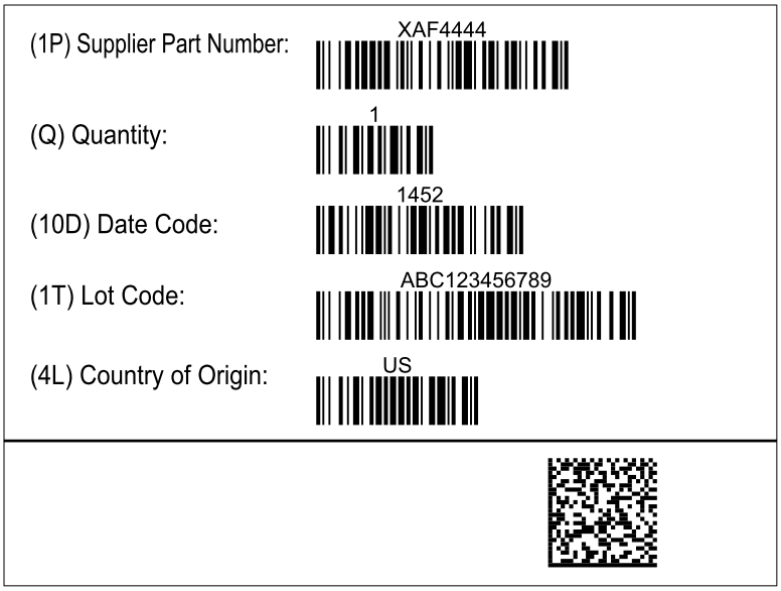
For the Date Code and Lot Code fields on the Pack Slip, there are special exceptions in the event that they cannot be listed out:

Date Code: If it is not possible to list each Date Code grouping as a separate line, use the oldest date code followed by an “M” (for MIXED or MULTIPLE). Alternatively, use the term “MIXED” in place of a date code. For example, if Data Identifier “10D” was used, and the oldest date code was “1531”, acceptable strings would be “10D1531M” or “10DMIXED”.

Lot Code: If it is not possible to list each Lot Code grouping on separate lines, use the term “MIXED” or “MULTI” in place of a lot code. Alternatively, leave the field blank. For example, “1TMIXED”, “1TMULTI”, and “1T” are acceptable strings to indicate mixed lot codes.

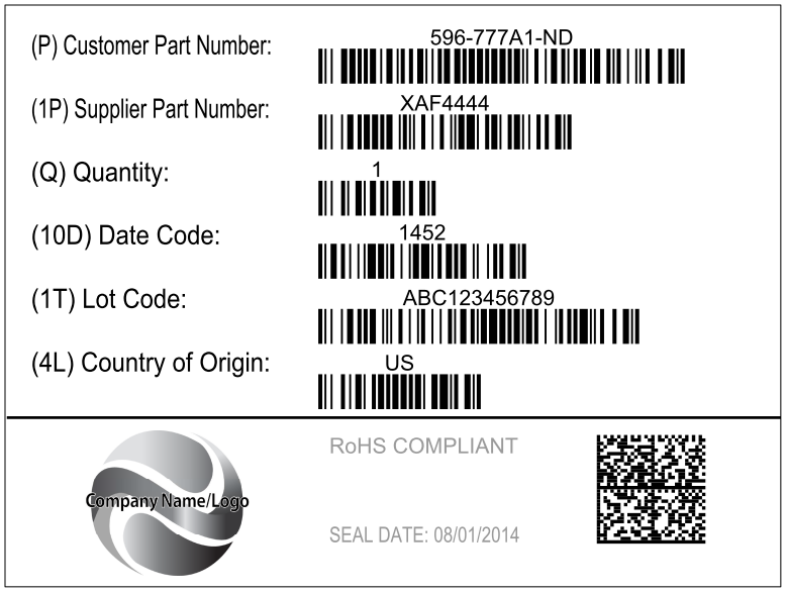
4.5 Product Label Format

The ECIA Product Label, with both 2D and 1D barcodes, is currently acceptable by all trading partners. There is a 2D barcode only format which is not currently accepted by every distributor. See APPENDIX D for more information.



ECIA Format - Product1

This example shows only the required ECIA data fields. Lot Code may be omitted only if not tracked.

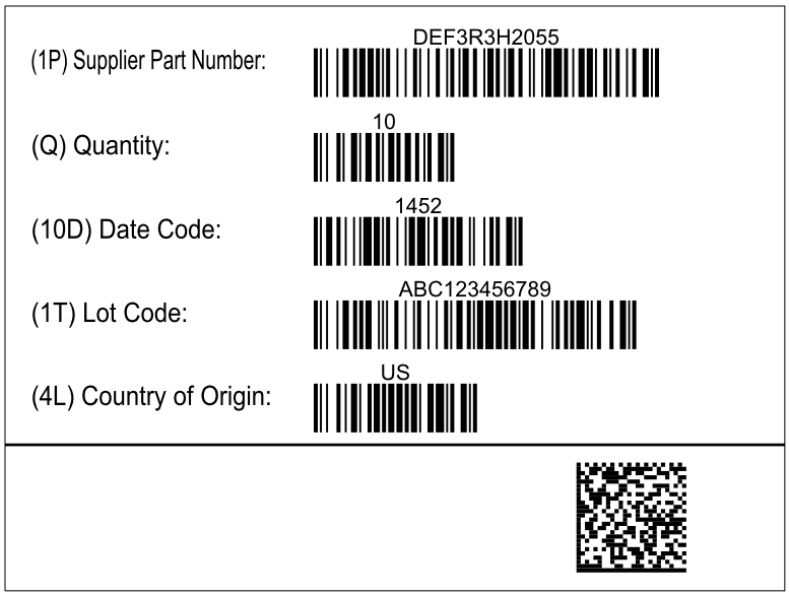


ECIA Format – Product1

This example shows ECIA required fields as well as additional optional and distributor specific fields.

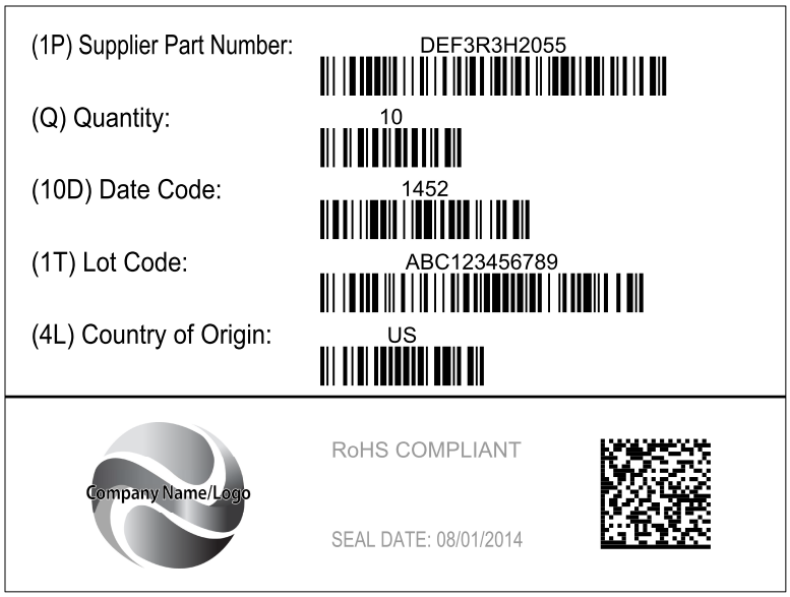
4.6 Intermediate Label

The ECIA Intermediate Product Label, with both 2D and 1D barcodes, is currently acceptable by all trading partners. There is a 2D barcode only format which is not currently accepted by every distributor. See APPENDIX D for more information.



ECIA Format - Intermediate1

This example shows only the required ECIA data fields. Lot Code may be omitted only if not tracked.

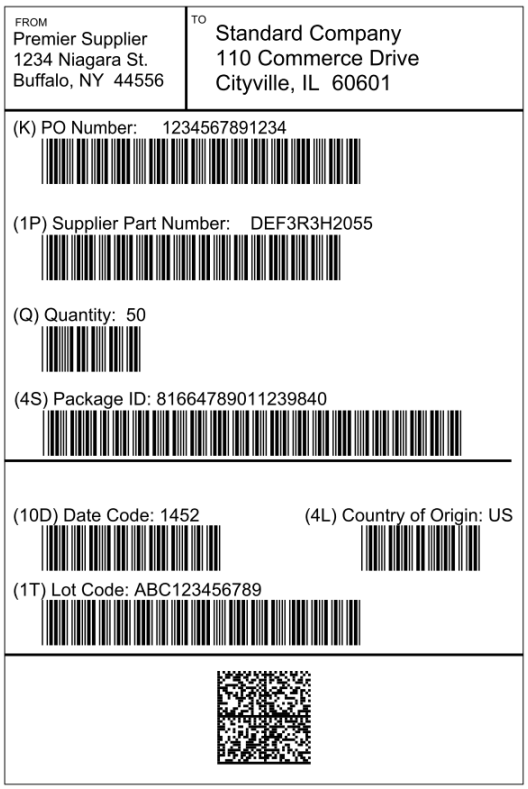


ECIA Format- Intermediate1

This example shows ECIA required fields as well as additional optional and distributor specific fields.

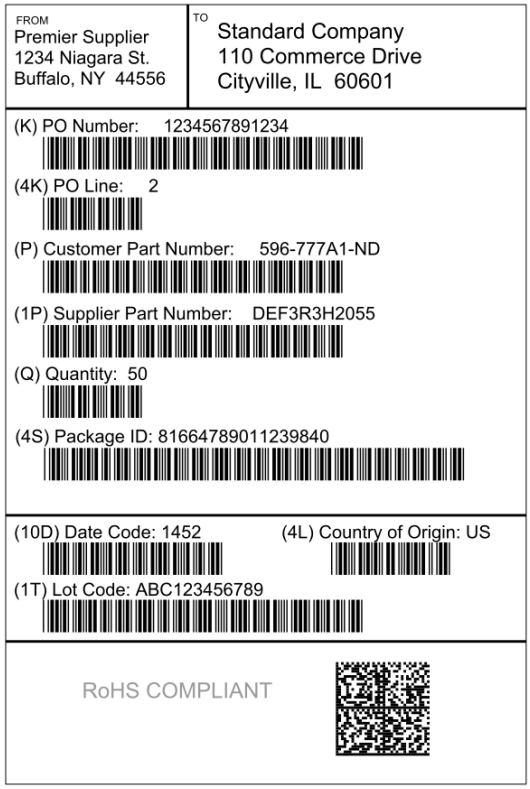
4.7 Logistic Label

Also known as a carton label, the ECIA Logistic Label, with both 2D and 1D barcodes, is currently acceptable by all trading partners. There is a 2D barcode only format which is not currently accepted by every distributor and other formats. See APPENDIX D for more information.



ECIA Format - Logisitic1

This example shows only the required ECIA data fields. Lot Code may be omitted only if not tracked.

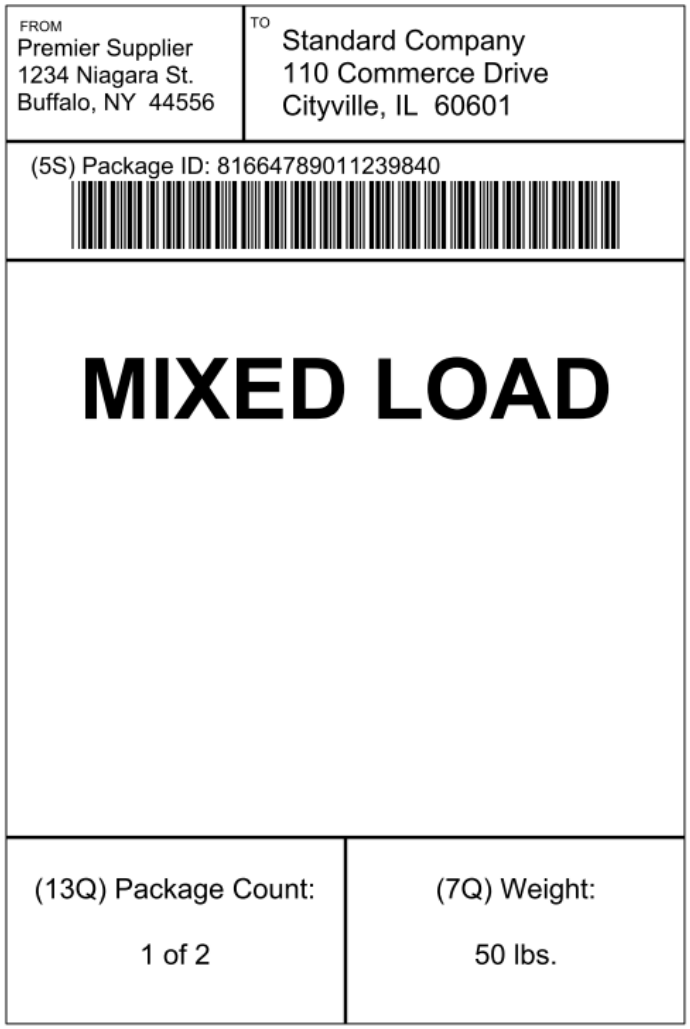


ECIA Format – Logistic1

This example shows ECIA required fields as well as additional optional and distributor specific fields.

4.8 Mixed Load Logistic Labels

For cartons that contain different items, a "Mixed Load" label may be used. When this label is used, any intermediate packs must have labels with Package IDs using data identifier "3S". See APPENDIX A.2 for details.



ECIA Format - LogisiticMixed

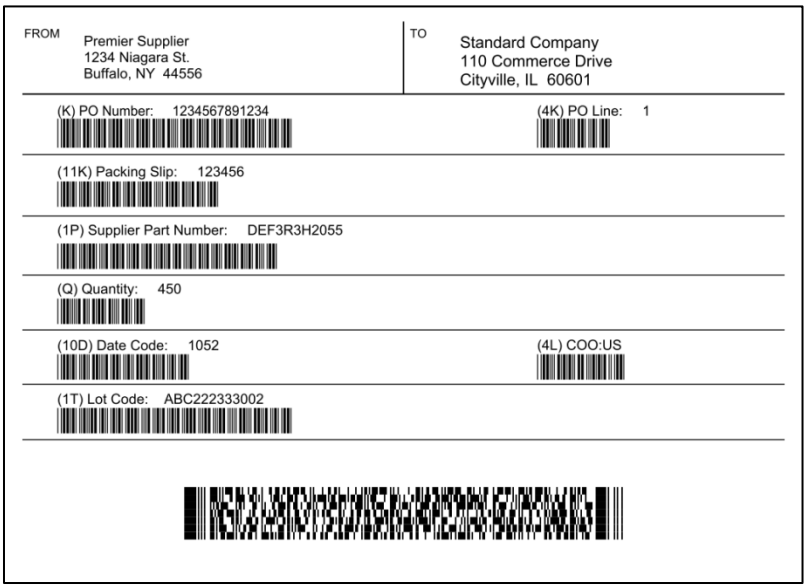
4.9 Packing Slips

The ECIA Pack Slip, with both 2D and 1D barcodes, is currently acceptable by all trading partners. Due to multi-line and mixed shipments, there are other acceptable formats. See APPENDIX D for more information.

For consolidated shipments containing multiple Purchase Orders, use separate Pack Slips for each order.

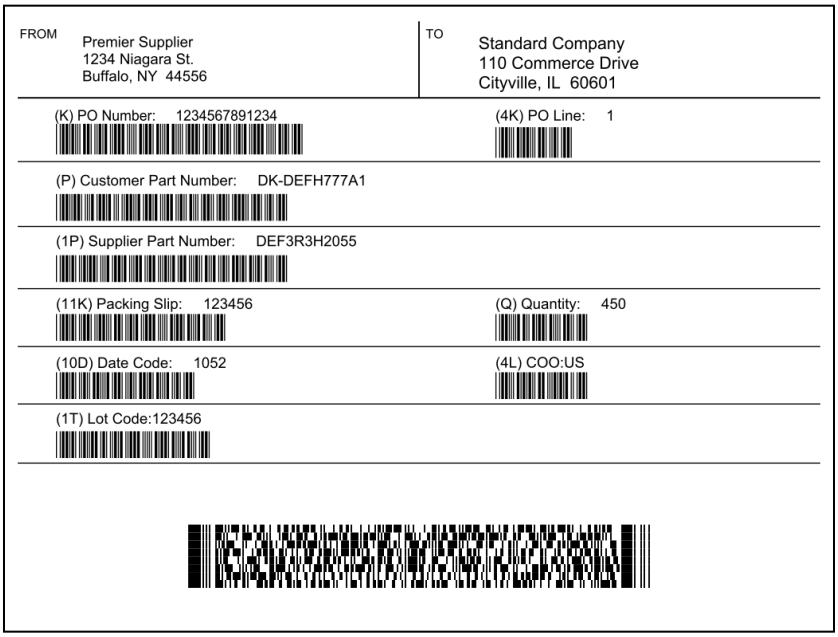
Note: A few distributors allow suppliers who due to system limitations cannot produce a barcoded Packing Slip to utilize an ECIA 2D barcode Logistic Label along with the Packing Slip. One logistic label must be created for each line of the Packing Slip, and these labels must be included on the back of the Pack Slip or on additional pages attached to the Packing Slip. See Section 4.7 for an example of the ECIA Logistic Label format.

4.9.1 Packing Slip – Single Line



ECIA Format - PackSlipSingle

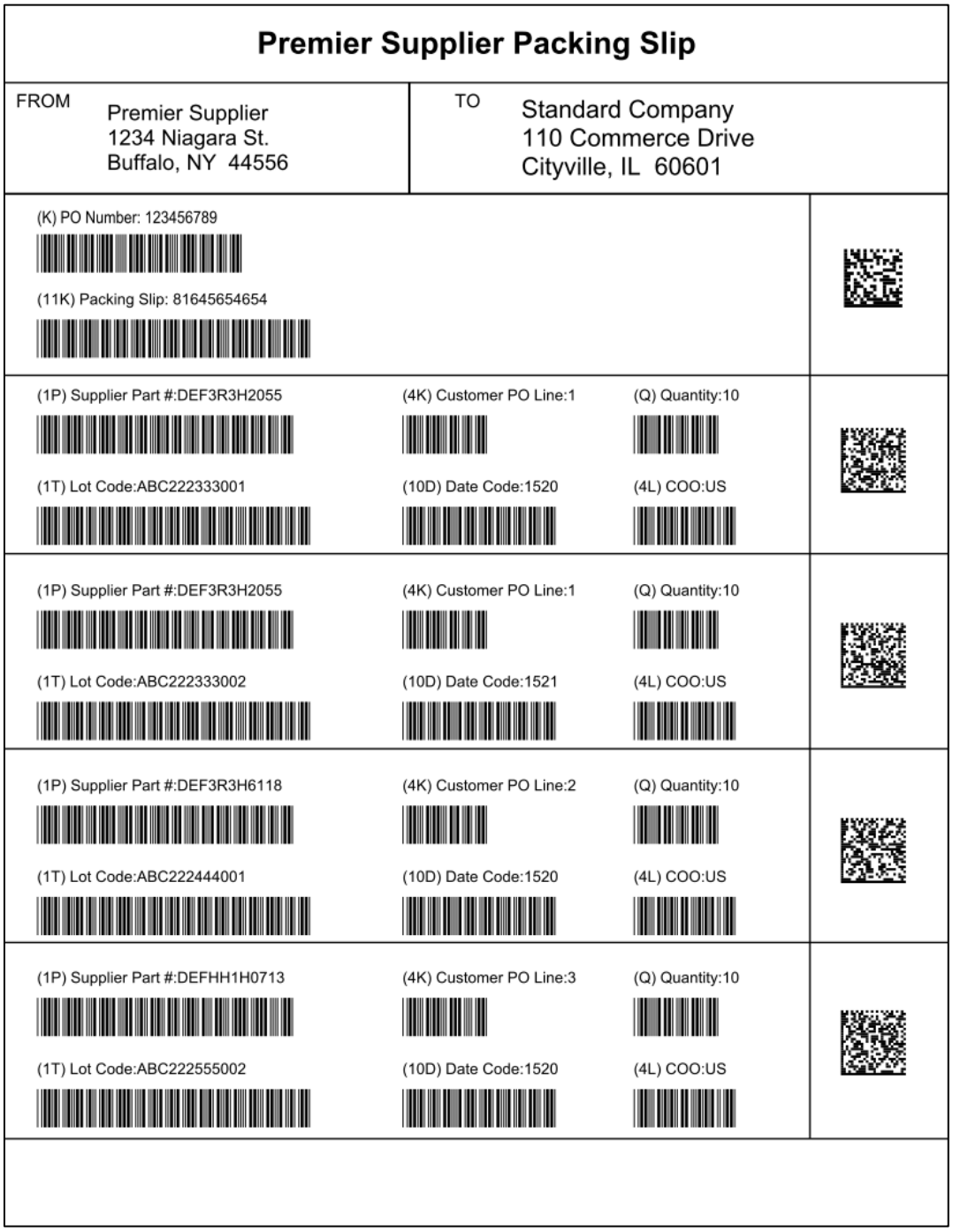
This example shows only the required ECIA data fields. Lot Code may be omitted only if not tracked.



ECIA Format- PackSlipSingle

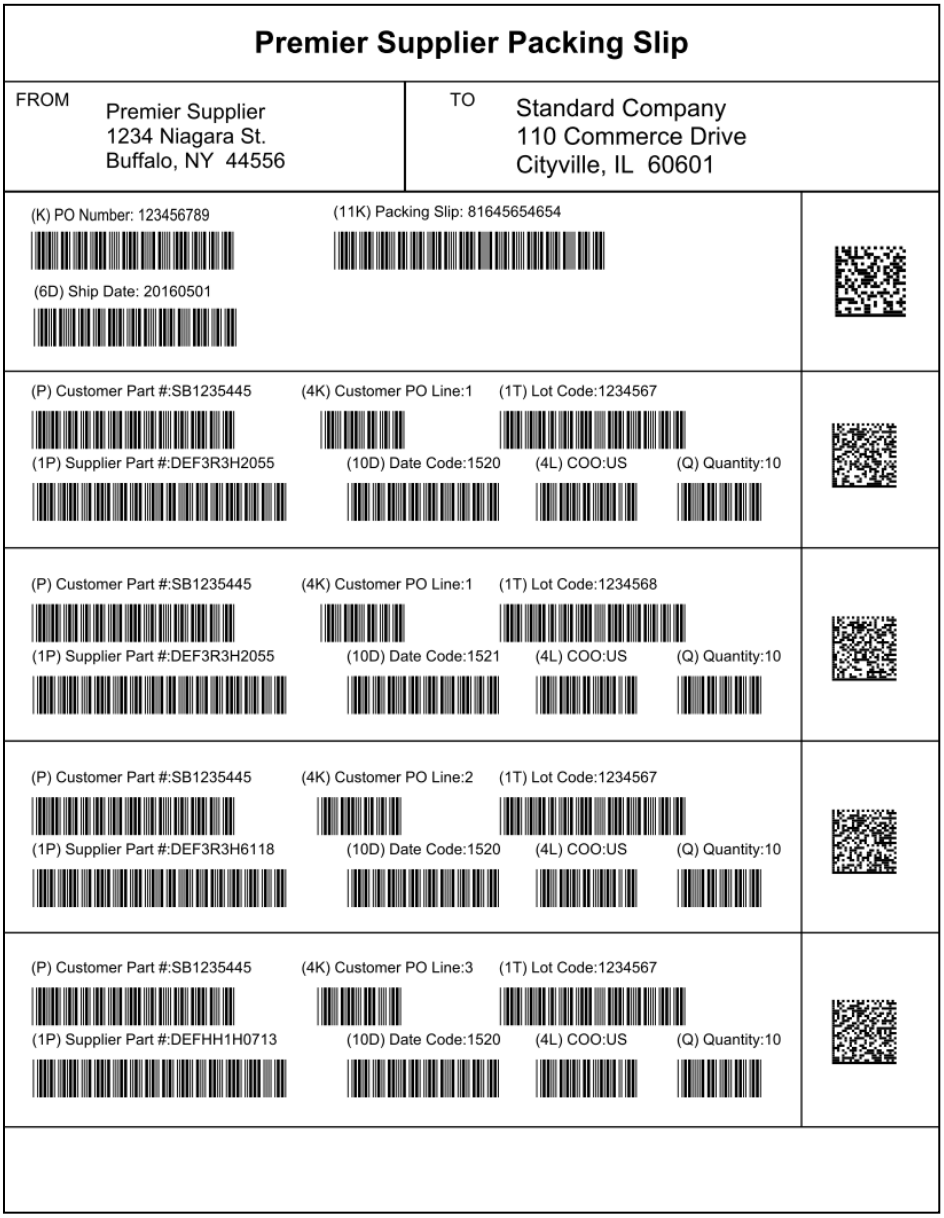
This example shows ECIA required fields as well as additional optional and distributor specific fields.

4.9.2 Packing Slip – Multi Line



ECIA Format - PackSlipMulti

This example shows only the required ECIA data fields. Lot Code may be omitted only if not tracked.



ECIA Format- PackSlipMulti

This example shows ECIA required fields as well as additional optional and distributor specific fields.

APPENDIX A

Field Description Charts (Product, Intermediate, Shipping, Packing Slip)

A.1 Product Label Field Descriptions

Field Name	Data Identifier	Max Field Length	Product Label	Specific Requirements
Customer Part Number	P	40	○	Customer assigned part number
Supplier Part Number	1P	40	●	Supplier assigned part number
Quantity	Q	9	●	Quantity of product in each package
Date Code	9D, 10D	7	●	9D - YYWW, 10D – YYWW (preferred) D - YYMMDD (use permitted until January 2019)
Lot Code	1T	15	●	Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Max field length expanding to 20 characters in 2019.
Country of Origin	4L	2	●	Country where part was manufactured. Two letter code from ISO 3166 country code list.
Serial Number	S	25	○	Unique alphanumeric value assigned to each part by manufacturer
BIN Code	33P	35	○	Code for sorting and classifying LEDs. Use when applicable.
Company Name/Logo	n/a		–	Logo, name, or other identifying mark for manufacturer
Revision number	2P	6	–	Alphanumeric string assigned by the supplier to distinguish from one closely-related design variation to another. Use as required or when applicable
RoHS/CC	E		–	Use as required or when applicable. May be encoded in barcode form.
Moisture Sensitive Level	n/a		–	Use as required or when applicable
Moisture Barrier Bag Seal Date	n/a		–	Use as required or when applicable

● **Required in barcode and text**

○ **Use as required or when applicable in barcode and text**

– **Use as required or when applicable in text**

A.2 Intermediate Product Label Field Descriptions

Field Name	Data Identifier	Max Field Length	Product Label	Specific Requirements
Customer Part Number	P	40	○	Customer assigned part number
Supplier Part Number	1P	40	●	Supplier assigned part number
Quantity	Q	9	●	Quantity of product in each package
Date Code	9D, 10D	7	●	9D - YYWW, 10D – YYWW (preferred) D - YYMMDD (use permitted until January 2019)
Lot Code	1T	15	●	Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Max field length expanding to 20 characters in 2019.
Country of Origin	4L	2	●	Country where part was manufactured. Two letter code from ISO 3166 country code list.
Package ID	3S	25	○	Unique alphanumeric number assigned by supplier 3S - Package ID for Inner Pack when part of a mixed Logistic Carton. Always used in conjunction with a mixed logistic label with a 5S data identifier for Package ID. See Section 2.2.1.
Customer PO	K	25	○	Customer assigned purchase order number. Used for Inner Pack when part of a mixed Logistic Carton.
BIN Code	33P	35	○	Code for sorting and classifying LEDs. Use when applicable.
Company Name/Logo	n/a		–	Logo, name, or other identifying mark for manufacturer
Revision number	2P	6	–	Alphanumeric string assigned by the supplier to distinguish from one closely-related design variation to another. Use as required or when applicable
RoHS/CC	E		–	Use as required or when applicable. May be encoded in barcode form.
Moisture Sensitive Level	n/a		–	Use as required or when applicable
Moisture Barrier Bag Seal Date	n/a		–	Use as required or when applicable

● **Required in barcode and text**

○ **Use as required or when applicable in barcode and text**

– **Use as required or when applicable in text**

A.3 Logistic Label Field Descriptions

Field Name	Data Identifier	Max Field Length	Logistic Label	Specific Requirements
Ship From	*n/a*		∗	Supplier name and address
Ship To	*n/a*		∗	Customer name and address
Customer PO	K	25	●	Customer assigned purchase order number
Package ID	4S, 5S	25	●	Unique alphanumeric number assigned by supplier 4S - Package ID for Logistic Carton with like items 5S - Package ID for Logistic Carton with mixed items Legacy use of 3S, 4S, and 11K permitted until 2019. See Section 2.2.1.
Ship Date	6D	8	○	Ship date in format YYYYMMDD
Customer Part Number	P	40	○	Customer assigned part number
Supplier Part Number	1P	40	●	Supplier assigned part number
Customer PO Line	4K	5	●	Line item number from PO
Quantity	Q	9	●	Quantity of product contained in logistic package
Date Code	9D, 10D	7	●	9D - YYWW, 10D – YYWW (preferred) D - YYMMDD (use permitted until January 2019)
Lot Code	1T	15	●	Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Max field length expanding to 20 characters in 2019.
Country of Origin	4L	2	●	Country where part was manufactured. Two letter code from ISO 3166 country code list.
BIN Code	33P	35	○	Code for sorting and classifying LEDs. Use when applicable.
Package Count	13Q		○	Sequential carton count in format “#/#” or “# of #”
RoHS/CC	E		–	Use as required or when applicable
Reel ID	n/a		–	Use as required or when applicable
Moisture Sensitive Level	n/a		–	Use as required or when applicable
Moisture Barrier Bag Seal Date	n/a		–	Use as required or when applicable

● **Required in barcode and text**

○ **Use as required or when applicable in barcode and text**

∗ **Required in text**

– **Use as required or when applicable in text**

A.4 Packing Slip Field Descriptions

Field Name	Data Identifier	Max Field Length	Packing Slip	Specific Requirements
Ship From	*n/a*		∗	Supplier name and address
Ship To	*n/a*		∗	Customer name and address
Customer PO	K	25	●	Customer assigned purchase order number
Packing List Number	11K	25	●	Unique alphanumeric number assigned by supplier Legacy use of 3S, 4S, and 11K permitted until 2019. See Section 2.2.1.
Ship Date	6D	8	○	Ship date in format YYYYMMDD
Customer Part Number	P	40	○	Customer assigned part number
Supplier Part Number	1P	40	●	Supplier assigned part number
Customer PO Line	4K	5	●	Line item number from PO
Quantity	Q	9	●	Quantity of product for line item
Date Code	9D, 10D	7	●	9D - YYWW, 10D – YYWW (preferred) D - YYMMDD (use permitted until January 2019)
Lot Code	1T	15	●	Traceability number assigned to a batch or group of items. Required if product is tracked with a lot code. May only be omitted if not tracked. Max field length expanding to 20 characters in 2019.
Country of Origin	4L	2	●	Country where part was manufactured. Two letter code from ISO 3166 country code list.
BIN Code	33P	35	○	Code for sorting and classifying LEDs. Use when applicable.
Package Count	13Q		○	Sequential carton count in format “#/#” or “# of #”
ECCN	n/a		–	Use as required or when applicable
Weight	7Q		○	Use as required or when applicable
Manufacturer	1V		–	Use as required or when applicable
RoHS/CC	E		–	Use as required or when applicable
Reel ID	n/a		–	Use as required or when applicable
Moisture Sensitive Level	n/a		–	Use as required or when applicable
Moisture Barrier Bag Seal Date	n/a		–	Use as required or when applicable

● **Required in barcode and text**

○ **Use as required or when applicable in barcode and text**

∗ **Required in text**

– **Use as required or when applicable in text**

APPENDIX B

2D Barcode Technical Information

The 2D symbologies approved for ECIA use are Data Matrix and PDF417. The 2D barcodes on ECIA labels encode multiple pieces of shipment and product data and allow for all data to be read in one scan.

B.1 Data Matrix Specifications

When using the Data Matrix symbology, the Data Matrix ECC-200 type must be used. ECC-200 is a reference to the error correction used by this specific symbology.

B.1.1 Data Matrix Symbol Size

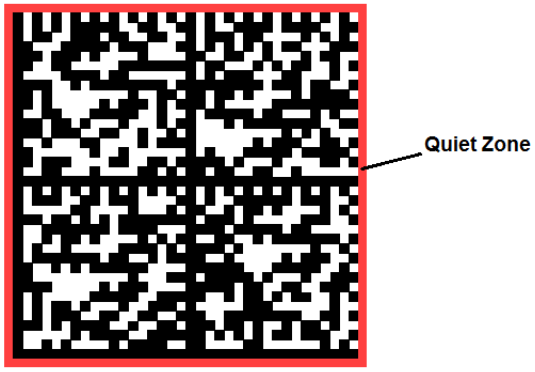
The minimum acceptable X-dimension for Data Matrix symbol is 14.6 mils, or 0.0146" (0.371 mm).

The symbol size requirements are defined by the X-dimension of the barcode. The X-dimension is a measure of the smallest element of the barcode. For a Data Matrix symbol, this is a measurement of the black and white squares that comprise the symbol. X-dimensions are commonly displayed in "mils" (thousandths of an inch), inches, or millimeters.

B.1.2 Data Matrix Quiet Zones

Quiet zones are the space immediately around a barcode symbol that is free of printing or marks (blank space or white space).

The minimum required quiet zone for the Data Matrix symbol is equal to the X-dimension of the symbol. For example, for a 19.5 mil/0.0195" symbol, a minimum quiet zone of 0.0195" must be maintained around the top, bottom, left, and right of the symbol.



B.1.3 Data Matrix Error Correction Level

Error correction is inherent to Data Matrix ECC-200 and allows for partially damaged barcodes to still be read.

B.1.4 Data Matrix Print Quality

A minimum ISO/ANSI print quality grade of 1.5/10/660 (C) is required for the Data Matrix symbol.

These components make up the **1.5/10/660 (C)** print grade:

- **1.5** – The ISO/ANSI Print Quality grade. Equivalent to a "C" grade.

- **10** – The aperture of the reading device in mils.
- **660** – The light wavelength of the reading device in nanometers.
- **(C)** – The letter equivalent of the print quality grade.

B.2 PDF417 Specifications

When using the PDF417 symbology, only the PDF417 symbology may be used. Truncated PDF417 and Micro PDF417 are not acceptable.

B.2.1 PDF417 Symbol Size

The symbol size requirements are defined by the X-dimension of the barcode. The X-dimension is a measure of the smallest element of the barcode. For a PDF417 symbol, this is the width of the narrow bars that comprise the symbol. X-dimensions are commonly displayed in "mils" (thousandths of an inch), inches, or millimeters.

The minimum acceptable X-dimension for PDF417 symbol is 9.5 mils, or 0.0095" (0.241 mm).

The height of the bars must be 3x (three times) the X-dimension. For example, for a 9.5 mil symbol, the bar height must be 28.5 mils.

B.2.2 PDF417 Quiet Zones

Quiet zones are the space immediately around a barcode symbol that is free of printing or marks (blank space or white space).

The minimum required quiet zone for the PDF417 symbol is equal to 2x (two times) the X-dimension of the symbol. For example, for a 9.5 mil/0.0095" symbol, a minimum quiet zone of 0.019" must be maintained around the top, bottom, left, and right of the symbol.

B.2.3 PDF417 Error Correction Level

A minimum error correction level of 3 is recommended. Error correction allows for partially damaged barcodes to still be read.

B.2.4 PDF417 Print Quality

A minimum ISO/ANSI print quality grade of **1.5/5/660 (C)** is required for the PDF417 symbol.

These components make up the **1.5/5/660 (C)** print grade:

- **1.5** – The ISO/ANSI Print Quality grade. Equivalent to a "C" grade.

- **5** – The aperture of the reading device in mils.
- **660** – The light wavelength of the reading device in nanometers.
- **(C)** – The letter equivalent of the print quality grade.

B.3 2D Message Format

This section defines the formatting for the data content of the 2D barcode. The same message formatting is used for both the Data Matrix and PDF417 barcodes.

ECIA requires use of the Format 06 structure, as defined by the ISO/IEC 15434 specifications. This message structure is used to handle the multiple pieces of a data that can be encoded.

Different types of software will require different levels of involvement with the specifics of formatting the data. At one end, some software will allow for a "Format 06" setting to be selected and all required elements will be added by the software. At the other end, some software may require that each formatting sequence be manually entered or coded.

B.3.1 General Structure

Format 06 is made up of a header, data stream, and trailer, with special character sequences used to identify each part and to separate each piece of data.

- **Header** – A special sequence of characters identifying that Format 06 structure is being used.
- **Data Stream** – The data encoded in the Format 06 structure.
- **Trailer** – A special sequence of characters that identifies the end of the message.

Here is an example of how the data would be formatted with the header, data stream, and trailer identified:

HEADER	DATA STREAM	TRAILER
[)>$^{R}_{S}$06$^{G}_{S}$	P596-777A1-ND$^{G}_{S}$1PXAF4444$^{G}_{S}$Q3$^{G}_{S}$10D1452$^{G}_{S}$1TBF1103$^{G}_{S}$4LUS	$^{R}_{S}$^{E}O$_{T}$

B.3.2 Special Characters

Format 06 uses special characters for formatting data. The "Compliance Indicator" is a sequence of three characters that is used to begin the Format 06 structure.

The other special characters used in Format 06 are the Record Separator, Group Separator, and End of Transmission characters. These are non-printable "Control Characters" and cannot be directly displayed in text format. This document displays them using the representations shown in the "Character" table in the following chart. Included in the chart are the ASCII and HEX values for these characters.

Name	Character	ASCII value	HEX value
Compliance Indicator	[]> *(three characters)*	91, 41, 62	5B, 29, 3E
Record Separator	$^{R}_{S}$	30	1E
Group Separator	$^{G}_{S}$	29	1D
End of Transmission	$^{E}O_{T}$	04	04

B.3.3 Header

This is the first portion of the data that will be encoded into the barcode.

$$[)>{}^{R}_{S}06{}^{G}_{S}$$

This sequence of characters identifies to the barcode reader where the message begins and that Format 06 is being used for the data to follow.

B.3.4 Data Stream

The data stream makes up the middle portion of the encoded data. Each data element (purchase order number, customer part number, lot code, etc.) will follow the same formatting pattern when encoded. Data elements are separated by the Group Separator special character. Below is an example that shows how a purchase order number would be formatted:

DATA IDENTIFIER	DATA	GROUP SEPARATOR
P	596-777A1-ND	$^{G}_{S}$

The data stream is comprised of these segments, each following the same pattern – Data Identifier, Data, Group Separator.

If the data element is the last data element in the data stream, the Group Separator is not required, but if present will not impact usability.

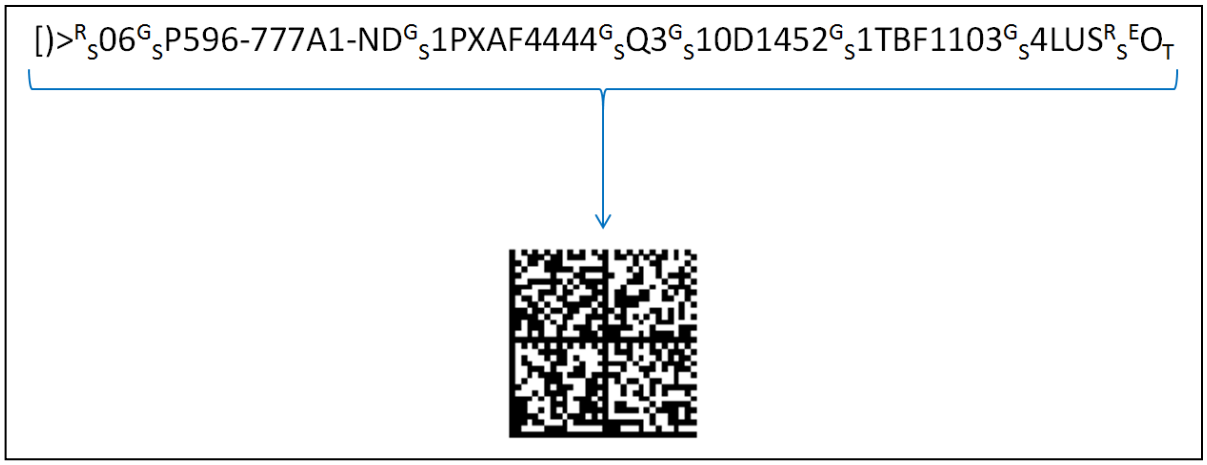
B.3.5 Trailer

This the final portion of data that is encoded to let the barcode reader know that the formatted data and message is complete:

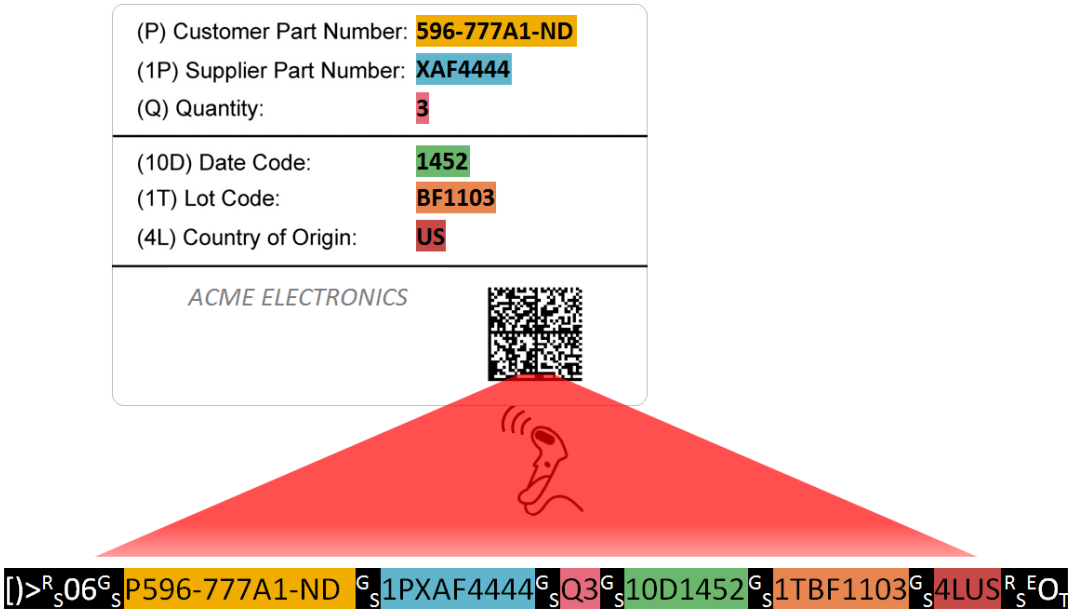
$R_S E O_T$

B.3.6 Examples

The following graphic shows the 2D barcode data as it is encoded into the barcode:



The following graphic shows sample data and the relationship between the label data and the 2D barcode:



APPENDIX C

Linear Barcode Technical Information

The linear barcodes acceptable for use are Code 128 and Code 39 barcodes.

C.1 Linear Barcode Dimensions

C.1.1 Narrow Element – X-Dimension

The X-dimension of a barcode is a measure of the narrow elements (the bars and spaces) that make up the barcode. The X-dimension, along with the data encoded, determines the overall width of the barcode symbol.

The minimum X-dimension for Code 128 and Code 39 barcodes is 9.5 mils (0.0095”/0.24 mm).

C.1.2 Code 39 Wide to Narrow Ratio

For the Code 39 symbology, an additional parameter called, wide to narrow ratio (or “W/N”, or just “ratio”), defines the size of the wide barcode elements in relation to the size of the narrow barcode elements.

Acceptable wide to narrow ratios for the Code 39 barcode must be between 2.25:1 and 3.0:1.

C.1.3 Barcode Height

The target height for linear barcodes is 0.375”/0.95 cm. It is recommended that the minimum height not be less than 0.25”/0.64 cm.

C.1.4 Linear Barcode Quiet Zones

For optimum scanning, a symbol's leading and trailing clear area known as the quiet zone must be at least 10 times the width of the narrowest element or 0.25” (0.64 cm), whichever is greater.

C.2 Linear Barcode Print Quality

A minimum ISO/ANSI print quality grade of **1.5/5/660 (C)** is required for the Code 128 and Code 39 barcodes.

These components make up the **1.5/5/660 (C)** print grade:

- **1.5** – The ISO/ANSI Print Quality grade. Equivalent to a “C” grade.
- **5** – The aperture of the reading device in mils.
- **660** – The light wavelength of the reading device in nanometers.
- **(C)** – The letter equivalent of the print quality grade.

C.3 Linear Barcode Data Structure

The data encoded in the linear barcodes must follow this format:

<Data Identifier><Data String>

For a carton with 12 items, the following would be encoded in the Quantity barcode:

<Data Identifier>	<Data String>
Q	12

No spaces should be encoded between the data identifier and data string.

C.4 Linear Barcode Human Readable Text

The linear barcode must be accompanied by a text field called the human readable text. This text is to be placed above the barcode symbol and displays the data encoded in the barcode.

The following components make up the human readable text:

- Data identifier – displayed in parentheses.
- Field name – description of the data.
- Data string – the actual data string encoded in the barcode.

For example, a Quantity barcode for a carton with 12 items would look like this:

APPENDIX D

Label Formats

This section covers additional label formats. Refer to Section 4 for the standard formats.

D.1 2D Only Formats

Examples of 2D only formats are provided in this appendix. Some distributors have the ability to read solely the 2D barcodes but this functionality is not currently available by all trading partners.

D.1.1 Product Label – 2D only format

ECIA Format – Product2 – 2D only
This example shows ECIA required fields as well as optional fields.

D.1.2 Intermediate Label – 2D only format

ECIA Format - Intermediate2
This example shows ECIA required fields as well as optional fields.

D.1.3 Logistic Label – 2D only format

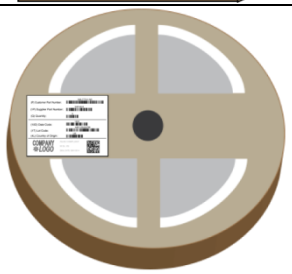
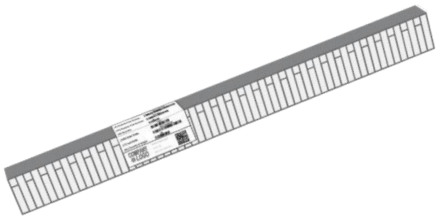
ECIA Format -Logistic2
This example shows ECIA required fields as well as optional fields.

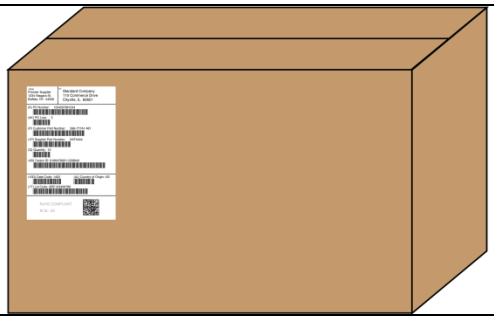
APPENDIX E

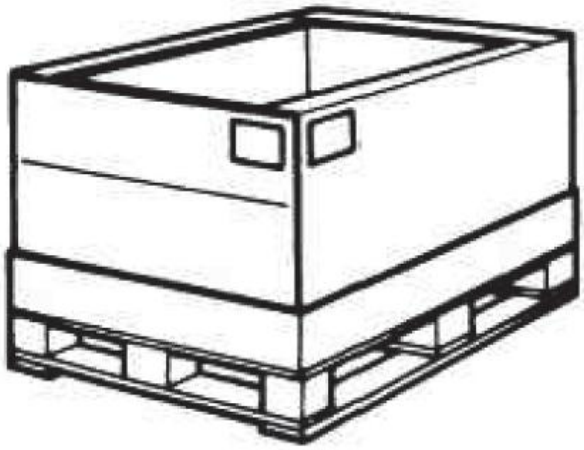
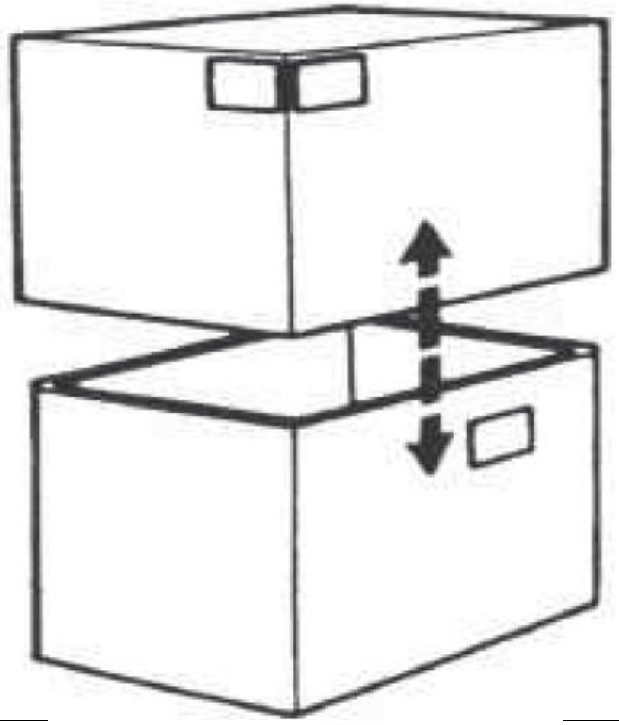
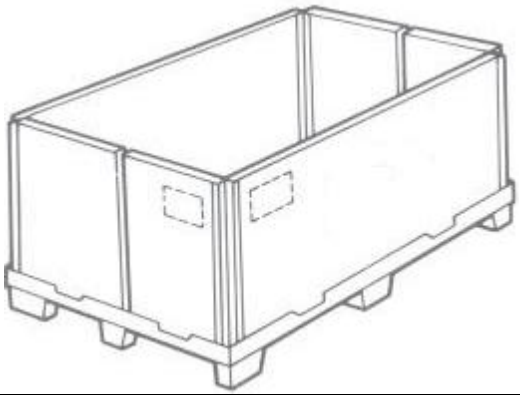
Placement Examples

E.1 Placement Examples

This section covers placement examples.

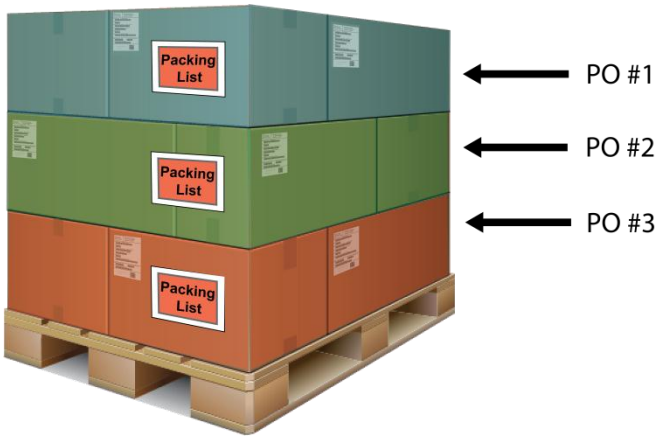
	**Product Label** **Cartons under 4" wide –** labels should be placed on the top panel. **Cartons 4" wide and greater –** labels should be placed on the "front" side panel.
	**Reel** Label to be placed on flat surface of reel, not impeding center spindle hole or any cutouts on the reel surface.
	**Bag**
	**Tube** If label must be wrapped to fit, do not wrap 2D barcode over any edges. Entire 2D barcode must be placed on flat surface.

	**Box or Carton**
	**Packing Slip on Carton, in pouch** Packing slips may be placed in a plastic pouch attached to a carton. For multiple carton shipments, the packing slip must be on the lead carton. The carton must be identified as the lead carton and must indicate that the packing slip is attached.
	**Packing Slip in Carton** Packing slips may be placed inside a carton. Carton must indicate that a packing slip is enclosed. For multiple carton shipments, the packing slip must be in the lead carton. The carton must be identified as the lead carton and must indicate that the packing slip is enclosed.
	**Cartons on Pallet** Each carton shall be individually labeled as described above. Cartons should be arranged on the pallet so that carton labels are visible. An additional label should be applied to the pallet, with data representing the entire pallet contents. A packing slip should be placed in a plastic pouch or in a clearly labeled lead carton.

	**Pallet Box** Identical labels shall be located on two adjacent sides or as agreed to by the trading partners (wrap around label is acceptable).
	**Telescopic or Set-Up Containers** Identical labels shall be located on two adjacent sides of the outer box or as agreed to by the trading partners. Some applications may also require identification of the inner box (wrap around label is acceptable).
	**Collapsible Sleeve Pack** Identical labels shall be located on two adjacent sides in designated locations or as agreed to by the trading partners.

E.2 Shipment Examples

A packing slip must accompany each shipment. The examples below show acceptable packing slips on different shipment types:

	**Single carton** – the packing slip can be placed in a plastic pouch attached to the carton or enclosed in the carton.
	**Multiple cartons** – the packing slip must be attached to the lead carton or enclosed in the lead carton.
	**Palletized shipment, single PO** – the packing slip can be attached to the pallet in a pouch, or can be enclosed in the lead carton. The carton must be identified as containing the packing slip.
	**Palletized shipment, multiple POs** – The cartons for each PO must be grouped together and distinct from other POs. A separate packing slip for each PO is preferred.

APPENDIX F

Technical References

ANSI MH10.8.2 Data Application Identifier Standard

CEA-556-C, Outer Shipping Container Label Standard

CEA-624-A, Linear Barcode and Two-Dimensional Symbols for the Labeling of Product Packages

ISO 22742 - Packaging – Linear Barcode and Two-Dimensional Symbols for Product Packaging

ISO 3166-1, Codes for the Representation of Names of Countries and Their Subdivisions – Part 1: Country Codes

ISO/IEC 15415, Information Technology - Automatic Identification and Data Capture Techniques – Barcode Print Quality Test Specification – Two-Dimensional Symbols

ISO/IEC 15416, Information Technology -- Automatic Identification and Data Capture Techniques -- Barcode Print Quality Test Specification -- Linear Symbols

ISO/IEC 15417, Information Technology — International Symbology Specification - Code 128

ISO/IEC 15434 Automatic identification and data capture techniques -- Syntax for high-capacity ADC media

ISO/IEC 15438, Information Technology — International Symbology Specification - PDF417

ISO/IEC 16022, Information Technology — International Symbology Specification – Data Matrix

ISO/IEC 16388, Information Technology — International Symbology Specification - Code 39

JEDEC JEP 130, Guidelines for Packing and Labeling of Integrated Circuits in Unit Container Packing

APPENDIX G

Sunset Dates

G.1 Sunset Date Process

Several items of the specification have been updated to meet the preferences and needs of the industry. To facilitate transition from current practices, sunset dates have been established. Suppliers are encouraged to adopt the updated practices immediately, and will be required to do so by the sunset date. Suppliers that certify using the legacy formats will need to recertify updated formats before January 2019.

The updates are described in the relevant sections of this document and are also gathered here for convenience and reference.

G.2 Date Code

Covered in Section 2.2 and 2.4. Data Identifiers 9D and 10D are the preferred data identifiers. 9D and 10D are always used in conjunction with the date format of YYWW (last two digits of year and two digit week number 01-53).

Data Identifier D with date format (YYMMDD) is also permitted. Use of this identifier and date format are allowed until January 2019.

G.3 Lot Code

Covered in Section 2.2 and 2.4. Maximum field length is currently 15 characters. This is expanding to maximum field length of 20 characters in January 2019.

G.4 Package ID and Packing List Number

Covered in Section 0. The definitions for Package IDs and Packing List Numbers in this document follow the ANSI MH10.8.2 Data Application Identifier Standard. These are the data fields using the 3S, 4S, 5S, and 11K Data Identifiers. Each identifier is used for specific packaging levels and package types.

Previous ECIA specifications presented the 3S, 4S, and 11K data identifiers as interchangeable, permitting them to be used for both Package IDs and Packing List numbers. Companies should adopt the ANSI aligned definitions presented in this document, but note that legacy usage of 3S, 4S, and 11K will be allowed until January 2019.

APPENDIX H

Label Certification

H.1 2D Barcode Label Certification Process

In partnership with Bar Code Graphics, Inc., ECIA offers an industry wide certification program to simplify supplier compliance by having a single testing source used for trading partners taking advantage of the 2D barcode labeling. Suppliers can register and certify all shipping locations for all applicable 2D barcode formats required by their trading partners. Once certified, suppliers will need to implement the approved formats into production.

Register for 2D barcode certification at:
http://ecia.identifcationlabs.com

Contact Identification Labs at:

Identification Labs, a division of Bar Code Graphics
800.662.0701 ext.310
ecia@identificationlabs.com
http://ecia.identificationlabs.com