



MERITOR SUSPENSION SYSTEMS COMPANY

SUPPLIER TRANSPORT LABEL SPECIFICATION

**FINAL REVISION 1.0
FEBRUARY 27, 2006**

INTRODUCTION

This standard is intended to outline the design and implementation of the Meritor Suspension Systems Company (MSSC) component shipping labels. There are three required MSSC Supplier Transport Label (STL) templates to be used on unit loads. This standard does not supersede or replace any applicable safety or regulatory marking or labeling requirements. This standard is to be applied in addition to any other mandated labeling requirements.

The following have been identified as the label types in use at MSSC:

- Individual Container
- Master Load
- Mixed Load

It is the responsibility of the supplier to provide bar code marked labels that meet the specifications outlined in this standard. A DR (Discrepant Material Concern/Response Report) will be generated by MSSC for non-compliance with these requirements. This report will be recorded and will affect your supplier rating. All associated supplier penalty fees will apply.

Maximum weight (gross) of a load unit (pallet) to be handled with a forklift or pallet jack shall not exceed 2400 lbs (1089Kg).

Container to be handled manually must fit within a standard 45" x 48" pallet.

Any specific details regarding packaging refer to the Arvin Meritor Supplier Guideline Manual.

In this document, the word "shall" indicates a requirement and the word "should" indicates a recommendation.

***All exhibits are for illustrative purposes only, and may not be to scale or bar code print quality standards.

LABEL CONCEPTS

This section defines a standardized label concept for the MSSC Supplier Transport Labels.

Label Size

The labels are designed around the label sizes of the B-16 with a minimum recommended size of 102 mm x 152 mm (4.0 inches x 6.0 inches). Label shall be white with black text.

Building Block

The following illustrations and matrix describe the distribution of data within the label templates:

- The label is divided into horizontal blocks or sub-blocks.
- Not all sub-blocks need be used.
- Data content shall not exceed the stated block/sub-block limits.
- Building blocks shall be stacked vertically separated by
- A horizontal line shall separate building blocks.
- Each building block is approximately 13mm (0.5") in height.

Text

All fonts shall be black (and bold if possible), UPPER CASE, and sans serif for readability (e.g. Arial Narrow, Helvetica Condensed, or equivalent). Color fonts and italics shall not be used. Font size shall meet or exceed sizes stated in the corresponding matrix to the label in design. Try to use the largest font size possible to increase ease of readability.

Linear Bar Code (License Plate)

The linear symbology used in this standard shall be Code 128, allowing for a quiet zone at each end of the symbol, of at least 6.4 mm (0.25 inches).

- The four characters %, /, \$, +, shall not be used.
- The minimum height of the symbol shall be 10.2 mm (0.4 inch).
- Non-significant zeros and spaces shall be omitted.
- "X" Dimension. The dimension of the narrowest element (X dimension) range shall be from 0.33 to 0.43 mm (0.013 to 0.017 inch) as determined by the printing device. Symbols with narrow elements at the lower end of this range may require special care to meet the print quality requirements.
- Each linear barcode shall have the appropriate data identifier included within the barcode data but not in the human readable. Example if you are shipping a quantity of 120 pieces the barcode would read Q120 when scanned but will show only 120 as the human readable above the barcode.

PDF417 (2D Bar code)

See section title PDF417 title later in this specification for characteristics and syntax.

Print Quality

ISO/IEC 15438 and ISO/IEC 15415 Bar Code print quality test specification for Linear Symbols shall be used to determine the print quality. The minimum symbol grade should be 1.5/10/660, where:

- Minimum Print Quality grade = 1.5 (C) at the customer's point of scan
- Recommended Print Quality grade \geq 2.5 (B) at the point of printing the symbol
- Measurement Aperture = 0.254 mm (0.010 inch)
- Light Source Wavelength = 660 nanometers (nm) \pm 10 nm.

It is important that the linear bar code symbol be decodable throughout the system of use. The symbol quality and measurement parameters should ensure scan-ability over a broad range of scanning environments. Print quality at the point of production should be higher (Print Quality Grade \geq B) than the requirements at the point of use. Unattended scanning may require a higher print quality grade than that identified above. Consequently, those implementing this standard for unattended applications should discuss print quality requirements with the labeler.

To reduce errors associated with the mislabeling of containers, on-demand printing should be placed as close as possible to the point of application. Studies have shown that batch, central printing and pre-printed labels have higher error rates associated with mislabeling (wrong label on the container).

Direct thermal and thermal transfer printer devices produce the most consistent results for symbol print quality and text uniformity. The supplier should have an in-house verification process for ongoing quality control of all labels.

BEST PRACTICES WHICH MUST BE FOLLOWED

Bar codes with a high bar gain/loss dramatically decrease scanner performance and decodability without affecting ANSI print quality.

- Width of the narrow bars shall be the same width as the narrow spaces ideally within +/- 10%, but shall be within +/- 25%.

Bar Gain/Loss can be caused by many factors in the printing process such as the ink applied to form the bars spreading on the background material. The ideal situation would be to have 0% variation. In case of high bar gain/loss, adjustments need to be made to the original artwork, plate marking, ink application, ribbon formulation, and print head temperature. Bar code verification equipment should be utilized in order to bring this deviation as close to zero as possible.

Note:



QUALITY OF MEDIA (I.E. LABELS AND RIBBON) CAN HAVE A PROFOUND EFFECT ON IMAGE QUALITY AND SUBSEQUENTLY A SCANNERS ABILITY TO DECODE A BAR CODE SYMBOL. SUPPLIERS SHOULD UTILIZE GOOD QUALITY PRINT MATERIALS WHEN MAKING THEIR STL LABELS.

CONTAINER LABEL


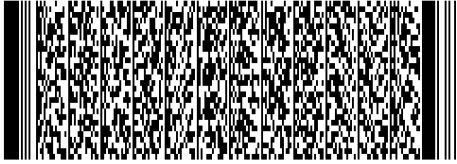
FROM: AALSTEC DATA CORP. P.O.B. 43555 REN CEN DETROIT, MI 48243 313.962.7790 MADE IN USA		TO: MERITOR SUSPENSION SYSTEMS 201 PARK AVENUE EAST CHATHAM, ONTARIO N7M 3V7			
QUANTITY: N2345		LOT NUMBER: AN34567890		REFERENCE: AN34567	
PART NUMBER: N23456789012345					
LICENSE PLATE (1J):  UN 123456789 A2B4C6E1P				SHIPMENT DATE: 01/09/2006 GROSS WEIGHT: 295 KG	
SUPPLIER FREE AREA				FUTURE USE	

DATA TITLE	DI	DESCRIPTION	BAR CODE	MAX. CHARS.	DATA TYPE	FONT SIZE
FROM		Ship From address. Maximum 5 lines of data consisting of: Company Name, Contact, Street Address, Country of Origin, MADE IN / ASSEMBLED IN		5 lines	A/N	10
TO		Ship To address. Maximum 5 lines of data consisting of Company Name, Additional contact info, Address up to 3 lines.		5 lines	A/N	12
QUANTITY	Q	Numeric unit of measure. Assumed to be "each" unless otherwise mutually defined by MSSC and the supplier.	in PDF417	5	N	24
LOT NUMBER	1T	Trace-ability number assigned by supplier to identify/trace a unique group of entities.	in PDF417	10	A/N	24
REFERENCE	K or 15K	Either an Order Number (K) or a Kanban Number (15K) assigned by MSSC for the purpose of this transaction.	in PDF417	7	A/N	24
PART NUMBER	P	Item identification code assigned by MSSC.	in PDF417	15	A/N	36
LICENSE PLATE	1J	Consists of assigning authority code "UN", the supplier's DUNS number, and a supplier generated serial number.	Code128 and in PDF417		A/N	18
SHIP DATE	9D	Date of shipment generated by month, day, year. e.g. MM/DD/YYYY	in PDF417	10	N	18
GROSS WEIGHT	7Q .. GT	Gross weight in kilograms, at the time of shipment.	in PDF417	3	N	18
BILL OF LADING	3K	Bill of lading assigned by the supplier for the current shipment.	in PDF417	7	A/N	N/A

MASTER LABEL

FROM: AALSTEC DATA CORP. P.O.B. 43555 REN CEN DETROIT, MI 48243 313.962.7790 MADE IN U.S.A.	TO: MERITOR SUSPENSION SYSTEMS 201 PARK AVENUE EAST CHATHAM, ONTARIO N7M 3V7	MASTER LABEL
		REFERENCE: AN34567
PART NUMBER: N23456789012345		
LICENSE PLATE (6J):  UN 123456789 A2B4C6E1P		TOTAL QTY: 148140 # PACKS 12 QTY/PACK: 12345 GROSS WEIGHT: N23 KG
		

DATA TITLE	DI	DESCRIPTION	BAR CODE	MAX. CHARS.	DATA TYPE	FONT SIZE
FROM		Ship From address. Maximum 5 lines of data consisting of: Company Name, Contact, Street Address, Country of Origin, MADE IN / ASSEMBLED IN		5 lines	A/N	10
TO		Ship To address. Maximum 5 lines of data consisting of Company Name, Additional contact info, Address up to 3 lines.		5 lines	A/N	12
MASTER LABEL						24
REFERENCE	K or 15K	Either an Order Number (K) or a Kanban Number (15K) assigned by MSSC for the purpose of this transaction.	in PDF417	7	A/N	24
PART NUMBER	P	Item identification code assigned by Arvin.	in PDF417	15	A/N	36
LICENSE PLATE	6J	Consists of assigning authority code "UN", the supplier's DUNS number, and a supplier generated serial number.	Code128 and in PDF417		A/N	18
TOTAL QTY	7Q .. PL	Cumulative total of all container quantities in the master load.		6	N	18
# PACKS	7Q .. PK	Number of containers in the master load.		3	N	18
QTY/PACK	Q	Individual container quantity.		5	N	18
GROSS WEIGHT	7Q .. GT	Weight of the entire master load.		3	N	18
BILL OF LADING	3K	Bill of lading assigned by the supplier for the current shipment.	in PDF417	7	A/N	N/A

FROM: AALSTEC DATA CORP. P.O.B. 43555 REN CEN DETROIT, MI 48243 313.962.7790 MADE IN USA		TO: MERITOR SUSPENSION SYSTEMS 201 PARK AVENUE EAST CHATHAM, ONTARIO N7M 3V7		<h1>MIXED LOAD</h1>	
PART # N123456789012345 # PACKS QTY / PACK 1 @ 100 TOTAL QTY 100		PART # N123456789012345 # PACKS QTY / PACK 2 @ 200 TOTAL QTY 400		PART # N123456789012345 # PACKS QTY / PACK 3 @ 300 TOTAL QTY 900	
PART # N123456789012345 # PACKS QTY / PACK 4 @ 400 TOTAL QTY 1600		LICENSE PLATE (5J):  UN 123456789 A2B4C6E1P		PART # N123456789012345 # PACKS QTY / PACK 5 @ 500 TOTAL QTY 2500	
		GROSS WEIGHT: <h1>9999 KG</h1>			

DATA TITLE	DI	DESCRIPTION	BAR CODE	MAX. CHARS.	DATA TYPE	FONT SIZE
FROM		Ship From address. Maximum 5 lines of data consisting of: Company Name, Contact, Street Address, Country of Origin, MADE IN / ASSEMBLED IN		5 lines	A/N	10
TO		Ship To address. Maximum 5 lines of data consisting of Company Name, Additional contact info, Address up to 3 lines.		5 lines	A/N	12
MIXED LOAD						24
LICENSE PLATE	5J	Consists of assigning authority code "UN", the supplier's DUNS number, and a supplier generated serial number.	Code128 and in PDF417		A/N	18
REFERENCE	K or 15K	Either an Order Number (K) or a Kanban Number (15K) assigned by MSSC for the purpose of this transaction.	in PDF417	7	A/N	N/A
PART NUMBER	P	Item identification code assigned by Arvin.	in PDF417	15	A/N	12
TOTAL QTY	7Q .. PL	Cumulative total of all container quantities in the master load.		6	N	10
# PACKS	7Q .. PK	Number of containers in the master load.		3	N	10
QTY/PACK	Q	Individual container quantity.		5	N	10
GROSS WEIGHT	7Q .. GT	Weight of the entire master load.		3	N	24
BILL OF LADING	3K	Bill of lading assigned by the supplier for the current shipment.	in PDF417	7	A/N	N/A

WHICH LABEL TO USE

Individual Container

Holds one or more like parts in a single structure.

Master Load

Multiple Containers of like parts on or in a single structure (e.g. a pallet). Master loads require proper individual container labeling.

Mixed Load

Multiple Containers of unlike parts on or in a single structure. Mixed pallets also require proper individual container labeling. However, with mixed pallets, any single part number shall not be shipped on more than one mixed pallet.

Keep like parts together; in other words, consolidate mixed parts.

Any single part number shall not be shipped on more than one pallet in a mixed load

PDF417

Message Format

This section defines how data shall be formatted within the 2D symbol. The data within a 2D symbol is called a *data stream*. A two-level structure called *enveloping* is used to *format* the data within the data stream.



PDF417 Symbol

The outermost layer of the message is a *Message Envelope* that defines the beginning and end of the message. The Message Envelope contains one or more *Format Envelopes* that contain the *formatted data*.

The Message Envelope consists of:

- A Message Header
- A Message Trailer

The Format Envelope within the Message Envelope consists of:

- A Format Header
- Formatted Data
- A Format Trailer

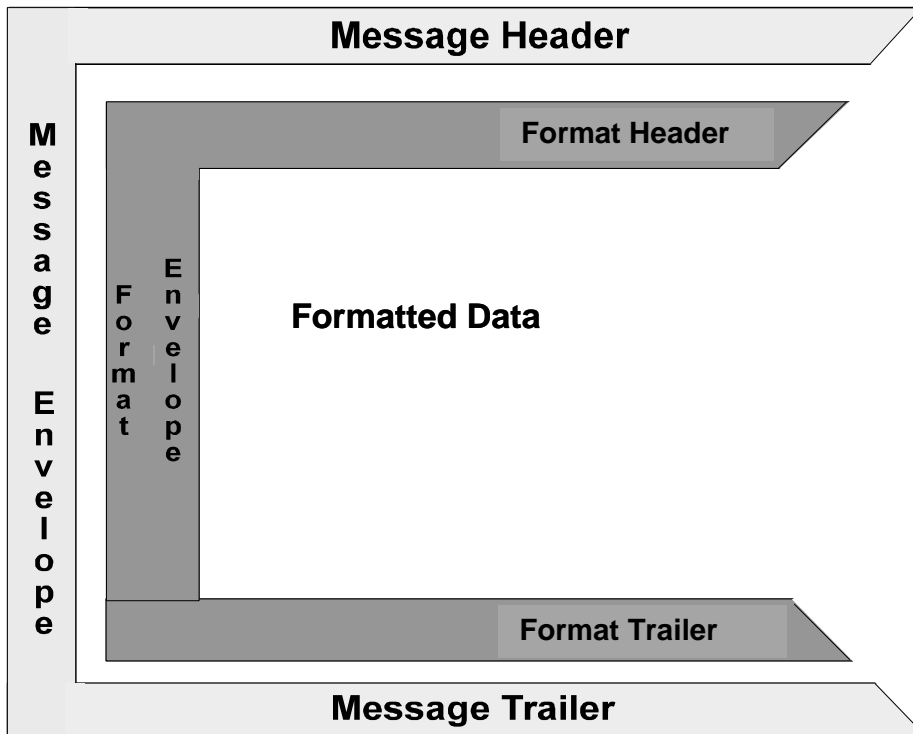


Figure 1. Pictorial Illustration of Enveloping Structure

Message Envelope

The Message Envelope defines the start and end of the data contained within the data stream and provides the following functions:

- Indicates that the message contained within the symbol is formatted using **Data Identifiers (DI)** in compliance with the rules of this Standard.
- Indicates the character that has been defined to separate Formats within the Message.
- Provides a unique character to indicate the end of the Message.

The structure within a data stream is as follows:

- A Message, containing one or more Formats
 - A Format, containing one or more Segments
 - A Segment, containing one or more Data Elements
 - A Data Element (field), potentially containing one or more Sub elements (Sub fields).
 - Message Header

The Message Header shall consists of two parts,

- The three-character Compliance Indicator
- The Format Trailer Character

The complete Message Header shall be: **[]>^R_s or []>**RS**** (See Table 1 below)

Table 1. Hexadecimal and Decimal Values - Subset of ASCII/ISO 646

ASCII/ISO Character	646	DECIMAL	HEX
[91	5B
)		41	29
>		62	3E
^R _s or RS		30	1E
^G _s or GS		29	1D
^E _{O_T} or EOT		04	04

Compliance Indicator

The Compliance Indicator shall be the first three characters in the Message Header. The Compliance Indicator shall be **[]>** (left bracket, right parenthesis, greater than).

Format Trailer Character

The Format Trailer Character shall be the fourth character in the Message Header. The Format Trailer Character shall be the non-printable ASCII character represented as "^R_s". The Format Trailer Character is used to indicate the end of a Format Envelope.

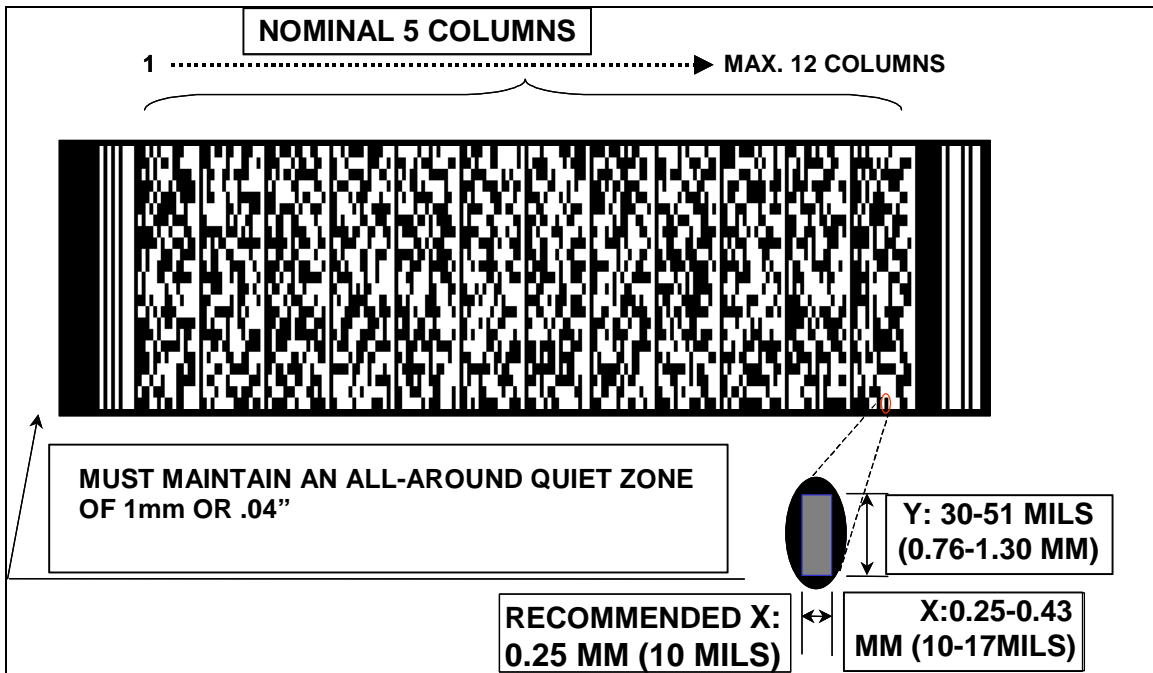
Message Trailer

The Message Trailer identifies the end of the message within the data stream. The Message Trailer shall be the non-printable ASCII End Of Transaction character, "^E_{O_T}" or "EOT". The Message Trailer character shall be used once, at the end of the message.

The sequence or order in which data is encoded in the PDF417 bar code is not significant within the format envelope.

Characteristics

- X dimension of 10 to 15 mil
- 5 to 12 columns of information
- security level of 3 to 5
- row height of $Y = 3X$
- quiet zone of 1mm or .04" completely around the symbol



Data Examples

All data streams start with the three character compliancy indicator followed by a record separator and the numbers 06 which indicate data identifiers are used to define the values contained in the data stream. Each value will be separated with a group separator, and prefixed with its' appropriate data identifier. After the data stream is finished, a format trailer is applied which consists of a record separator and an end of transmission.

Container Label PDF417 data stream:

```
[>[ RS]06[ GS]PN23456789012345[ GS]QN2345[ GS]1JUN123456789A2B4C6E1P[ GS]KAN34567
[ GS]3Klading[ GS]7Q295GT[ GS]1TAN34567890[ GS]9D12192005[ GS]2P121405[ RS][EOT]
```

Master Label PDF417 data stream:

```
[>[ RS]06[ GS]6JUN123456789A2B4C6E1P[ GS]3Klading[ GS]PN23456789012345[ GS]Q12345[
GS]7Q148140PL[ GS]7Q12PK[ GS]7QN23GT[ GS]KAN34567[ RS][EOT]
```

Mixed Load PDF417 data stream:

```
[>[ RS]06[ GS]5JUN123456789A2B4C6E1P[ GS]3Klading[ GS]7Q9999GT[ GS][ RS]
06[ GS]PN123456789012345[ GS]7Q100PL[ GS]7Q1PK[ GS]Q100[ RS]
06[ GS]PN123456789012345[ GS]7Q400PL[ GS]7Q2PK[ GS]Q200[ RS]
06[ GS]PN123456789012345[ GS]7Q900PL[ GS]7Q3PK[ GS]Q300[ RS]
06[ GS]PN123456789012345[ GS]7Q1600PL[ GS]7Q4PK[ GS]Q400[ RS][EOT]
```

** Above data streams are broken for ease of reading and should be continuous within the PDF417

TERMS AND DEFINITIONS

TERM	DEFINITION
1D Symbol	1D one-dimensional or linear symbol, such as Code 128. An array (linear sequence) of variable width rectangular bars and/or spaces, arranged in a predetermined pattern, following specific rules, to represent elements of data; these bar and space patterns are referred to as characters . A bar code symbol typically contains a leading quiet zone, a start character, data character(s) including a check character (if any), a stop character and a trailing quiet zone.
2D Symbol	2D two-dimensional symbol. A machine-readable symbol that must be examined both vertically and horizontally to read the entire message. A 2D symbol may be one of two types of machine-readable symbols: a Matrix Symbol or a Stacked Symbol. 2D symbols differ from linear bar codes in that they have the capability for high data content, small size, data efficiency, and error correction.
AIAG	Automotive Industry Action Group
Alphanumeric	A character set that contains alphabetic characters (letters), numeric digits (numbers), and usually other characters such as punctuation marks.
Bar Code Symbol	The combination of symbol characters and features required by a particular symbology, including quiet zones, start and stop characters, data characters, check characters and other auxiliary patterns, which together form a complete scan able entity.
Character (CH)	The smallest group of elements that represents one number, letter, punctuation mark or other information.
Code 128	For the purposes of this standard, Code 128 shall mean the symbology as described in ISO/IEC15417
Container	A receptacle or flexible covering for shipping goods. Example is a box, bag, package or pallet. (See also Transport Unit and Pack, Package or Load .)
Customer	In a transaction, the party that receives, buys, or consumes an item or service. I.e. TSBI.
Customer Part Number	The part number as defined by the customer.
Data Element	The smallest named item of information that can convey data, analogous to a field in a data record or a word in a sentence.
Data Element Separator	The special character used to separate data elements in a data format.
Data Identifier (DI)-	A specified character (or string of characters) that defines the general category or intended use of the data that follows. Data Identifiers are defined by ANSI MH10.8.2 / ISO 15418. The DI is not part of the data.
DR-	Discrepant material concern / Response report

ECC (Error Correcting Code)	A technique used at the byte level to detect and correct data transmission errors. Supplemental bits introduced or source encoded into a data stream to allow automatic correction of erroneous bits and/or derivation of missing bits, in accordance with a specific computational algorithm. See also "Error Correction Level."
Element	A single bar or space in a linear or stacked symbol or a single cell (module) in a matrix symbol (not the same as Data Element).
Element Width	The thickness of an element measured from the leading edge of an element to the trailing edge of the same element (see X dimension .)
Human Readable Interpretation	The human readable letters, digits or other characters representing the data encoded in/and printed along with the linear bar code or 2D symbol.
Item	A single part or material purchased, manufactured and/or distributed.
IPP	Initial Production Part
Label	A piece of paper, plastic, card stock or metal that is marked (by printing or some other means) and attached to an object to convey information. For purposes of this document, attachment of a label is to be on the exterior of a container.
Lot	A quantity of homogeneous material either manufactured or received.
Manufacturer	Actual producer or fabricator of an item; not necessarily the supplier in a transaction.
Master Load	A multiple pack or unit load of common items (sharing a single part number), such as a pallet.
Message	A continuous stream of data elements, including formatting characters and delimiters, to be encoded in a (two-dimensional) symbol or set of symbols.
Message Envelope	A pair of elements consisting of a Message Header and a Message Trailer that delimits the start and end of a data stream in a given message.
Message Header	A character or group of characters that defines the start of a Message Envelope.
Message Trailer	A group of character used to identify the end of a Message Envelope.
Pack, Package or Load	A transport package (container) that provides protection and containment of items plus ease of handling by manual or mechanical means, for example: bags, cartons, pallets, bins and racks.
Pallet	A platform to hold unit loads, permitting stacking of materials and transport packages, and the movement of the materials as a single load. A pallet may be either expendable (e.g. wood) or returnable (e.g. plastic).
Part	An identifiable item that has a unique name and/or number assigned to it.
Part Number	A unique code that identifies a part, assembly, component or kit.
Quantity	On a label, the marking that indicates the number of parts or items or the amount in any other unit of measure that is contained within the package.

Quiet Zone	Areas free from interfering markings surrounding a bar code symbol and, in particular, preceding the start character and following the stop character. Also referred to as “light margin” or “clear area”.
Reader	A device consisting of a scanner and a decoder.
Scanner	An electronic device to collect and convert reflected light from the elements (e.g., bars and spaces in linear symbols) of a symbol into electrical signals for processing by the decoder.
Serial Number	A string of numeric or alphanumeric characters in the issuer’s information system used for uniquely identifying an individual item or entity for its life. This character string shall not be repeated within 365 days to a single customer.
Shall/Should	In this document, the word “shall” indicates a requirement and the word “should” indicates a recommendation.
Ship From	On a transport label, the address of the location where the carrier will return the shipment if the container is undeliverable.
Ship To	On a transport label, the address of the location where a carrier will deliver the shipment.
Structure	The order of data elements in a message.
Supplier	In a transaction, the party that produces provides or furnishes an item or service.
Symbol	A graphic array of light and dark elements that forms a complete scan able entity.
Symbology	A standard means of representing data in bar code form. Each symbology specification sets out its particular rules of composition or symbol architecture.
Syntax	The way in which data are combined to form messages. Syntax also includes rules governing the use of appropriate identifiers, delimiters, separator character(s) and other non-data characters within the message. Syntax is the equivalent of grammar in spoken language.
Transport Unit	One or more transport packages or other items held together by means such as strapping, interlocking, glue, shrink wrap, or net wrap, making them suitable for transport, stacking, and storage as a unit.
Unit Load	One or more transport containers or other items held together by means such as strapping, interlocking, glue, shrink wrap or net wrap, making them suitable for transport, stacking and storage as a unit.
X Dimension	The intended width of the narrowest elements (for bar codes or two-dimensional symbols) required by the application, symbology specification, or both.
Y Dimension	The intended height of the elements dictated by the application, symbology specification, or both.

Lines-Per-Block (LPB) Calculations

Lines Per Block	Character Height (Points)	Character Height (Millimeters)	Character Height (Inches)
2 LPB	36 pts	1.27 mm	0.50 in
3 LPB	24 pts	0.84 mm	0.33 in
4 LPB	18 pts	0.64 mm	0.25 in
5 LPB	14 pts	0.51 mm	0.20 in
6 LPB	12 pts	0.43 mm	0.17 in
7 LPB	10 pts	0.36 mm	0.14 in
8 LPB	8 pts	0.32 mm	0.13 in
10 LPB	7 pts	0.25 mm	0.10 in

This table is provided as a reference only. Font sizes may vary depending on the software and printer used.

OBTAINING NORMATIVE REFERENCES

Normative references are cited at the appropriate places in the text and the publications are listed hereafter.

AIAG B-10 Trading Partner Label Implementation Standard (B-10 02.00 03/00)

AIAG B-14 Standard for Use of Two-Dimensional Symbols with AIAG Trading Partner Labels (B-14 01.00 12/97)

AIAG B-16 / Global Transport Label Standard (B-16 02.00 11/02)

ISO/IEC 15438 and ISO/IEC 15415 Bar Code print quality test specification.

This document takes into account existing templates from Odette's Transport Label (OTL) and the GM 1724 ABC as well as design input from JAMA/JAPIA and is based on the AIAG B-10 Standard.

Contact the organizations listed below for information on the references listed in this document:

Aalstec Data Corp.
c/o Label Certification
3865 Malden Road
Windsor, ON N9C 2G4

Meritor Suspension Systems
201 Park Avenue East
Chatham, ON N7M 3V7